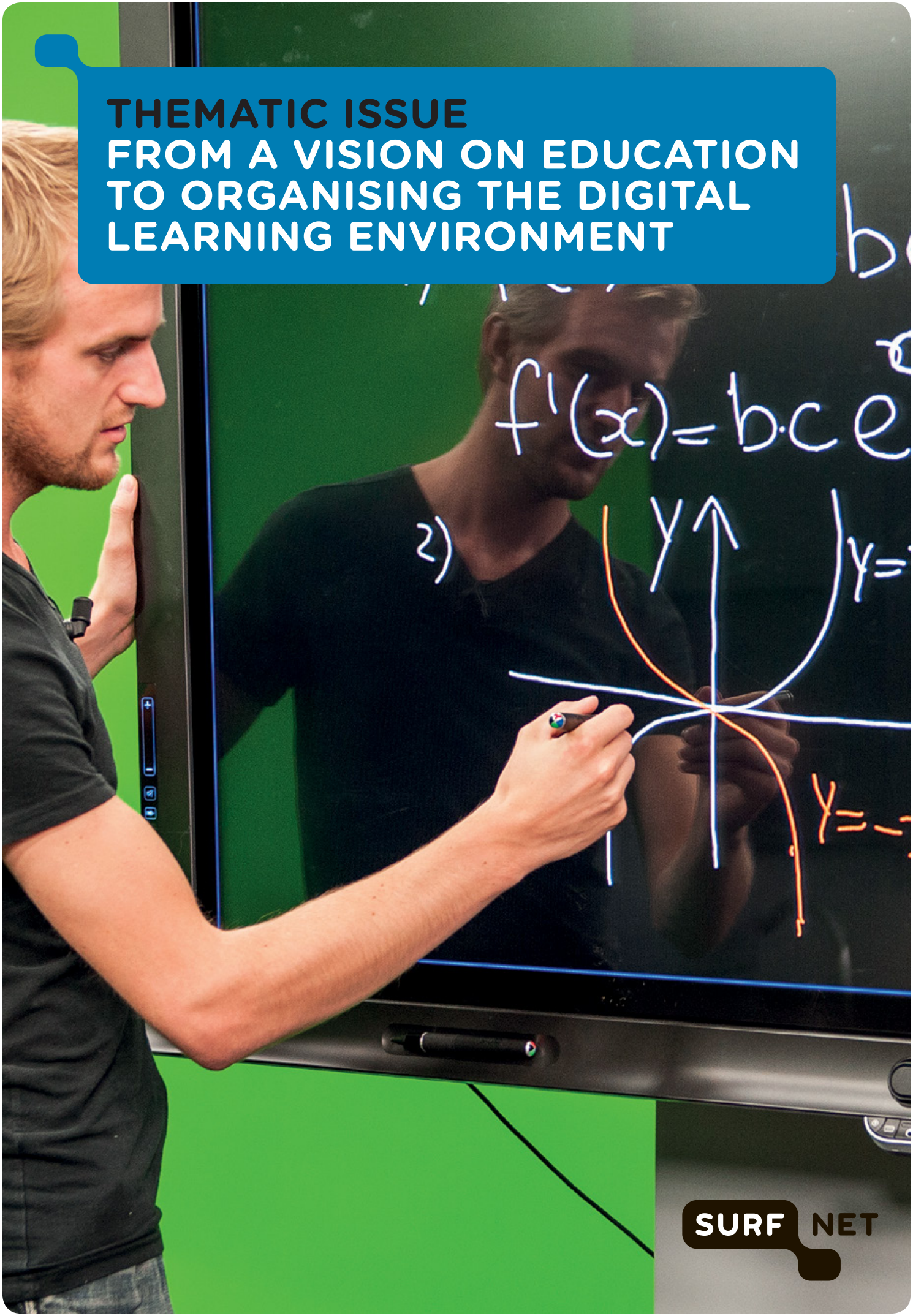
THEMATIC ISSUE
FROM A VISION ON EDUCATION TO ORGANISING THE DIGITAL LEARNING ENVIRONMENT



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INTRODUCTION

SURFnet supports higher education institutions in organising the applications and systems that form the digital learning environment. A digital learning environment is not a single system, but is made up of a combination of different applications and systems. One of the challenges faced by institutions is organising the digital learning environment to ensure it is reliable and secure but at the same time responsive to the individual needs and wishes of different users. Furthermore, the digital learning environment must also be flexible. Components must be easy to replace without affecting the accessibility and security of content, and they must be able to work together seamlessly. This places high demands on the IT infrastructure. SURFnet supports higher education institutions in this complex challenge. The document 'A flexible and personal learning environment, from separate components to a single whole: a survey[1], describes this challenge from the perspective of technology.

Vision on education as a point of departure

However, technology is only one side of the story. In order to avoid being led by a technology push, ideally speaking, higher education institutions need to formulate a vision on education that guides them in their choices in relation to the digital learning environment. In their vision on education, universities describe their educational goals and targets. These goals are generally quite ambitious and set demanding requirements for the learning environment. Often, these requirements cannot be converted to functionalities one by one.

Most universities have formulated a global vision on education, but the application of a single educational model is far from being the rule. A global vision on education can be interpreted and implemented in various ways and with different emphasis. Even if an institution has formulated a single, integrated educational model, the manner in which it is applied to each programme or course can make different demands on the learning environment.

Application at different levels

Translating the vision on education into an educational model and didactic applications often takes place at several levels within an institution. Choices are also made regarding the organisation of the learning environment at different levels of the organisation: for the institution as a whole as well as for the faculty, programme, or teacher. The architecture of the digital learning environment and the associated tools used throughout the institution are often worked out at the level of the institution as a whole, but in the end educational innovations must be implemented at the level of programmes and courses. Not all programmes and all teachers are equally focused on innovation. Pioneers often desire innovative solutions, whereas others simply want access to basic and user-friendly functionalities. This makes it more difficult to organise a single, generic, digital learning environment.

At the level of the institution, it is impossible to fulfil all the wishes and requirements associated with the digital environment. However, the digital learning environment must be able to adequately support as many different educational and learning processes as possible. The choices made at the level of the institution must therefore allow for sufficient flexibility at the level of individual programmes.

1 *https://www.surf.nl/binaries/content/assets/surf/en/knowledgebase/2016/memorandum-learning-environment_uk_web.pdf*

From vision on education to organisation

This thematic issue focuses on how the vision on education can best be translated and implemented for organising the digital learning environment. To what extent does the vision on education of an institution influence or determine the choice of a digital learning environment? What role is played by didactic concepts? Is there sufficient freedom of choice at the level of individual faculties and programmes, or does the teacher simply have to accept and work with the choices made at the level of the institution? The input for this publication was obtained from discussions with representatives of research universities and universities of applied sciences as well as from a roundtable meeting with these representatives.

Chapter 1 describes a number of characteristic components that are defined in visions on education from different universities. For each component, we describe the pertaining global requirements implied for the digital learning environment. Within an institution, education is often organised in various different ways. How can you ensure that the digital learning environment effectively facilitates the didactic processes? This is the subject of chapter 2. Using two specific examples, the chapter shows how similar didactic processes can lead to different emphases in relation to the requirements that apply to the digital learning environment.

The discussions with the experts and the roundtable meeting resulted in a good overview of the success factors for the (further) development of the digital learning environment in order to ensure that it meshes effectively with innovative education. Chapter 3 provides an overview of what you absolutely have to do. The discussions with the experts have been worked out in six cases. These are described in brief in the box below.

CASE DESCRIPTIONS

Case study 1: Open University of the Netherlands (OUNL)
The OUNL is developing its own digital learning environment, yOUlearn. The University has a shared, collective vision based on the following keywords: flexible, personalised and stimulating online education. The digital learning environment must support this vision.

Case study 2: University of Applied Sciences Leiden
The Management & Business faculty is working on an innovative educational concept in which the focus is squarely on learning outcomes. The faculty is investigating which tools and applications are needed for education that focuses on the talents and drive of students.

Case study 3: Inholland University of Applied Sciences
The digital learning environment is at the core of the part-time Master's programme in Learning & Innovation. It provides an integrated framework for the educational institution, the digital environment, and actual practice. As the course material is dealt with in depth online before and after the physical classes, these classes start off with experts participating at a more advanced level.

Case study 4: Amsterdam University of Applied Sciences
De opleiding Commerciële Economie
The Marketing programme of Amsterdam University of Applied Sciences has been completely overhauled during recent years. Various applications and services are being tried out within the programme. Short feedback loops and learning analytics result in more efficient education

Case study 5: University of Twente
The Twente Educational Model (TOM) forms the basis of the digital learning environment at the University of Twente. The theory has already been formulated; the University is now ready to carry out the innovation of the digital learning environment in practice.

Case study 6. Delft University of Technology
The Delft University of Technology has started analysing the vision documents and learning formats used within the University in order to create a new Collaboration and Learning Environment (CLE). Using a best-value procurement method, the University is searching for a supplier that can keep pace and develop further in the area of educational ambitions and future innovations.

Please see the appendix, starting on page 19, for detailed descriptions of the case studies.

1. VISION ON EDUCATION AS A POINT OF DEPARTURE

From discussions with experts, it is clear that many higher education institutions have similar requirements for the digital learning environment based on their vision on education. This chapter describes a number of these requirements. We will examine how the institutions attempt to implement their vision on education in the organisation of the learning environment.

Flexible and personal education

Institutions aim to respond more effectively to different target groups within the framework of lifelong learning. They also want to fulfil the individual wishes and needs of students. A programme can be made flexible in terms of time by working with flexible entry and departure times. A programme can also be made flexible in terms of content by giving students more freedom in choosing the learning activities they consider necessary for achieving the end goals. There can be differences in the way this is organised. For example, the Open University of the Netherlands (OUNL) offers flexible education, but within a clearly structured framework. Within the Bachelor's programmes, courses are still offered with a variable entry time. In addition, the OUNL also has courses with a "fixed format". These courses are not flexible in terms of time as they have fixed start dates and end dates. However, they are flexible in that they offer a diverse range of learning activities and contexts within which assignments can be carried out. Another way to create a flexible offer is to allow students to choose the final goals themselves together with the associated learning units or activities.

However, the educational institution has the primary responsibility for organising the learning process, even if the focus is on the students' capability of managing their own learning process. There are few students who wish to organise the entire process. However, students like to have responsibility for making choices related to content. So, organise the learning process, but offer different options with regard to learning content. The student does not usually want to manage the process but does want to be able to choose between interesting subjects.

>> *The digital learning environment must provide effective support for both teachers and students, so that students can take responsibility for their own learning process. In order for this to occur, the digital learning environment must provide a clear and transparent overview of the activities offered and the associated tasks and deadlines.*

Focus on learning outcomes

One way to introduce flexibility into the learning pathways is to describe the desired learning outcomes. Instead of completing a predetermined programme, the final goals of the programmes are formulated before being translated into learning outcomes[2], independently of the learning pathway chosen. In vocational education,

[2] *Learning outcomes are descriptions of what a student knows, understands, and can do after completion of a learning process (Cedefop, 2008). The shift to learning outcomes. Conceptual, political and practical developments in Europe. Luxembourg: Office for Official Publications of the European Communities.*

this takes place in consultation with the professional sector concerned. Students can choose various pathways to achieve the learning outcomes. Their programme supports them in this process. The teaching team for the Master's programme in Learning & Innovation at Inholland University of Applied Sciences is developing the educational framework on this basis. The students have a high degree of freedom in choosing the content of the examination assignments to be submitted and receive personal coaching in developing the end products.

>> *To introduce greater flexibility into the structure of the curriculum, the physical and digital learning environment must meet certain requirements. The organisation of the student assessment system and on how scheduling takes place will be affected, as well as the need for applications that are part of the learning environment. Greater variation is needed within the digital learning environment for different learning pathways and learning formats. For example, applications for building a portfolio are very relevant.*

Giving students a greater insight into the learning process

Students need to understand the learning process in order to be able to determine how they are faring and, if relevant, how they compare to classmates. It is also important for teachers to understand the learning process so that they can make adjustments and intervene where necessary. Diagnostic tests and feedback tools are important tools for obtaining insight, but learning analytics also offer interesting possibilities. An institution can obtain a great deal of insight by ensuring that learning analytics is a fixed part of all the components of the learning environment.

Amsterdam University of Applied Sciences chooses to assess and coach students via direct feedback. For example, the University schedules brief evaluations after exams during which the exam questions are dealt with so that students immediately know what they have done correctly or incorrectly. The Management & Business faculty at University of Applied Sciences Leiden also attaches a great deal of importance to direct feedback. This provides students and teachers with ongoing insight into student progress. This is important in order to be able to effectively make adjustments to learning behaviour.

>> *The digital learning environment must provide insight into the learning process of individual students and groups. The learning environment must also make it possible to obtain insight via (peer) feedback. Organising learning activities such as peer feedback requires tight management. In educational practice, digital resources are needed to enable teachers to implement this.*

Facilitating collaboration

Encouraging collaboration is often an important component of the vision on education. The ability to collaborate and work together with others is an essential skill that students need to acquire. In addition, many institutions want to work together in the digital learning environment with external experts, for example from the commercial sector. The Delft University of Technology has chosen to set up a Collaboration and Learning Environment to emphasise the importance of a collaborative working environment. The OUNL uses a virtual classroom tool within the learning environment to enable students and teachers to hold remote meetings with each other in real time. Finally, many programmes wish to give external parties such as experts or clients from the professional field access to the learning environment. According to Inholland, the digital learning environment can serve as a bridge between the physical learning environment and work-based learning.

>> *The digital learning environment must enable students to collaborate with others, within the boundaries of the institution itself as well as externally. It should also facilitate organising students into different groups. The learning environment should facilitate the creation of communities and provide communication tools such as discussion boards and chat options. In order to hold online meetings, the institution needs to be able to easily assign roles and facilitate single sign-on procedures.*

Focus on the user experience

In addition to the demands imposed on the learning environment by the vision on education, there is also a more practical requirement that applies to all institutions in organising the learning environment: the user experience of students and teachers must be a key factor. As a result of recent technological developments, we have all become accustomed to a high degree of user friendliness. Users expect this in the field of education as well. The University of Twente believes that the digital learning environment must have the same look and feel for all students. User interaction design was an important point of departure in the development of yOUlearn by the OUNL. There is an ongoing focus on routing and the manner in which students and teachers can work within the learning environment. The user experience is also an important point of departure at the Delft University of Technology. They have agreed to disable certain functionalities of the learning environment for a specific study programme. This ensures that users do not confuse centralised functionalities with functions that are specially designed for their use.

If it takes a great deal of time and effort to learn how to use an application, users will simply give up and look for other solutions. Due to the use of easily accessible applications on smartphones and tablets, we have all become accustomed to a high degree of user-friendliness. By focusing on the user experience, institutions can ensure that the applications really do facilitate the processes associated with learning as well as collaboration, teaching, and coaching.

2. THE LEARNING ENVIRONMENT FROM A DIDACTIC PERSPECTIVE

Not all educational practices are the same. This chapter discusses in more detail the demands imposed on the digital learning environment from a didactic perspective. We describe two learning processes and the demands imposed by each on the learning environment from an educational perspective. We also discuss various ways of approaching technology from the perspective of the learning format instead of vice versa.

In practice: learning processes and associated requirements

In order to effectively facilitate educational processes, it is important to take a very close look at how those specific educational processes are organised. What may at first sight appear to be similar may actually turn out be quite different upon closer inspection. According to Jos Fransen, Lecturer on Teaching, Learning & Technology at Inholland University of Applied Sciences, a well thought-out use of didactic instruments is needed. This demands a thorough knowledge of the learning processes in question. Only upon closer inspection of the details does it become clear that different educational processes impose their own specific demands on the learning environment. We will analyse two examples in some detail to illustrate this point.

1. High-level interaction

The Master's programme in Learning & Innovation at Inholland University of Applied Sciences is a part-time programme aimed at people who are already working in the field of education. The students meet in the same physical space about once a week. These meetings are preceded and followed up by online activities.

Fransen was closely involved in the development of the didactic concept behind this programme. He explains: "To prepare for the masterclasses by leading experts, students have to read and react to articles from the scientific literature, for example by posting questions on the digital platform. Their fellow students and study advisors then respond to these questions. Two students from the group prepare a summary of the questions and online discussions and send it to the expert. This makes it possible to start the physical meeting at a higher level."

This interactive cycle requires a number of specific functionalities. Inholland aims to provide the students with a rich and varied learning environment. The articles can be linked to other sources, including web-based lectures and material from open educational resources. Students also add a great deal of new sources themselves. One of the requirements imposed upon the learning environment is that the distribution of study materials must be optimised. Effective support is needed to facilitate the discussion about the sources. This can be achieved with a forum, but it can also take place via annotations to online sources. Fransen: "We sometimes work with an annotation system developed at the University of Utrecht, which is intended to enable users to read the same documents together and assist each other with annotations. But this system requires students to navigate to a different environment. This makes it less user-friendly. We are now trying to integrate it into the Moodle open source learning platform so that users can collaborate by reading and annotating the same materials."

The students have to deliver a number of products, including a study plan, a study project design, and two research papers. All the definitions and concepts that they develop for that purpose are submitted to a peer review cycle. This process is tightly supervised by the programme. Within Moodle, the "workshop" is the place for organising peer review. Fransen: "I can set it up anyway I like. Within a specific group, I can organise peer review activities per student, assign deadlines, and provide support in the form of guidelines for reviews. I can assign tasks, and I can also do so anonymously and at random. The system makes a neat overview of all this and sends the students alerts when they are expected to submit something or provide a review."

Interaction with peers as well as with experts is a critical component of this learning process. This means that the assignment of roles in the learning environment must be done carefully. For example, some teachers only read discussions but are not given any writing rights. Fransen: "It's no problem to assign access rights and other rights in a differentiated manner. Within Moodle, it's easy to organise matters in a very detailed and individual manner when it comes to assigning roles and levels of involvement for interactive activities."

2. Remote feedback

The OUNL is developing its own digital learning and working environment called yOUlearn, which is intended to serve various target groups. The University uses a "layered model" for this purpose. This aims to make courses and other "educational formats" available to different groups of learners in a flexible and efficient way. The institution's own students comprise the innermost layer. They can access everything, from courses and research results to the library and external sources. The second layer consists of people who pay for certain content, for example online masterclasses. The third layer consists of people who submit their e-mail address in exchange for access to a part of the available content. The fourth and outermost layer consists of interested people searching for information without any registration. The underlying architecture for such a system must not only make it easy to assign roles to users but also allow users to change their roles. For example, an interested person can become a student and then an alumnus.

"The great thing about working on all this within a digital learning and working environment is that everything, from feedback through to assessment, takes place via the system," says Saskia Brand-Gruwel, Dean of the Faculty of Psychology and Educational Sciences at the OUNL. "This creates opportunities for archiving and monitoring. Previously, we only stepped in if students themselves asked for help. Now we can act proactively if we see that a person has not logged in for the past two months."

The second layer also includes teachers who want to take part in additional training and follow online masterclasses for that purpose. This target group is therefore somewhat similar to those taking a Masters in Learning & Innovation at Inholland. They must be able to show that they have achieved specific targets. The University needs to provide functionalities for students to build up a portfolio, as it must be able to determine whether a student has actually participated in the masterclasses before the student is awarded the certificate. That also explains why certain checks, including for plagiarism, are carried out on the documents submitted. The OUNL uses traditional methods to check whether the student has understood the study material, such as setting assignments involving writing an opinion on the study material, but is also working on introducing brand new methods such as learning analytics.

"Monitoring is a question of supporting and motivating," says Brand-Gruwel. "Students can place their own check marks next to completed tasks. They will soon be provided with a dashboard that gives them insight into their learning process and shows them what their position is compared to the others. Teachers can place flags

next to students whom they wish to steer in the right direction. Of course, these functionalities impose strict requirements on archiving, accreditation, and protecting the privacy of the students."

Learning modes

Different learning formats require different functionalities for the learning environment. Jos Fransen, Lecturer on Teaching, Learning & Technology at Inholland University of Applied Sciences, differentiates between three learning processes. For each learning process, the learning environment needs to provide a different form of support. In practice, these forms of learning are used in combination and each one has its own merits.

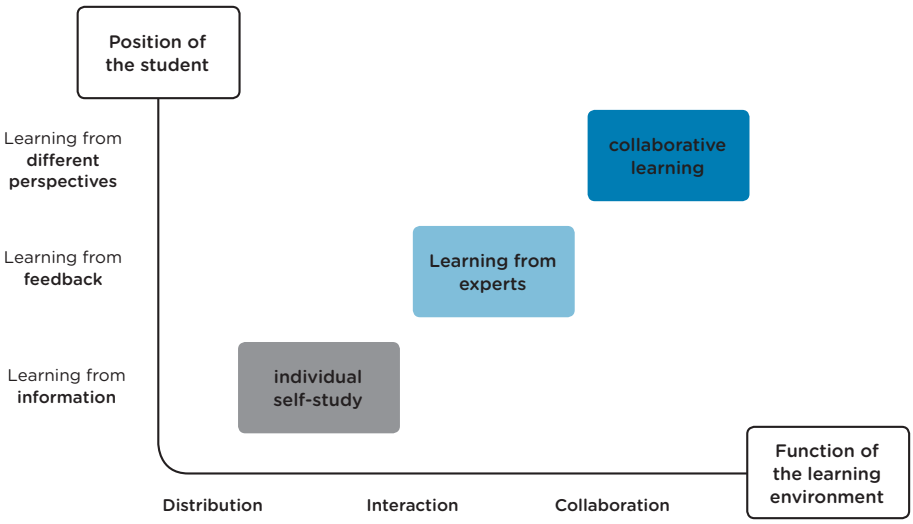

Figure 1. Three forms of learning with descriptions of the position of the student and the role of the learning environment (Freely adapted from: Reinmann-Rothmaier, 2003)[3]

For individual self-study, i.e. learning from information, a student needs a learning environment that supplies well documented content (distribution) and facilitates self-study.

The student needs to interact with experts to process the knowledge acquired. The expert can be a teacher or a professional in the relevant field. This interaction provides insight into more complex forms of knowledge. The learning environment must facilitate such interaction.

In order to successfully understand a case from the professional world, input is necessary from various perspectives, i.e. collaboration. The learning environment must ensure seamless collaborative learning by facilitating communication and the exchange of various products.

From learning format to app (not vice versa)

Which applications are suitable for which didactic learning formats? In order to avoid situations in which teachers structure the educational framework on the basis of the app, educational experts have come up with various models for determining which application is appropriate to which learning format.

[3] *Reinmann-Rothmaier, G. (2003). Didaktische innovation durch blended learning. Bern/Göttingen, GER: Verlag Hans Huber.*

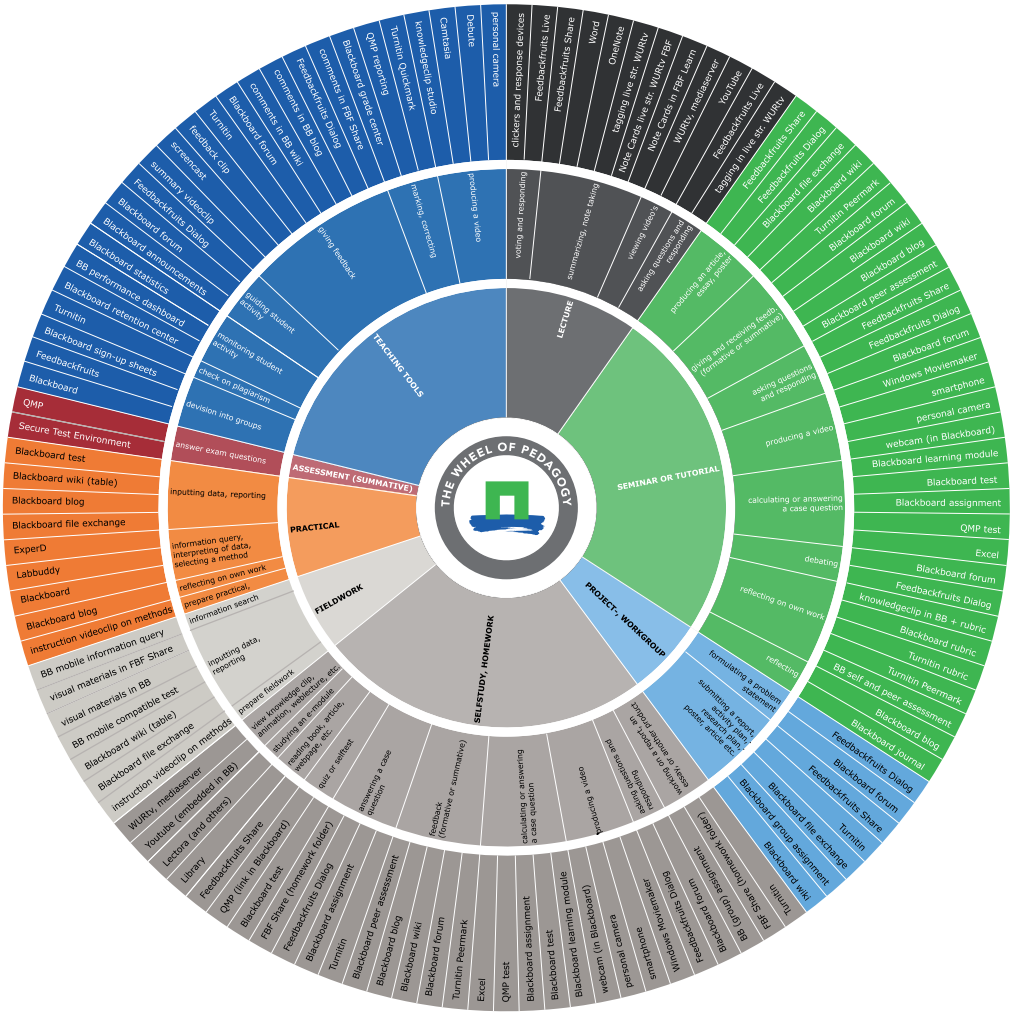

Figure 2. "The 'wheel of pedagogy" at Wageningen University

The Wheel of Padagogy (a play on words) is based on the taxonomy devised by educational expert Benjamin Bloom, in which learning goals are arranged according to complexity. The cognitive learning goals are placed in the innermost circle: remembering, understanding, applying, analysing, evaluating, and creating. In the next circle, these basic concepts are expanded in more detail and assigned specific learning activities. The outermost ring contains the tools and/or apps that support these learning activities. Nowadays there are more such wheels in use. University of Applied Sciences Leiden used a pedagogic diagram[4] from the Sheffield Hallam University (SHU) as a guideline to develop a similar 'wheel of pedagogy'[5] . Wageningen University used that as a basis to develop its own ''wheel of pedagogy'[6] , in which the innermost circle containing Bloom's taxonomy was replaced by concrete learning formats (see figure 2).

Evaluating LMS on the basis of teaching aspects

Another way to ensure logical links between didactic learning formats and technology is to first identify which teaching aspects are supported in which learning management systems (LMS). In order to obtain insight into the various learning environments on the market, the Delft University of Technology carried out a study together with Deloitte to determine to what extent teaching aspects derived from learning theories are supported in various LMSs. The table below, produced by Delft University of Technology and Deloitte, provides an overview of the points of departure underlying the various learning theories organised per category of the educational taxonomy developed by Abcouwer & Smit (2009)[7].

[4] *https://elearningyork.wordpress.com/2014/06/13/changing-the-learning-landscape-teaching-approaches-and-technologies-that-support-them/*
[5] *https://www.edugroepen.nl/sites/Wheel/default.aspx*
[6] *https://www.surf.nl/binaries/content/assets/surf/nl/2016/20160126-presentatie-the-wheel-of-pedagogy.pdf*
[7] *Abcouwer, T. & Smit, B. (2009). Back to basics; understanding the choice of supportive technologies.*

Educational taxonomy

The learning theories (behaviorism, cognitivism, constructivism and connectivism) are used to score the categories of the taxonomy. The score can be derived from the educational vision of the TU Delft.

	Behaviorism	Cognitivism	Constructivism	Connectivism
Knowledge creation	• Focus on internalization of objective knowledge • Teacher guided learning • Use of objective knowledge is determined by the learning process	• Objective knowledge, knowledge scheme's • Knowledge absorption • Knowledge has an absolute value • Knowledge areas are independent and not connected	• Subjective Knowledge • Knowledge is influenced by culture, context, environment • (self-guided) Learning • Knowledge determined by its context	• Rests in diversity of opinions • Group guided learning • Complete knowledge cannot exist in one single person
Communication & feedback	• Teacher stimulates the individual pupil • Communication focuses on the use of skills • Feedback is based on observed behavior • Fast feedback is essential for the learning process	• Learning is an individual activity • Communication is based on the exchange of facts • Feedback and judgement uses absolute measurements of operational learning goals	• You learn more in the group than on your own • Aimed at individual learning processes • Feedback is based on individual learning progress (learning delta) and doesn't use an absolute scale of knowledge	• Cycle of knowledge development • Learning is not an internal, individual activity • Feedback originates from the network
Learning content	• Teacher stimulates pupil • Guiding is based on behavior • Teacher sets learning goals	• Absolute division between teacher and pupil • From part to whole • Knowledge is timeless • Learning goals are absolute	• Meaningful situation • Aimed at construction and design • Broad development takes central stage • From whole to part	• No difference between learner and teacher • From whole to part and part to whole • The process is the learning goal
Own responsibility & reflection	• Aimed at behavioral change • Monitoring progress by teacher • Focus on skills of pupil	• Limited own responsibility • Monitoring progress by teacher • Reflection is based on absolute measures	• Learner-follow-yourself approach • Self-evaluation • Compare achievements with previous achievements	• Self-evaluation
Adaptivity	• Focus on a limited set of intelligences chosen by the teacher	• Appeals to a limited set of intelligences based on the skills of the learner	• Appeals to multiple intelligences based on personal preferences and interaction with others	• Appeals to multiple intelligences based on personal preferences and interaction with others
Role division	• Learning-master: teacher • Process-master: teacher	• Learning-master: teacher • Process-master: learner	• Learning-master: teacher/learner • Process-master: teacher/learner	• Learning-master: learner • Process-master: learner

Figure 3. Overview of the points of departure underlying theories organised per category of the educational taxonomy developed by Abcouwer & Smit (2009)

The Delft University of Technology wanted to evaluate the LMSs in preparation for the tender process. However, the matter proved to be more difficult than expected. "Due to the additional insight into what is needed in the tender process, we approached the evaluation phase differently than we originally planned," explains Erna Kotkamp, project manager for education and ICT at Delft University of Technology. The use of this procedure provided a great deal of information which was of great benefit to the University in the follow-up process.

The above examples show that it is no simple matter to formulate a single and consistent relationship between an educational model and the requirements imposed on the learning environment. Various institutions have made efforts to tackle this issue. Although these efforts do not necessarily result in ready-made solutions, they do encourage a discussion within the institution on what is really important when it comes to organising the digital learning environment.

3. SUCCESS FACTORS

How can you create a digital learning environment that facilitates innovative education? The six cases presented on page 4 have very different approaches, however they all share a number of common points. This chapter describes the main success factors identified by the institutions.

Being proactive

Leadership

Leadership plays a decisive role. This is of course always the case when changes have to be implemented, but this does not alter the fact that it is also essential for the digital learning environment. The directors of the institution need to take a clear stance when guiding the institution in the direction of change and innovation. If a clear and transparent vision is formulated and ambitions are communicated effectively, it provides a focus for everyone within the institution. In addition, time, funding, and energy are needed to drive innovation.

Effective leadership requires an effective and flexibel collaboration between directors and their subordinate levels. The various actors within the institution need to cooperate to implement the necessary changes, preferably in teams with a strong feedback culture. All actors need to know who is responsible for taking decisions on the organisation of the digital learning environment. What takes place at a centralised level? What can the faculties or programmes purchase and organise by themselves? What is the role of the ICT department?

Consensus and freedom to make autonomous choices

The cases demonstrate that the instruments available throughout the institution are not always used within all the programmes. Innovative programmes seek out their own applications and instruments that provide an optimum fit with their methods for organising their educational processes. They argue that the manner in which the digital learning environment is structured at the institutional level should facilitate the educational processes of individual programmes. A flexible architecture can be useful in this regard.[8]

Amsterdam University of Applied Sciences, for example, mentions that it is important to ensure that information can flow freely and efficiently and that various tools are available. As the University sees it, the foundation must be a solid one. Of course, the necessary supporting facilities and conditions must be in place. These can include basic, quality resources such as the ability to present and edit online study materials and clear agreements on who may purchase what materials as well as on the options available for additional facilities and professionalisation.

However, even universities that are working to organise matters in a centralised manner make sure that individual programmes have a measure of freedom to make their own choices. With the introduction of the new environment, the Delft University of Technology, for example, aims to make it possible for specific study programmes to use their own advanced tools within the learning environment. If there is sufficient demand for a particular application, the institution also aims to provide centralised support.

[8] *For more information, please refer to the document entitled 'A flexible and personal learning environment, from separate building blocks to a single integrated environment' (SURFnet, 2015)*

Erna Kotkamp emphasises the importance of speedy decision-making processes: for example, if a teacher wishes to introduce an exciting new feature, they will quickly find out whether they can expect to receive any support. If the answer is yes, then they will receive the broadest possible support. It is important for all parties to remain involved in the development of a digital learning environment for the entire university. Ensuring that everything is effectively coordinated takes time, as the wishes of the various programmes and faculties can differ quite significantly. But there are also significant benefits, as it generates understanding and support for the choices that are made. Be realistic: in an institution where different groups work in different ways, it will never be possible to reach complete agreement on all elements of a learning environment.

Involving teachers

Taking the pressure off

Many teachers are rather conservative in their wishes for the digital learning environment. One of the reasons for this is the fear that it will be difficult to master new and time-consuming applications. By taking some of the pressure off the teacher, the institution can help to eliminate such fears. As part of the implementation process of the institution-wide Collaboration and Learning Environment at the Delft University of Technology, all teachers - including those who are not among the leaders when it comes to educational innovation - receive user-friendly support for all the elements involved..

Taking the pressure off teachers begins with helping them to formulate their real wishes, taking education as the point of departure. It ends with transferring a course to the new learning environment and setting the desired default mode, thereby minimising the amount of extra tweaking that the teacher has to do. Of course, teachers who actually enjoy choosing their own settings are also free to do so.

Professionalisation

It is also important for teachers to receive assistance when first starting to make use of teaching applications, in the form of hands-on support or the option of additional professional training. The design of educational processes is increasingly being dealt with by educational teams. Within that context, professionalisation is not so much dealt with via stand-alone courses but rather via discussions about the education offered.

Professionalisation also involves learning that you cannot always decide which instruments you will use and accepting that the instruments used will never be completely in line with your own specific wishes.

Support for pioneers

If you continue doing what you have always done, you will continue to get what you have always got. Therefore, in order to implement change, you need people who approach matters differently. If a university is aiming for sustainable implementation of innovative educational formats, they should consider supporting pioneers. Pioneers find it interesting to experiment with forms of emergent practice. Enthusiastic pioneers will inspire their colleagues.

Jos Fransen identifies three stages in this process: if the pioneer is a bridge builder and gets to work together with colleagues, it can result in a good practice. If the application is adopted by the entire team, it results in a shared practice. Due to the important role played by the pioneer in this process, institutions that aim for innovation will not simply sit back and watch when the emergent practice develops but will look for ways to provide the pioneer with support. In Fransen’s view, the development of the digital learning environment must deal with matters that are important to teachers but also be guided by a practical and well thought-out didactic concept.

Figure 3. The working procedure for the sustainable implementation of educational innovation with the application of technology (Fransen et al., 2012).[9]

Sharing responsibilities

Giving users responsibility

Taking the wishes of teachers and students into account from the beginning ensures that they also feel a sense of shared responsibility for the learning environment. Teachers and students who feel involved in the implementation process will prevent situations from arising in which the end product turns out to be a monstrosity that nobody wanted.

After all, they are ultimately the ones who will end up using the digital learning environment intensively. It is therefore a good idea to ensure that users feel their wishes are being taken into account throughout the entire process, from the formulation of the underlying vision to the organisation and implementation phase. Transfer ownership to the teachers so that they will take charge of the process.

Making use of user stories

One way of getting a better read on the situation when choosing a learning environment for the entire institution is to develop user stories. This is a way to find out how different groups such as students, teachers, and educational developers, want to use the learning environment. During discussions with potential suppliers, user stories make it easier for suppliers to explain what they can offer in practical terms. The major providers of digital environments do not differ greatly from each other in terms of functionality. It is therefore better to ask them how they would provide support for specific cases. How do they help the student, teacher, and educational developer to achieve their goals? The Delft University of Technology is using a best-value procurement method to find a supplier that can keep pace and develop further in the area of educational ambitions and future innovations.

Ongoing development

Knowing what's going on

Coordinating wishes at different levels is always a matter of two-way traffic. It is not enough to simply identify requirements and wishes on a one-off basis. After all, the overall environment, the tools and applications offered on the market and the wishes of those concerned are continually developing and changing.

[9] *Fransen, J., Swager, P., Bottema, J., Goozen, B. v., & Wijngaards, G. (2012). Broad acceptance and sustainable implementation of educational innovations with ICT. Rotterdam: Inholland Research group on Teaching, Learning & Technology [in collaboration with Kennisnet]*

University of Applied Sciences Leiden notes that it is important to keep abreast of what is happening in the market and to create opportunities for taking advantage of new developments. However, you also have to make choices since you cannot do everything at once.

This is why University of Twente argues for short-cycle development phases. According to the University, the current level of technology does not make it possible to fulfil all the wishes of the parties concerned. Over the last year, pilots and projects have been carried out to gain experience with digital instruments and to evaluate what is and is not possible.

The OUNL is working to develop its own digital learning environment via an agile method. Not everything is being developed in-house. The University uses open source portal software with links to separate modules, such as a virtual classroom solution.

CONCLUSION

The digital learning environment should provide optimum support for the teaching and educational processes. Technology must facilitate the learning process. This is one thing all institutions agree on.

All institutions have high educational ambitions and expect a great deal from the digital learning environment. At the same time, they realise that not all their wishes can yet become reality, as the options on offer do not yet match their needs and wishes. Accordingly, many institutions approach the digital learning environment from a developmental perspective and keep their options open with regard to further development and innovation.

Decisions on how best to organise the learning environment are taken at various levels. Many institutions carry out pilots and projects to gain experience with different, potential components of the learning environment. There are also several institution-wide projects that generally focus on an open learning environment linked to tools and applications. In such projects, the aim is also to allow teachers to take ownership wherever possible. There must be enough freedom to choose the necessary applications on the basis of various educational models. Although there are major differences in how higher education institutions organise their digital learning environment, everyone seems to want to avoid a situation in which implementation is too much of a top-down process.

Based on the cases and the roundtable discussion, it is possible to identify a number of clear success factors for the process of converting a vision on education into the actual organisation of the learning environment. Leadership is essential for maintaining a focus on the vision and ambitions of the organisation. Funding, time and attention, and a clearly agreed-upon assignment of tasks and responsibilities also have a significant impact on the process. Make sure that all the parties are involved in decisions on the digital learning environment. Seek consensus and look for opportunities to provide support for various educational models. Teachers and students must adopt the process. This means taking their wishes seriously, managing their expectations, and focussing on professionalisation, for example by having them work together in development teams. Effective support from all concerned is an essential factor for the implementation of the digital learning environment.

FINAL REMARKS

This document was prepared on the basis of interviews held with representatives of institutions and other discussions, including a roundtable meeting on 11 February 2016. During this meeting, the participants discussed which opportunities and challenges the institutions can tackle together and what role SURFnet can play in this regard. SURFnet supports institutions in organising a flexible architecture and develops services that contribute to that goal. In addition, SURFnet facilitates discussions between institutions on the various topics relevant to the digital learning environment. By approaching matters from a didactic perspective, we hope to develop better technical solutions for the challenges higher education institutions are facing.

Case study - Open University of the Netherlands

STRUCTURED, PROACTIVE ONLINE EDUCATION TO OPTIMISE EDUCATIONAL FEASIBILITY

FROM A VISION TO THE DEVELOPMENT OF THE YOULEARN DIGITAL LEARNING ENVIRONMENT AT THE OPEN UNIVERSITY OF THE NETHERLANDS.

The Open University of the Netherlands (OUNL) is developing its own digital learning environment, yOUlearn, to support educational innovation. Prof. Saskia Brand-Gruwel, Dean of the Faculty of Psychology and Educational Sciences, describes this development.

The OUNL has traditionally provided part-time educational opportunities for adults who wish to study in their own time, at their own pace and at home. In past years the success rates were disappointing, as students often failed to complete a course or programme. That is why the OUNL is modernising its Bachelor/ Master programmes. Personal coaching and structure are important points of departure in this process. The renewal and implementation of the education being offered is a direct result of the vision on education adopted by the OU, where the focus is on a flexible, personalised, and proactive online form of education.

The yOUlearn digital learning and working environment

The OUNL is developing its own digital learning and working environment, called yOUlearn, based on the Liferay open source portal software. In doing so, the OUNL is building further on the experience it gained with the OpenU open learning platform, which was designed to implement its policy on open education.

yOUlearn has been employed for all of the new-style Master programmes since September 2015. “The digital learning environment provides a good level of basic functionality with which students as well as teachers can get down to work,” explains Saskia Brand- Gruwel. “The learning environment has been rebuilt from scratch. This allowed us to optimise the design of the routing and the way that teachers and students work with the learning environment. The beta version of OpenU is the basis for this. Significant investments were made in user interaction design in particular.”

The basic functionality consists of applications for providing information, schedules, and study materials. Options for creating groups, communicating, and monitoring and coaching students are also very important. For example, the system makes use of self assessments and formative submission assignments with automatic feedback. The existing virtual classroom tool is integrated into yOUlearn, as participation in synchronised online learning sessions provide students with a certain degree of structure.

Although this is no longer strictly in line with the principle of allowing students to study at their own pace, this does help ensure that students achieve their study goals. In the new vision, the teacher is no longer simply the person who has designed the learning experience but also the one who actually provides and guides it. Each course is structured in the form of a community with discussion groups and blog options, for example. Brand-Gruwel: “The aim is to ensure that the students who follow a specific programme actually function as a group. The online presence of the teacher in the course is very important in this respect.”

Not all programmes use the learning environment in the same way. The curriculum committee of a programme makes its own choices in that regard. For example, whether the course is organised just for a few participants or for a large number of participants has an impact on how the learning environment is used.

Further development of yOUlearn

In future, the OUNL aims to flesh out yOUlearn in order to offer life-long learning opportunities. For example, this could be achieved by giving external parties access to learning objects under certain conditions and by further expanding the research potential of the learning environment. A dashboard, a portfolio and peer support options are still under development. In future, the university would like to be able to monitor the submission of student products via learning analytics. Linkage to an advanced profile service is also high on the list of goals. The Welten Institute, the Centre for Learning, Teaching and Technology of the OUNL, is also involved in the process of creating new opportunities for innovative education. The pace of further development is not as fast as some of those involved would wish for. This is because the entire institution needs to be part of ongoing developments. In addition, it takes time to effectively connect the learning environment to the basic systems of the institution.

The direction of further development is decided upon in consultation with all the parties. The Executive Board, the deans, the CIO platform, the user council, and the yOUlearn product owner also have a say in the matter. Different programmes can report their wishes regarding functionalities, which are then prioritised and incorporated into a roadmap. The end result can be a rather complicated puzzle. The wishes regarding further development are quite varied, and the decisions that need to be taken will have far-reaching consequences for study programmes.

Taking part in educational innovation

The OUNL offers flexible and personalised education, but structure is very important for retaining and motivating students. It is a challenge for the OUNL to provide a structure but also create opportunities for flexibility. One way of doing so is to allow individual students to decide which courses they wish to take in which order and in which timeframe. There is also room for flexibility within courses themselves. In terms of content, for example, students are given the option of choosing their own case studies, which are linked to what they do in their work. The OUNL also offers flexibility by allowing variation in teaching format and study tempo, for example by making it possible for students to review the literature before the start date.

Brand-Gruwel is satisfied with their present situation. “The learning environment is functioning without any significant problems, and it is felt to be user-friendly. We see ample opportunities for further development in the right direction. Of course, there will always be obstacles to overcome when such a major innovation is implemented throughout the institution, but there is also a lot of synergy involved. The process gives us a great deal of additional insight, and we hope to use these insights to grow and develop further in future.”

Case study – University of Applied Sciences Leiden

WORKING TOGETHER TO PROMOTE EDUCATIONAL INNOVATION

SETTING UP THE DIGITAL LEARNING ENVIRONMENT OF THE MANAGEMENT & BUSINESS FACULTY AT UNIVERSITY OF APPLIED SCIENCES LEIDEN

Cilia Born, educational expert for the Management & Business faculty at University of Applied Sciences Leiden, talks about educational innovation in her faculty and the consequences for the organisation of the digital learning environment.

The Management & Business faculty at University of Applied Sciences Leiden started modernising its educational offer in 2012. These efforts were spurred by dissatisfaction on the part of students and teachers with regard to the education being offered and the excessively high drop-out rate. The first year was devoted to preparing plans. The following question was taken as the point of departure: what dreams do students and teachers have with regard to the future of education?

Vision on education

A key element of the vision on education developed within the faculty is that the education offered must be in sync with the drive and talents of the students. The education must be less focused on the supply side. This means that there must be no single path, but rather various opportunities must be available to students to shape their learning path.

All six programmes in the faculty are presently involved in these developments. Cilia Born: “Giving everyone at all levels of the organisation the opportunity to think about educational innovation is seen as something of value. We still need to articulate our vision.” The faculty is still in the process of searching how to define flexible and personalised education in practical terms and accurately describe the learning outcomes. Born: “We do not want to simply throw out the baby with the bathwater. Not everything can be determined by the individual. In addition, some students like having a supply-side in place.”

The discussion about the student of the future brings up the question of how the responsibility for learning should be approached. Ideally speaking, this is the responsibility of the student, but in practice it turns out that students like to simply sit back and relax. Some of the faculty programmes have decided to make attendance at lectures compulsory in order to avoid situations whereby lectures are given, sometimes by guest lecturers, without any students showing up. In the long run, these measures may be counter-productive, as they shift responsibility away from the student instead of encouraging responsibility. “It’s not always easy to decide how a programme can best deal with such issues”, says Born. “If you ask students what they consider important in their education, they state their relationship with the programme and the feeling that they are being seen and heard. This points to the importance of a personalised approach.”

Last year, the focus was on dreams. This year, 10 pilot groups are being launched with various small-scale experiments. The topics will include talent development, shared propadeutic courses, and greater flexibility in terms of the educational offer. Motivated teachers can take the initiative for pilots. This is not compulsory.

The learning environment for the faculty Management & Business

The Management & Business faculty is still searching for the best way to organise the learning environment. Students should be able to easily transfer from one programme to another. A shared learning environment is needed for umbrella courses such as Dutch and English. This environment must be able to facilitate the teaching of basic skills, but it must also be able to facilitate correction work, interim testing, and giving feedback. A number of sub-programmes are being made more extensive and more blended.

The HealthCare Sectors programme is experimenting with aNewSpring and Gradework. Consideration is also being given to how Sharepoint can be used effectively, as this is available throughout the institution. The Blackboard learning platform, which is also available throughout the institution, is not suitable for this experiment as it is not considered user-friendly. A number of teachers in the faculty use FeedbackFruits for providing feedback, submitting assignments, and discussions. Applications such as Kahoot, Socrative, Padlet and Hogeschooltaal are also in use. All lectures are recorded. Shorter content clips are also available in digital form. "Policy at present is that everything may be tried out", explains Born. "In the end, we will need to use a mix of tools and applications. We just don't yet know what this mix will look like exactly."

The market for tools and applications is developing rapidly. Born: "For example, the Pitch2Peer application developed by a teacher at Leiden University could be an excellent system for peer reviews of presentations and discussion skills. It scores quite well in terms of feedback communication, competition, and user-friendliness. But there are a great many other interesting applications out there as well. For example, one external trainer showed up with a Toolbox for study and career coaching via socialisland.nl. The question is whether we should purchase all of these separately. Who decides which applications to use, and who will manage them?

It is not yet clear whether the market for educational tools will soon settle down or whether it will continue to develop further. Institutions and programme faculties need to figure out a way to deal with the market effectively and efficiently. Procurement legislation serves as an obstacle in this regard. According to Born, "It would be great if we were able to purchase products via SURFmarket without any limitations."

The learning environment of the University

At University of Applied Sciences Leiden, efforts are underway to develop a new learning environment based on Office 365, which will replace Blackboard and Sharepoint in the future. Faculties emphasise that certain elements of a shared foundation are important, for example with respect to student registrations. However, faculties would prefer to work out the exact structure of the digital learning environment at faculty level, together with an ICT expert.

According to Born, "In future, certain teachers will likely be assigned the task of making choices from the digital toolbox. Regardless of which learning platform is implemented, a significant change in the attitude of many teachers is needed. They must be given the opportunity to use the tools for didactic purposes, learn how to use them, and also learn what the limits are when it comes to using the digital tools."

Case study – Inholland University of Applied Sciences

COMPLEXITY OF LEARNING PROCESSES AS A POINT OF DEPARTURE

THE ORGANISATION OF THE LEARNING ENVIRONMENT AT THE MASTER PROGRAMME IN LEARNING & INNOVATION AT INHOLLAND UNIVERSITY OF APPLIED SCIENCES

Jos Fransen is professor in Teaching, Learning & Technology at Inholland University of Applied Sciences. In his inaugural address in September 2015, he discussed the role that technology can play in relation to complex learning processes in higher education. For that reason, SURFnet asked him to present his vision on the development of the digital learning environment. Fransen is also involved in the Master programme Learning & Innovation. He describes the development of the learning environment for this programme and of the University as a whole.

"Flexibility and personalisation are key themes at Inholland University of Applied sciences", says Fransen. "They make it possible for us to provide better services for the different groups of students entering the University." The University has worked with competence-based education for several years now. However, only now several programmes are truly beginning to adopt the concept. In addition, programmes aim to provide pedagogical strategies to activate students in order to make the learning process more effective.

Inholland University of Applied Sciences is aiming for students to become competent in the execution of their professional tasks. To ensure that this is the case, the learning outcomes of a programme must be clearly described. Formative tests and assessments are needed which provide information about the quality of task execution, to determine whether students have successfully achieved the learning outcomes. In addition, they can help to monitor and guide the student's development. At present, in many cases the reproduction of learning content offered in a programme is being asked of students during assessments.

Teachers must work as a team to organise and support student learning. They must advise and coach students in their ongoing development, including their search for and use of appropriate learning content. Fransen adds: "When it comes to professionalisation, instead of organising more courses about which buttons or switches to push, you need to enter into substantive discussions with teachers about education and involve them in designing the education of the future."

The learning environment of the Master programme Learning & Innovation

The Master programme in Learning & Innovation is an example of a part-time programme that provides an optimum mix of learning at the educational institution, learning in the digital environment, and learning in the professional practice. The teachers of this Master's programme operate as a team. They are also involved in the further development of the pedagogical concept of the Master's programme. As a result, this programme can serve as a source of inspiration as well as benchmark for other flexible, part-time programmes still to be developed at the University. The first step is to thoroughly think through complex professional tasks and responsibilities. This makes it more complicated to design and implement education at the institution, but it also makes it more exciting.

Fransen: "It's crucial to effectively organise the process for students. You need to set high standards for students, but you also need to take into account the "zone of proximal development". Accordingly, you need to provide them with support for things they cannot yet do, but you also need to show them what they can do with a bit of support. If the steps are too big, they do not learn effectively and end up losing their motivation. That's another reason why the members of the team need to work together effectively."

In the first year of the Master programme, the students are supervised quite tightly. In the second year, they are given more freedom. Students themselves make it clear that they need more guidance and deadlines, otherwise their focus turns to other matters outside the programme. For example, extra peer review rounds were scheduled in the second year at the request of students. These peer reviews are organised very tightly, otherwise it doesn't work.

The Master programme Learning & Innovation uses the Moodle open source learning platform to facilitate peer review activities. The learning process that students go through was the point of departure in organising matters in the Moodle environment. Moodle offers a wide range of opportunities to facilitate and supportinteractions in the learning process.

The learning environment of Inholland University of Applied Sciences

Depending upon professional tasks and responsibilities, students have access to three different learning environments: the physical environment, the digital environment, and the professional practice. The manner in which these environments are combined within a learning process should be different each time, partly because Inholland aims to provide personalised education for all their students. The digital environment must help to make future-proof education possible. According to Fransen, the digital learning environment can serve as a link between the two other learning environments. But the digital environment also plays an essential role in facilitating and supporting cooperation between the educational institution and the professional practices in educating professionals. It is therefore important to ensure that the environment can be easily accessed by professionals and partners outside the university.

In his inaugural address, Fransen described the essence of the learning process. Among other things, he looked at the desired combination of three forms of learning, namely individual self-study, learning from experts, and collaborative learning. The learning environment must be organised in such a manner as to effectively support the interactions within the learning process. This includes the ability to provide feedback, including "implicit feedback". A student receives implicit feedback from the learning environment. For example, this can take place when an annotated source is made available or a case is worked out in detail, or via a simulated environment in which the student can experience the consequences of their choices or actions.

Various communication tools are also available. Which instruments (synchronous or asynchronous) are used and in which combination partly depends upon the student and the learning situation. For collaborative learning to take place, the learning environment needs to be organised in a specific way. Students are increasingly using social media for that purpose. The downside of this is that the progress of the learning process is less visible to the teachers and not all feedback and interim results are recorded, which means that they cannot be of benefit to others in the learning environment.

Fransen adds: "The digital environment must ensure that the source learning materials are accessible, that they can be integrated into the learning process, and that opportunities are provided for interacting with these sources." Within the University, efforts are underway to develop a new, institution-wide digital environment. The My Inholland dashboard provides all users with all relevant information in a personalised manner. All systems at the University must be able to provide information to this portal. The target is to have this learning environment up and running by 2018, which is quite a challenge.

The design of the digital environment at Inholland is increasingly being dictated by educational needs and less by technology. By taking the needs of the user as the point of departure, the likelihood of successful implementation is greatly increased. This requires a carefully considered approach.

Case study – Amsterdam University of Applied Sciences

MAJOR CHANGES MADE POSSIBLE THANKS TO INNOVATION AND ICT

THE ORGANISATION OF THE LEARNING ENVIRONMENT AT THE STUDY PROGRAMME IN MARKETING AT AMSTERDAM UNIVERSITY OF APPLIED SCIENCES

Jeroen Prent is manager of the Marketing programme at Amsterdam University of Applied Sciences. He describes the changes made to this programme in recent years.

The foundation course for the Marketing programme was thoroughly revised last year. Various versions were integrated into a single, large foundation course, which 900 students started on last year. Starting in the second year, students can choose one of four major subject areas.

Vision on education

As Jeroen Prent sees it, education is very much in flux. “Innovation with ICT offers opportunities that will drastically change the educational landscape in the coming years”, he explains. “I think that many people still underestimate this.” What does this mean for the education provided in his programme? He is still coming up with a great many ideas in this regard. Part of his input comes from his attendance of the Educause conference in the US. For example, Prent was able to see the seamlessly organised flow of information and services at Ubertaxi, resulting in short waiting times as well as immediate online invoicing and feedback. The taxi driver made it clear to him that a poor score on the feedback assessment immediately results in a conversation with the organisation. “The education sector could learn something from them, such as in-time scheduling, location-based information, and short feedback loops,” says Prent. “Via learning analytics and ongoing evaluations, the quality of the education offered as well as the guidance provided to students can go to the next level.”

As he sees it, education must be made more efficient by optimising the learning output of each individual student. Personalised education is needed to achieve this. “You’re dealing with various types of students with different learning styles, with some leading the pack and others bringing up the rear. Besides a main path, which is adequate for perhaps 50% of the students, you should also be able to offer various alternative paths. Students have to know what they need to learn and how they can get there. Co-creation is an interesting method for that purpose. It enables you to hold on to what you already have and to build further on that.”

Learning analytics offers a great many opportunities for monitoring students more effectively and holding them accountable. For example, if a student has not yet opened his course book, the teacher could send them a message asking why they haven’t done so. When submitting assignments, it is motivating for students to see what percent of the students have already done so. The programme has also noticed that many students actually prefer to be reminded and subjected to a certain degree of pressure. Brief evaluation meetings – which provide students with information about the correct answers soon after an exam – are also seen as a valuable form of feedback.

According to Prent, short feedback loops are also beneficial for the evaluation of the programme. From this year on, the programme is evaluating all of its modules instead of simply choosing a few as samples. The programme committee is involved in the evaluations. Half of the committee members are students. The programme committee provides assistance with focus group interviews. This makes the way that teachers function more transparent, but also more vulnerable. The programme has noticed that teachers who are focused on further development are happy with the feedback.

The learning environment of the programme

With the start of the new foundation course, the programme also introduced the FeedbackFruits learning platform. An environment has been created within FeedbackFruits for each module, and classes and project groups have been formed within each environment. Everything connected with learning and learning materials is taken care of via the platform: content presentations, assignment submissions, and discussion groups.

The programme is reasonably satisfied with the present version of FeedbackFruits, although it cannot yet do everything that they would like it to. The supplier is presently working on the development of a 2.0 version, which will increasingly come to resemble a complete learning environment. Some teachers are embracing FeedbackFruits, whereas others are adopting a wait-and-see attitude. A teachers' lab gives them the opportunity to share their experiences and what they have learned with each other.

In addition to the introduction of FeedbackFruits, an innovative project has also been started regarding sales. The idea was that students would use Sales-board, an existing application, to sell advertisements for a student discount app called STUDIS. In conjunction with this, an associated CRM and CMS system were built.

The introduction of FeedbackFruits and the sales applications for 900 new students encountered some problems, as might be expected. "The lesson learned in the programme is that it's important to effectively manage student expectations," explains Prent. "The programme wishes to send out a message that it is an innovative and enterprising programme that dares to be different, but that it is also a learning organisation. This means that you can also make mistakes."

The learning environment of the University

At Amsterdam University of Applied Sciences, time and energy have been invested over the past few years into building a digital learning environment in SharePoint. The Marketing programme makes almost no use of this. For the programme, it is essential for links to exist between different applications, such as the SIS student information system and the scheduling systems. Students should be able to access all the information they find useful and necessary via their mobile telephone. A well-organised flow of information is needed for this to be achieved. Universal exchange standards need to be worked out.

The programme uses the applications it has chosen for itself, as described above. It is important that they provide support as effectively as possible for innovative education in the programme, and that they are not in any way restrictive: the focus should be squarely on the students and teachers.

Case study – University of Twente

FROM THE TWENTE EDUCATIONAL MODEL TO A NEW DIGITAL LEARNING ENVIRONMENT

THE MODERNISATION OF THE DIGITAL LEARNING ENVIRONMENT AT THE UNIVERSITY OF TWENTE

The University of Twente (UT) is making no compromises when it comes to designing its new digital learning environment. On the basis of its educational model, the University is investigating which digital instruments can best be used to implement its vision of education. The University is now ready to organise its digital learning environment anew. Tom Mulder, Frank Snels and Wytze Koopal from The University of Twente are involved in these efforts at a strategic level and discuss recent developments.

The Twente Educational Model, whose Dutch acronym is TOM, was developed for the Bachelor programmes. When developing the model, the developments to be expected in the online learning world were taken into account, but the campus remains an important element in the education offered. The University finds itself at an important crossroads with regard to the digital learning environment. A great deal has already been put on paper, which is necessary for plotting a clear and consistent route. By involving all the parties concerned, it was possible to create consensus and support for the vision formulated. In addition, various pilots and projects have been carried out. On the one hand, this provided valuable input for the formulation of the vision. On the other hand, experience has also been gained on what does and does not work when it comes to providing digital support for the learning process. Now, steps need to be taken to actually flesh out the details of modernising the digital learning environment.

Digital tools for supporting the educational model

An important element within the Twente Educational Model is student-driven learning. In this vision, the student themselves assumes as much responsibility as possible for their learning process. Using instruments such as a personal development plan, a mid-term evaluation, and a self assessment report, the student manages their own learning process. The programme evaluates whether or not the student is meeting its requirements. However, most programmes are not yet putting this method into practice. However, within University College Twente, experience is being acquired with this method for a relatively small number of students. In the coming year, the Communication Sciences programme will also start working with this model.

The (digital) support provided for various types of formative testing is an integral part of student-driven learning. Options for diagnostic tests are also important. “Via a dashboard, you would like to be able to see and show where a student stands in achieving the learning outcomes”, says Tom Mulder. “In addition, you would also like to have the option of providing peer feedback and peer learning opportunities.” In recent years, pilots have been carried out with various software systems. Each time, it turned out that the various options available did not quite meet the requirements. The University also faces the problem that the present student information system cannot provide optimum support for the targeted processes.

The UT is presently thinking about the design of a so-called “learning store”. This is a sophisticated repository of learning resources intended to encourage students as well as teachers, insofar as possible, to share, use, reuse, and improve learning resources. The basic concept behind the learning store is to store learning resources and make them accessible, but it also has functionality that makes it possible for students and teachers to select, edit, and organise the resources available. It should also be possible for students and teachers to create playlists of the resources and materials available. A teacher can do this for a group of students as well as for individual students. The discussion on how

accessible the learning resources or playlist should be is still ongoing. The University prefers to make the resources as widely accessible as possible but is more cautious concerning metadata from the learning resources and data that result from learning analytics. Ideally, the University would provide access to the data collected via learning analytics primarily to students.

Organisation of the digital learning environment

To modernise the digital learning environment, the University is working with an open development model with a few important organisational boundaries. This makes it possible for programmes with different students and cultures to add their own particular colours and flavours. The University expects technological developments in this area to accelerate rapidly in the coming years. “We will see an increasing use of smart intelligence and intelligent feedback systems”, predicts Frank Snels. “Student-driven learning means that students are behind the steering wheel when it comes to organising their own learning environment. They should be able to plug in the necessary tools and applications themselves when using the learning environment provided by the University. An open architecture is needed for this purpose. That is also the most important condition that needs to be satisfied by the new learning environment. In addition, it’s important for the new learning environment to have the same look and feel for all students.”

The University would prefer to bring the management and administrative functions into a core application, to which various other applications that support the educational model can be linked. However, the UT has not yet been able to locate such a core application. They have tentatively concluded that the educational applications available at the moment often fall a little short when it comes to satisfying the requirements and wishes of current and future users.

However, as the justification for the present learning management system (LMS) is under discussion, something needs to be done sooner rather than later. This presents a challenge to the University. Should efforts be made to try to replace the learning management system as a whole, or should present efforts focus primarily on achieving quality-related targets by improving the digital learning environment?

For the parties involved, it is clear in any case that a development-oriented perspective will have to be adopted. “In view of the ambitions and the present state of the technology, it is simply not possible to set up the entire digital learning environment in one go”, maintains Wytze Koopal. “That is also why we think it’s important to work on the basis of short-cycle development phases.” This idea goes against principles from information and application architecture. The biggest challenge in the near future is therefore finding the right balance between on the one hand ensuring that the present digital learning environment can be properly managed, and on the other hand creating opportunities for new developments and innovation.

Case study - Delft University of Technology

IMPROVING EDUCATION BY PROVIDING OPTIMUM SUPPORT FOR DIGITAL COLLABORATION AND LEARNING

THE DEVELOPMENT OF THE COLLABORATION AND LEARNING ENVIRONMENT (CLE) AT DELFT UNIVERSITY OF TECHNOLOGY

When looking for a new digital learning environment, Delft University of Technology (TU Delft) chose to focus its efforts on an environment that would provide optimum support for learning and collaboration. Erna Kotkamp, Project manager for education and ICT at TU Delft, tells us more about these developments.

Delft University of Technology aims to be a leader when it comes to online education and digital support facilities for campus education. In developing a new digital learning environment, the decision was made to focus specifically on providing optimum support for collaboration and learning. This was not because underlying, organisational issues are unimportant, but because TU Delft wishes to provide a learning environment that excels in facilitating collaboration and learning.

TU Delft attaches a great deal of importance to improving the quality of the education offered. The University wishes to provide the programmes with the facilities needed to enable educational innovation. The central department facilitates educational activities by providing effective support, opportunities for further professionalisation, and a user-friendly collaborative learning environment. To achieve this ambition, TU Delft has made a conscious choice for a learning environment and supplier that has already proven its worth. One of the reasons for this is that the learning environment chosen must provide support not only for more innovative teachers but for all teachers, including those who are not front-runners when it comes to the use of digital, didactic tools. They must be able to use the tools provided easily and effectively.

From vision to requirements

TU Delft invested a great deal of time, energy, and thought into formulating the requirements which the collaboration and learning environment needs to fulfil. A thorough analysis was made of vision documents, followed by a plan for their practical application to the learning environment.

A study was also carried out to determine which educational formats are presently in use at the University. For example, specific requirements for TU Delft include the provision that students can decide who has access to parts of the learning environment, so that they can determine who may or may not view products of the educational process. This is important in project-based education, in which companies are the client and must be able to access certain parts of the learning environment. However, collaboration and the creation of groups must also be effectively supported in design-based education. In addition, it must be possible to monitor the design process. This is now done physically. What digital options are there for doing this? How does the learning environment deal with multi-gig files? And is it possible to evaluate students separately within the context of group-based activities? In courses such as mathematics, education is more individual, but greater requirements are imposed upon the editors and options for models that provide mathematical answers and interpretations.

Due to the diversity of educational formats and the ambitions of the University, the point of departure chosen by TU Delft was that the new digital learning environment must, in principle, be able to support all educational formats. In collaboration with Deloitte, four educational theories were analysed in order to gain adequate insight into the existing learning environments. Next, the team looked at how these theories could be translated into requirements. For example, they investigated how the principles behind behaviourism, cognitivism, social constructivism and

connectivism are implemented in existing learning environments.

“The learning environment must provide basic access to all functionalities”, explains Erna Kotkamp. “In addition, it must be possible to provide additional functionalities by linking it to various tools. However, the tool must be provided as an integrated part of the learning environment.

It’s also important to be able to switch off the basic functionality if it is replaced by the broader tool. This approach ensures that it remains accessible for teachers and students.”

This is also the approach taken in the present learning environment. For example, the FeedbackFruits tools are integrated and available in Blackboard. When they are used, the Blackboard DiscussionBoard is switched off. In future, innovative tools and existing tools such as Perusall as well as a computerised correction tool for mathematics may also be offered in an integrated fashion.

“A thorough discussion has taken place on what should or should not be part of the CLE,” adds Kotkamp. “Logistics functionality is integrated into the present digital learning environment via a portal. This makes upgrading very complex. In the new approach, the CLE is primarily intended to facilitate learning and collaborating. It is part of a wider system, in which various components are integrated with each other, like interlocking building blocks.”

The tender procedure for the collaboration and learning environment

The University has chosen to organise the tender procedure via a best value procurement method. This means that the tender is not intended to result in choosing a product, but rather in choosing a supplier who is best able to satisfy the goals and ambitions of the institution via its product offering. The chosen supplier will also be asked to take responsibility for the integration of other tools.

The specific requirements formulated in the first phase of the tender procedure were later translated into a number of essential goals.

Based on these goals, the supplier must provide with insight into their product and its implementation possibilities. The experience acquired by the supplier with large-scale implementations and migrations at other universities will be have a strong influence in this regard. The University is presently conducting the procedure. A supplier is expected to be selected in the summer of 2016.

The supplier will also be asked to take responsibility for the implementation and migration of the digital environment. This migration will focus primarily on improving the quality of the education offered.
The educational support team, which already has a great deal of experience with online education, will play an active role in the implementation and migration. The team is familiar with the programmes and teachers. It is very well aware of where extra support is needed and where innovative ideas can be tried out.

For TU Delft, an exciting time lies ahead. The University has formulated a vision in the form of several goals. The suppliers must show how they intend to help realise these goals with their products and services. They will become co-owners of this vision. It is important for the University to decide what its priorities are. Will the system be easy to follow and manage with little opportunity for innovation? Or will it be a system that can do much more but that is therefore also more susceptible to errors? Or will it perhaps be possible to strike a good balance between both options? The suppliers have been asked what they consider to be the best solution.

Kotkamp: “The University has made it clear what it wants, ideally speaking. The suppliers must now make it clear to what extent they can comply with these wishes. By placing the supplier in the role of the expert, we hope to be able to choose a collaboration and learning environment that will satisfy as many of our wishes and ambitions as possible.”

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