SLUTRAPPORT

Virtuella skrivbord för distansstudenter/Molntjänster för distansundervisning

Projektledare Stefan Eriksson	**Beställare** Nils Nilsson	
Ansvarig avdelning Namn: EHB		
Projekttid Start: 2018-10-01 Avslut: 2019-12-31	**IT-projekt** ☐ Ja ☒ Nej	**Dnr**
Projektwebb		
Granskad ☐ Styrgrupp/beställare ☐ Förvaltningschef ☐ IT-chef (vid IT-projekt) _____	**Version**	

Innehåll

1 Beskrivning

1.1 Syfte

This project aims to improve teaching and education experience by solving one of the pedagogical education challenges in distance education, i.e., how to provide both campus and distance students access to all software used in education with full flexibility in place and time, and with reasonable costs for the university. As such, the project addresses two of the four overall targets of Mid-Sweden University:

1. ”Forskning och utbildning som tillgängliggör kunskap för fler genom hela livet”.

2. ”Studie- och arbetsmiljö som attraherar studenter och medarbetare och som bidrar till global och regional utveckling”.

1.2 Bakgrund

The digital revolution that we are facing today also effects higher education. Digitalization of the education make it possible for students to decide how they would like to have their courses. Courses could be pre-defined in place and time (campus learning), pre-defined in time but not in place (blended learning), full flexibility in place and time (distance learning), or any combination of the three.

The demand for flexible education seems to increase among students. This trend is expected to continue in the future. There are advantages in having flexible education, but also pedagogical challenges. For example: how to make sure that all students will have access to scientific literature, software, field measurements, labs, secure examination, etc.

Mid-Sweden University is a leading university in Sweden, when it comes to flexible education. Close to 60% of all students learn by distance. To be able to keep the leading position in the future, there is a constantly need to develop better pedagogics for both its campus and distance education. In a utopic education system, distance students should not feel different from a campus student, and v.v. That imply that both campus and distance students should have access to similar education tools, which include computer software.

In a growing digital world, computer software become integrated in all aspects of our life, and especially in our professional career. University education aims to prepare the students to the working environment, and therefore computer software are essential, and becoming more and more integrated into the

education programs. Our future students were already born in this digital word, and it is possible to presume that their expectation of digital pedagogics will be higher as well.

The problem

Campus students gain access to software via computer labs in the university premises. There, software tools used in education are physically installed in desktop (stationary) computers. These can be accessed at any time by the students, but only if sitting physically in the computer labs. However, distance students are dependent on the willingness of the software companies to provide them with free, alternatively temporary licenses, that could be installed in their own private computers. The current situation create few issues:

Availability

Distance: If no temporary license are available, the software cannot be used in their education.

Campus: In most cases, the number of licenses for each software tool is limited, and therefore also the available computers with the specific software. If these computers are occupied or not in function, students experience limited access to the software. The problem become apparent if many different software tools are installed on similar computers.

Costs

Distance: Temporary licenses for distance students may hold an installation cost per student and course. This is in addition to the cost of campus/classroom license that is already paid by the university/department.

Campus: The University computer labs also hold running costs, whether they are used by the students or not. The costs include locality costs (rental, electricity, conditioning, etc.), equipment costs (e.g., computers, printers, desks, chairs, etc.), and labor costs (IT maintenance, cleaning, etc.).

Legal

Distance: The installation of the temporary software by the distance students may damages their computer, which can create negative attitude, and legal issues as well.

The demand

The Department of Ecotechnology and Sustainable Building Engineering at campus Östersund, Mid-Sweden University run four bachelor programs and one advanced level program. About 50% of the department's students are distance students. The running of the programs are depended on distance students, as a source to balance its economy.

All programs use blended learning, as an education method. Blended learning is a special niche within higher education. This type of education provide frontal lectures and seminars for campus and distance students at the same time. Campus students are sitting physically in the classroom, while distance students participating online in real time through a special software tool.

In both bachelor programs, and especially in the master program, students are already using variety of computer modeling tools. The need for additional advanced software tools is increasing, due to progress in knowledge and technology.

Over the last four years, there was a demand from the department to find a suitable solution for its distance students. A solution that will provide higher flexibility in teaching and learning, increase students' access to software tools, enhance positive education experience, and possibly yield higher student competence.

2 Resultat

2.1 Projektmål

The project aims to test virtual desktop solutions for education. This will be tested on students from the Department of Ecotechnology and Sustainable Building Engineering (EHB). Other departments within the university also showed interest in such solutions, e.g. MKV, DES, EKS, DSV and KMM. The results of the project will be used to assess the feasibility of virtual desktop solutions for all students in Mid-Sweden University. The project will assess these solutions from the perspective of the user, the costs, and reliability.

Virtual desktop in education could provide several benefits for Mid-Sweden University, which include:

Short-term aims for the EHB department:

1. Access to software tools to all university students, both campus and distance.
2. Higher quality teaching using advance modeling tools.

3. Flexible learning – lower dependency on computer labs.
4. Improved education experience.

Long-term aims, if applied in University level:

5. All short-term benefits could be applied to all departments (1 to 4 above).
6. Possible cost saving for the university by phasing out computer labs (see also the description of 'The problem' in section 1).
7. If used also by university employees, number of purchased license, and related costs, could be reduced for programs like Office, Adobe, SPSS, etc.

2.2 Verksamhetsmål

VERKSAMHETSMÅL		**Genomförande/resultat**
Nr.	**Mål**	A new digital platform based on cloud solutions for education was constructed during the project time. Several versions of the platform were tested under the project time.
1.	Design and construct a new digital platform based on cloud solution for education using a virtual desktop	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		**Genomförande/resultat**
Nr.	**Mål**	The platform was tested on two courses in the master program in Ecotechnology: MX022A, and MÖ016A. These courses involve both distance and campus students (i.e., blended learning). In total, the students of both courses used five different software via the digital platform. No software installation from the students side were required.
2.	Test the digital platform on several courses with blended learning mode, which include both campus and distance students.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	In general, both the campus and distance students were very positive about the platform. The digital platform met its functional targets. There were no needs for software installation from the student side. Students could work with different end user machines, e.g., windows, MAC, android, etc. To access the platform the students needed only to login with their Miun logins details. The students could use the platform during the lectures, and after lecture time as well; at any place with internet connection, and at any time. Some use it from abroad as well. As any new technology, the digital platform also was experienced several bags and connection errors, which disturbed the learning activities. Fortunately, the students were understanding and show high level of tolerance, while these bags were fixed.
3.	Evaluate The education experience of the students.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	A great advantage was that there was no need for special computer labs. A simple conference room with projector was used during the education with the new digial platform. Students came with their own computers and work with the platform. The integration of the platform with Adobe Connect and later with Zoom worked smoothly. Teachers and students could share their screen and discuss their software modelling with each other. After lecture time, the teacher could use the digital platform and help the students from his office and even from his home.
4.	Evaluate The teaching experience of the teachers	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	The costs of using the platform during the trial period was about 15,000 sek/mounth. This is a high cost for a single course. However, much of the costs is a fix costs, and does not depends on the number of students or courses. A new version of the platform is under development, which expected to decrease the costs by 30%.
5.	Evaluate The costs for using this online solution.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	An annual cost model for the whole University, based on the trial period, show a high cost saving potential for the whole University, if the platform would be used as an alternative to the University computer labs. Currently, computer labs have low usage rate and cost about 5 Msek annually, while the digital platform will cost les then half. A new version of the platform is under development using a new technology, which will push down significantly the cost of the platform.
6.	Evaluation of the costs and benefits of upgrading to large no. of users, e.g. at a university level.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	Only one additional private supplier was identified that provides similar services to Universities, as the digital platform. However, he could not meet all the functional services needed for our education, as defined in this project.
7.	Evaluate Comparison between two different suppliers of virtual desktops.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

VERKSAMHETSMÅL		Genomförande/resultat
Nr.	**Mål**	Due to re-organisation in the university, it was not possible to plan a whole integration for the whole University. The digital platform was demonstrated to University employees in the vice chancelor days in Östersund and Sundsvall, and for several departments during APT's or similar meetings. Recently, IT received a new manager, which is very positive to the platform, and work with us to develop the platform to a University usage level.
8.	Plan action to upgrade to university-level solution.	
Måluppfyllelse ☒ Helt ☐ Delvis ☐ Inte alls		

3 Genomförande

3.1 Tidplan

Start: 2018-10-01
Avslut: 2019-12-31

Activity	Responsible	Outcome	Period
Setup of preferred solutions for pilot test - Purchase consultant - Set up license agreement with cloud service providers - Integration of cloud solutions with our technology (Active Directory) - Integration of our technology platform (System Center Configuration Manager) as a distribution solution.	Stefan Eriksson	PM	Sep. 2018
Ongoing test pilot - Frontal education with virtual desktop solutions. - Monitor performance parameters, CPU, memory, network load, disk usage and disk operation. - Fine-tune system parameters.	Itai Danielski Consultant	Data collection of performance	Sep 2018 – Jan 2020
Evaluation - Costs. - Student experience. - Teacher experience. - Benefits and challenges.	Stefan Eriksson Itai Danielski	PM	January 2020
Communication	Final report/ Presentation	February 2019	Stefan Eriksson Itai Danielski

3.2 Beslutspunkter

BP	Beskrivning	Datum
BP1	Client establish the projectplan	2018-10-01
BP2	**Step 1, POC** Easiest possible setup with entire solution in Azure without any integration to Miun Focus: Does the solution/technology works as planned ? Distribution of service : Remote desktop client	2018-10-15
BP3	**Step 2, first real configuration of service** Focus: Integration with Miun – Managering via ActiveDirectory, SCCM, VPN Miun<->Azure Distribution of service : Remote desktop client	2018-11-21
BP4	**Step 3** Countinully work with permission groups and automatisation of software installation, new way of delivery of solution to enduser. Planning of self service in coming pilot 2020 Focus: Futher development integration/automation and economy. Distribution of service : Streaming desktop (web client)	2019-01-14

4 Ekonomi

4.1 Finansiering

Costs		
Type of costs	**Budget**	**Financed by**
Consultancy	150.000	ALP medel
Licence	30.000	ALP medel
Travel expences	20.000	ALP medel
Operation costs (Amazon & Azure)	300.000	ALP medel
Personal costs	94.000	ALP medel
Sum SEK	**594.000**	**ALP medel**

4.2 Budget projektkostnader

Costs		
Type of costs	**Budget**	**Financed by**
Consultancy	287.000	ALP medel
Travel expences	31.710	ALP medel
Operation costs (Amazon & Azure)	217.765	ALP medel
Personal costs	30.774	ALP medel
Material	3.534	ALP medel
Indirect costs	17.787	Alp medel
Sum SEK	**588.570**	**ALP medel**

4.3 Kalkyl över framtida kostnader

A new ALP project is ongoing during 2020. In this project, we will continue to debvelope the digital platform with new available technologies. The aim is to deliver a cost effective and innovative digital platform to Infra, which will maintain it and scale it up to the whole University. The project report will be delivered in 2021.

4.4 Resurser

Funktion	Namn	Avdelning/organisation	Timmar
Projektledare	Stefan Eriksson	Infra	170
Investigator	Itai Danielski	EHB	170

5 Överlämning

No handover at this point, service is still to be developed during 2020 regarding

• Delivery of service, new solution Windows Virtual Desktop

• Mapping of homefolders from Miun to Azure, both students and staff

• Self-service for ordering virtual classrooms

6 Effektutvärdering

The project continues during 2020. A more complete evaluation will be done in February/march of 2021 by Itai Danielski and Stefan Eriksson.

7 Projektutvärdering

7.1 Analys av utvärdering

7.2 Sammanställning resultat från projektutvärdering

1.Helhetsintryck

Vad är ditt helhetsintryck av projektet?

2.Projektmål

Hur tydliga upplever du att projektmålen var inför projektet?

Upplever du att projektmålen har uppnåtts?

3.Hur upplevde du projektet utifrån följande projektparametrar?

Projektledarens insats

Projektets tidplan

Projektets mötesformer

Dokumentation i projektet

Kommunikation i projektet

4.Allmänna synpunkter

8 Erfarenheter från projektet

Due to intern re-organization in the University, we could not get all the support from the University IT group and their leadership, and valuable time was lost. The results of that was that we had to rely heavily on consultants, which in turn resulted with higher costs.

Today after the re-organization is complete, there is much better IT support in the second phase of the project during 2020.

In overall, the project met its goals. And many departments within the University showed interest in the digital platform.