

The Future of Learning and the Educational Process

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Abstract: The higher educational environment in Europe is changing and for the Netherlands this means that the dual educational system (universities and institutes for higher professional education) will disappear. However this is not the only driver of change. Many European countries face a population that is aging and in the near future many lecturers will retire. Also the current financial crisis in Europe is causing many investments in higher education to be delayed. These and other drivers mean that universities need to organize their resources (such as buildings, lecture halls, libraries, IT etc.) in a different manner. Furthermore support staff and administrators within universities need to be more flexible in the way they work to cater to the needs of a new customer group.

To identify the changes that are needed and any bottlenecks that can be expected, a study was conducted at the HU University of Applied Sciences in the Netherlands. Professors, managers, staff, and students were interviewed and based on the outcomes a method for a new way of working was developed and IT tools to support this were recommended. Subsequently the method and some of the tools were tested in a pilot with 22 students. One of the most impressive results has been the reduction in the number of e-mails sent. During the pilot several means of communication were used (mainly twitter and Facebook) while the use of e-mail was not allowed. For the lecturers involved this meant a reduction in e-mail from over 1000 mails to fewer than 200 while at the same time the amount of tweets and Facebook postings totaled around 350. This means a reduction of about 45% in the number of messages. Furthermore we also used e-learning to reduce the amount of time that teachers and students needed to be physically present at the university, thereby not only reducing overhead but also helping in realizing the sustainability goals of the university.

Keywords: Education, Learning, Processes, Future of Work.

1. Education will never be the same

The higher educational environment in Europe is changing. This all started with the Bologna agreement where all EU countries agreed to form the same system for higher education (EU Bologna, 1999; Neave, 2003). For the Netherlands this means that the dual educational system (universities and institutes for higher professional education) will disappear. Only universities will remain with either a focus on research or on professional education. However there are more drivers to change. Many European countries face a population that is aging and in the next 5 – 10 years many lecturers will retire. Furthermore many universities are having budget problems due to the financial crisis, which causes investments to be delayed. Finally there is a trend towards life long learning. The current generation of employees realizes that they continuously need to update their knowledge and skills.

This means that the type of customers of a typical university is changing from mostly full time students to a mix with a substantial amount of part time students. As a result the universities resources (buildings, libraries, IT etc.) should be organized in a different manner and this is also true for how the process of learning is organized. This change towards different and more flexible ways of learning in higher education is not new and has been researched before (Spady and Mitchell, 1977; Gray and Hymel, 1992; Spady, 1994; Marjanovic and Orlowska, 2000; Oliver et al., 2002; Schellekens, 2004; Plessius and Ravesteyn, 2006; Plessius and Ravesteyn, 2010). Also the use of IT to make processes more flexible and execution of activities less location and time dependent has been researched, especially the possibilities of telework (Di Martino and Wirth, 1990; Bailey and Kurland, 2002). However an integrated implementation of these two developments in a university has not been addressed before. In this paper bottlenecks related to such an integrated approach are identified and a framework is presented that can be used to implement it.

1.1 Project environment

This research is performed within the Faculty of Life Sciences & Technology (FLT) of the HU University of Applied Sciences in Utrecht, The Netherlands. The faculty currently employs around 350 people and about 4000 students follow bachelor or master courses. It is the only faculty that is located in three different buildings throughout the city centre of Utrecht, whereas all other faculties are located on the Utrecht Science Park (the campus area which is approximately 5 kilometers outside the city centre).

Since a majority of both employees and students are from outside Utrecht the location of the faculty buildings cause a lot of traffic. While most students either ride a bike to the University or take the bus from the train station, employees also frequently use a car as their main means of transportation.

As sustainability is one of the core values of the university, management is actively promoting environmental friendly ways of travel. For example there are electrical cars available for employees that need to travel from the FLT to other faculty buildings on the Utrecht Science Park.

Besides reducing the environmental impact by changing the mode of transportation, studies and pilots are undertaken to change the manner in which courses are delivered. Currently most courses still consists out of many face-to-face lectures combined with project learning. This means that students and lecturers still spent a large part of their time physically at the university. The same holds true for staff functions such as finance, marketing and human resources. Together with the drivers described above, the strategy towards a sustainable university means that the way in which the organization is currently organized and the manner in which students learn is about to change. The research described in this paper identifies both obstacles and opportunities to making learning and supporting processes more flexible (i.e. Independent of location and time of execution).

The next section describes the research approach that is used in this study, followed by the results of the research, suggestion of a framework to implement a new way of working and learning, and a pilot in section 3. In section 4 the conclusions of this research are given. Finally in section 5 some limitations to this research are discussed and suggestions for new research projects are described.

2. Research approach

As stated in the first section of this paper the objective of this research is to identify bottlenecks to making educational (primary) and support (secondary) processes more flexible. In the Netherlands the area of knowledge and services that is founded in the telework research domain is expanded (it no longer includes just technology supported methods) and is now known as the research area 'New-Way-of-Working'. In this research new ways of learning is integrated with this area and therefore we use the term 'New-Way-of-Working and Learning' (NWWL) throughout this paper.

In this research two parallel research phases can be distinguished 1) an analysis of the organization (HU University of Applied Sciences) and 2) a study of available best practices on NWWL (see figure 1).

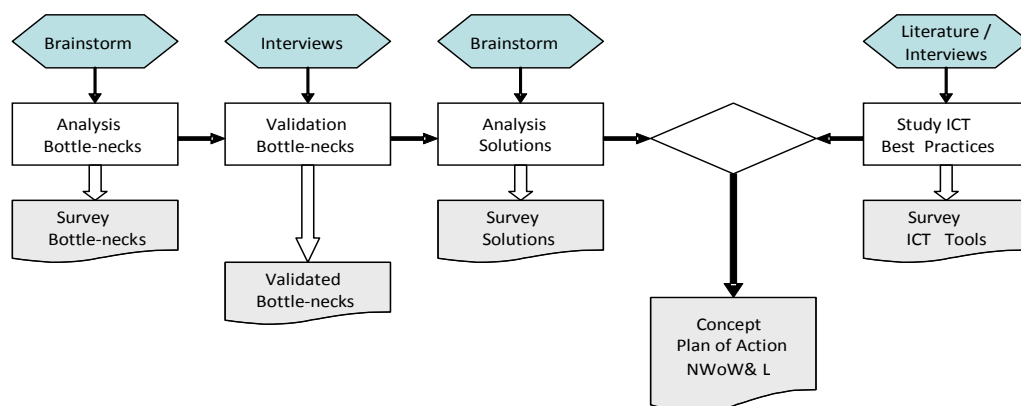


Figure 1: Overview research activities, techniques and results

In the analysis phase first a brainstorming session was organized to identify possible bottlenecks to changing educational and support processes. Second the outcome of the brainstorm session was validated via interviews with both employees and students at the university (see tables 1 and 2). The interviews consisted out of some basic questions such as name, age, gender, role(s) in the organization, and number of years employed (or active as student) this was followed by questions related to the experience of the respondent in regards to the possibilities they see to make educational and/or supporting processes more flexible.

Nr.	Position	Faculty
1	Financial Accounting	Life Sciences & Technology
2	Marketing & Communications	HU central staff
3	Marketing & Communications	HU central staff
4	Teacher & Staff International Office	Life Sciences & Technology
5	Team manager	Life Sciences & Technology
6	Teacher	Life Sciences & Technology
7	Team manager	Life Sciences & Technology
8	Teacher	Life Sciences & Technology
9	Teacher	Life Sciences & Technology
10	Teacher	Life Sciences & Technology

Table 1: Overview of interview respondents (staff)

Faculty	Study	# Students
Life Sciences & Technology	Bachelor IT: Informatics	4
Life Sciences & Technology	Bachelor Media technology	2
Life Sciences & Technology	Bachelor Business IT & Management	2
Life Sciences & Technology	Bachelor IT: Information Engineering	2
Life Sciences & Technology	Bachelor IT: System Management	5
Life Sciences & Technology	Bachelor IT: Technology Systems	1
Life Sciences & Technology	Bachelor Business Engineering	3
Life Sciences & Technology	Bachelor IT: (Saxion University, Enschede)	1
Society and Law	Bachelor Social Work and Services	1
Economics and Management	Bachelor International Marketing Management	1

Table 2: Overview of survey respondents (students)

Finally another brainstorm session was organized to identify a first set of possible solutions to the identified bottlenecks. This brainstorm was not yet focused on IT related solutions (although they were not dismissed either).

The second research phase that was executed parallel to the first phase consisted of a literature study and interviews. During the literature study both scientific and professional articles were identified that described best practices at organizations and/or ICT tools that can help when implementing a New-Way-of-Working and Learning within a university setting. Besides the literature study the interviews mentioned above also contained questions regarding the ICT tools the respondents used or recommended to be implemented as part of the NWWL. Finally several interviews were conducted with experts in the domain of NWWL that provided further insight in how ICT can be used to further automate work and learning and organize it more flexibly.

Based on the results from this research we developed a framework that organizations can use to implement NWWL. The overall results, the framework and the pilot project are described in the next section.

3. Results

The brainstorm session with employees resulted in a list of bottlenecks that is divided in two categories 'Education & Research' and 'Supporting processes' with respectively 19 and 12 aspects that the participants found were bottlenecks to the implementation of NWWL. These were used in the construction of a set of interview questions. Accordingly ten university employees were interviewed to validate the list from an employee perspective. Each interview lasted between 1,5 – 2 hours.

Furthermore the output of the brainstorm session was also used as input to a survey that was sent to 40 students participating in two different minors (of which 22 responded, see table 2).

Based on the interviews and survey results several bottlenecks were found to be present within the faculty of Life Sciences & Technology that hindered a NWWL implementation.

First and foremost (middle) management obstructed the implementation, although perhaps not deliberately. In many departments there are either formal guidelines in relation to the amount of time a lecturer needs to be present on premises (e.g. 80% of their work hours) or there is an informal culture where people feel the need to be present to get a good management review. The same holds true for student presence. While the education & exam handbook prohibits managers and lecturers to require students to be present all the time, many managers do implement such principles. This limits the possibilities for web lectures, virtual classrooms and other digital learning environments.

Besides guidelines regarding presence for lecturers and students there is also the implicit rule within the faculty that employees in a support function are present at all times. If people want to divert from this rule they need to discuss this with their manager. To succeed in such a discussion trust between employee and manager is vital. It seems that managing the presence of employees is easier than managing their output. Still, even if an agreement is made and an employee is allowed to work more time and location independent, many of the respondents stated that their colleagues put social pressure on them to be present. This means that even though a person might have a role that can be executed outside the workplace (thereby reducing traffic and the need of large office/faculty buildings), in practice this will hardly ever happen.

Even if management actively supports a more flexible way of working and teaching, and for example tries to implement flexible workplaces as part of a NWWL project, it is often the case that employees don't want to lose their private workplace. They do want to be able to work more flexible but don't want the changes involved such as having to search for a free desk to work at. The following reasons were given as an explanation by those interviewed: being able to find colleagues easily, possibility to cooperate, social contacts etc.

Especially in relation to learning, lecturers find it difficult to translate concepts from the 'new way of working principles' to an educational setting. Lecturers are afraid that the quality of education will drop if courses will be partially taught via web lectures or virtual environments (they fear changing their didactical concepts). Also there is almost no time to develop new courses and lectures that optimally use the functionality of digital learning environments. Even if there is development time available many lecturers don't have the competences needed to update their course material according to these new possibilities.

In departments within the faculty where NWWL is implemented, it seems to be done halfheartedly. Most frequently employees were allowed to work more flexible and in line with this a reduction in workplaces is implemented. Furthermore laptops and smartphones are made available. However often only one type of workplace is available in an office environment, typically a desk with a phone and flat screen to which employees can connect their laptop (and sometimes a desktop). This means there is no, or limited, availability of workspaces where people can organize meetings, workshops, video or conference calls etc.

Furthermore even if departments are trying to implement NWWL problems arise that are out of their range of control. Mostly this has to do with IT support. Information systems are not (easily) accessible from outside faculty buildings. There are limits to the amount of data (documents, mail, archives, intranet environment) that can be stored. Even if applications are available everywhere for employees it is often the case that sharing data or functionality (e.g. in SharePoint) is not possible with people that are not employed by the university. This is not caused by a lack of functionality of the IT environment but by the rules and guidelines set by the IT department. This limits the possibilities of implementing NWWL.

Finally, in this research we found that the amount of knowledge that lecturers and students have on NWWL is limited. Both groups have limited imagination in regards to the possibilities and the way in which this can change education. While this might be expected from an aging population of lecturers we didn't expect this from students. However even when we asked students to list their wishes

regarding the use of digital environments in education the most mentioned tools were Social Media (like Facebook) and Skype to be able to communicate with lecturers and fellow students. A few students mentioned the possibility to use YouTube for small instructional movies but none mentioned web lectures or virtual environments.

The bottlenecks listed above can often be diverted during the implementation if they are taken into account before starting a NWWL project. Therefore, based on these results, we have developed a framework that can help organizations to successfully implement NWWL.

3.1 A Framework for NWWL implementation

Based on the results from the organizational analyses we can conclude that the introduction of NWWL is no easy challenge. Therefore we developed a framework that consists of four areas that need to be addressed when implementing NWWL (figure 2).

Organization and processes	Information
Culture	Workplace design

Figure 2: NWWL Implementation framework

Organization & Processes; success of a NWWL implementation depends on the maturity of the organization in relation to NWWL. Does the organization already have flexible workplaces and is management control based on results instead of presence? Is HRM already involved with the implementation of NWWL? Is health and safety legislation taken into account? What are the possibilities for employee training in relation to NWWL? Is there a personal budget for mobile devices, etc.? Or are these all questions that still need to be answered?

Information; if an organization really wants to give its employees freedom to work where, when and with whom they want, then the supporting information systems should be equipped appropriate. Are all information systems accessible anywhere? And if this is not the case (which is possible from a good governance perspective), is it obvious why this is so and thus clearly communicated to everybody? Are employees allowed to bring their own devices and their own applications to work? Or are they dependent on what the organization offers?

Culture; in this research we found this to be the major deal breaker. Especially the "social pressure" of colleagues and students forces many employees to feel obliged to be present.

Workplace design; many organizations think NWWL is just the transition to flexible workplaces. Although this is certainly an important aspect, it should be taken into account that different tasks need different work areas. A lecturer does not only need a workspace to develop course material and grade papers but also needs areas for project meetings, lecturing, workshops etc. So depending on the task the workspace needs to be quiet and undisturbed or large enough to hold a group of students and equipped with a beamer, laptop connection and (wireless) Internet. In the same manner private conversations have different requirements to workplace as a conference call. During a NWWL implementation it should be taken into account that all these tasks and activities place different demands on the workplace (its function) and therefore a thorough analysis of the organization is needed.

To determine where bottlenecks may arise during the implementation of NWWL a survey is constructed consisting of 20 questions that cover the four areas of the framework. This survey can be used by the project team and should be distributed between both lecturers and supporting personnel (management, staff, etc.). In this way, all the bottlenecks are uncovered per specific target group. The developed questionnaire is not necessarily exhaustive and may be supplemented based on the experience of the organization in which NWWL is implemented.

Since organizational culture is the most common fail factor to the implementation of NWWL we explain this aspect in more detail.

3.2 Culture

If we take a closer look at higher education we find that management wants short lines of communication to lecturers, staff and students. A lot of the communication by management is informal. Furthermore managers find it important that students get quick and to-the-point answers if they pose questions. In this respect it is also important that both students and lecturers, and lecturers amongst themselves can easily connect (face-to-face if needed) to be able to collaborate. As a result managers tend to find presence within the faculty buildings by both students and lecturers very important. This creates a culture where everybody aims at being visible as much as possible, which is an obstacle to the implementation of NWWL. Employees start claiming flexible workplaces as theirs, bring in furniture (e.g. bookcases) and will be at the university as much as possible to 'defend their turf'.

When lecturers are not on premises they try (and are expected) to be available via e-mail, social media or phone as much as possible. We found that for many people this creates a psychological pressure, they can no longer distinguish between work and private life and feel the need to be available 24x7. This is contra-productive and opposite to the objectives of NWWL. The possibility to be more flexible in the way work is organized should lead to a better work-privacy balance. This is indeed true for many people who work in a well-integrated NWWL environment. A positive side effect is that the rate of sick leaves among employees drops (Hirt, 2011). However when cultural change is not explicitly part of the NWWL implementation it can cause higher levels of stress among employees and thereby increasing the number of people that are ill.

In many organizations it is possible to hear employees stating: "this is how we always organize our work" or something of a similar nature. In the interviews during this research we noticed that many people don't understand the NWWL concept (particularly the new-way-of-learning part). This means that a NWWL implementation should always start with explaining the concept. Also it is a good practice to provide training in time management and self-discipline for employees. Furthermore management should realize that not every person wants to spend (more) time working at home (or at least outside the university). Many part-time employees have a job as part of their social life outside of their homes and families.

So far the discussion on culture has primarily focused on the research findings in relation to new ways of working. However the same holds true for changing from a traditional educational model to a new more flexible and student oriented model of education. As stated earlier lecturers (and also many students) already find that there is not enough contact between each other. The definition given by most respondents of 'contact' is related to the face-to-face contact between lecturer and student. This is part of the dominant cultural awareness of the organization. However if we define contact as any synchronous or asynchronous communication between student and lecturer where learning takes place, a YouTube movie containing instructions can also be regarded as contact. If a cultural change would incorporate this new definition the use of digital environments in education can actually help to increase the amount of contact between students and lecturers.

To determine the possibilities and effects of using digital means of teaching, a pilot was performed with 22 students that followed the minor Virtual & Social Networks (VSN) from September 2011 to January 2012.

3.3 Pilot

In a pilot the framework described above was tested. Therefore a course, the minor Virtual and Social Networks, was selected that is representative for a typical semester course at our faculty. The minor VSN has a duration of five months and consists of 3 mandatory modules and 2 electives. As stated, during the pilot 22 students enrolled. The team of lecturers involved in the course consisted of an associate professor (who was responsible for coordinating the entire minor) and two assistant professors. Furthermore a trainer from outside the university was hired to provide a Prince2 foundation course.

The framework emphasizes the four areas that should be part of an integrated NWWL implementation: organization and processes, information, culture, and workplace design. As the team is small and everybody actively participated in trying out a new way of working and learning the cultural setting was no problem. To have more control on the supporting processes it was decided to

have one team member responsible for all organizational tasks and consequently the communication to staff members. Tasks such as planning the modules within the course, grade and student administration were done as much as possible by the team of lecturers instead of staff departments. This reduced the amount of communication with people outside the team and thus provided more control. Staff was only contacted to make reservations such as lecture halls. Regarding workplace design it was decided that team members would have flexible workplaces and one room was available for meetings or conference calls.

The fourth area in the framework is information. Parts of this area are integrated in the organization and process area (such as executing as much tasks as possible with member of the team), for the rest we considered how we could use digital environments / IT to change the educational model and thereby the way of learning. In our opinion the use of IT, and especially social media, to make work and learning more flexible is key to a new way of working and as it turned out, it was very successful. First of all by using web lectures and YouTube together with Dropbox (file sharing), Facebook and Twitter (@HU_minor_VSN) for communication we were able to reduce the amount of traditional face-to-face lectures tremendously. Typically a semester course has 300 hours of face-to-face lectures while the students in the pilot only had 134 – 162 hours (depending on the electives) and the rest was substituted by learning in a digital environment. A second result is the reduction in the number of e-mails sent. During the pilot several means of communication were used except for the use of e-mail, which was not allowed. For the involved teachers this meant a reduction in e-mail from over 1000 mails to under 200 (which were related mostly to arranging guest lectures, contact with companies providing projects, and internal mails with staff departments). At the same time the amount of tweets and Facebook postings totaled around 350. This means a reduction of 45% in the number of messages. Furthermore since we used e-learning to reduce the amount of time that teachers and students needed to be physically present, we did not only reduce overhead but also helped in realizing the sustainability goals of the university.

At the end of the pilot the course was evaluated (via an anonymous survey) and got an overall rating of 8.2 (from 1 – 10). The different modules were all rated around an 8; the students commented that the quality of both the course material and the (digital) lectures were very high. Finally the means of communication used during the course was scored with a 9.5.

4. Conclusion

Based on this research we can conclude that there are many bottlenecks to the implementation of a 'New-Way-of-Working and Learning'. The most important are the culture of the organization, its management, and the way processes and supporting information systems are organized. The key to change is trust and to have a successful implementation of NWWL can only be fully achieved by an integrated implementation approach. For this a framework is proposed.

While the implementation of NWWL may be difficult the benefits can be large, both in time and thus money as is suggested by the outcomes of the pilot but also in possible environmental benefits (which have been discarded in this research). Furthermore the use of digital learning tools is more scalable, can be easily shared with colleagues or other universities, and is better aligned to future generations of students. Especially this last aspect was the reason why the minor VSN (the pilot) scored very high when it was evaluated. Since students are our customers, this alone should be reason enough to start a NWWL implementation!

5. Discussion and Future Research

There are some limitations to this research. First the research project was done in the Netherlands and the 'New Way of Working' is becoming very popular (the last three years a national NWoW week was organized). Therefore many organizations are looking for possibilities to implement this concept and thus it is expanded to the higher education environment. In other countries the need for new and different ways of working and learning might not be high on the agenda of government, industry and education. Second, although the outcomes of the pilot were very positive it is too small to make any general conclusions. Furthermore the most important bottleneck to the implementation of NWWL 'culture' was not an issue in the pilot while in most universities the culture can be classified as 'traditional' and not open for change and innovation. Finally the suggested framework is not validated (besides the pilot) and it cannot be concluded that it will work in other organizations. Therefore in future research projects the framework needs to be thoroughly tested (in different institutions of higher

education that have different types of cultures in regards to the willingness to change) and if needed expanded.

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