

Student ID Card System

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Agenda

- Introduction
- Company & context
- Scoping
- Design methodology
- Design process and methods
- Redesign solution
- Alternative solutions
- Limitations
- Questions

Real-World Case Presentation

Client

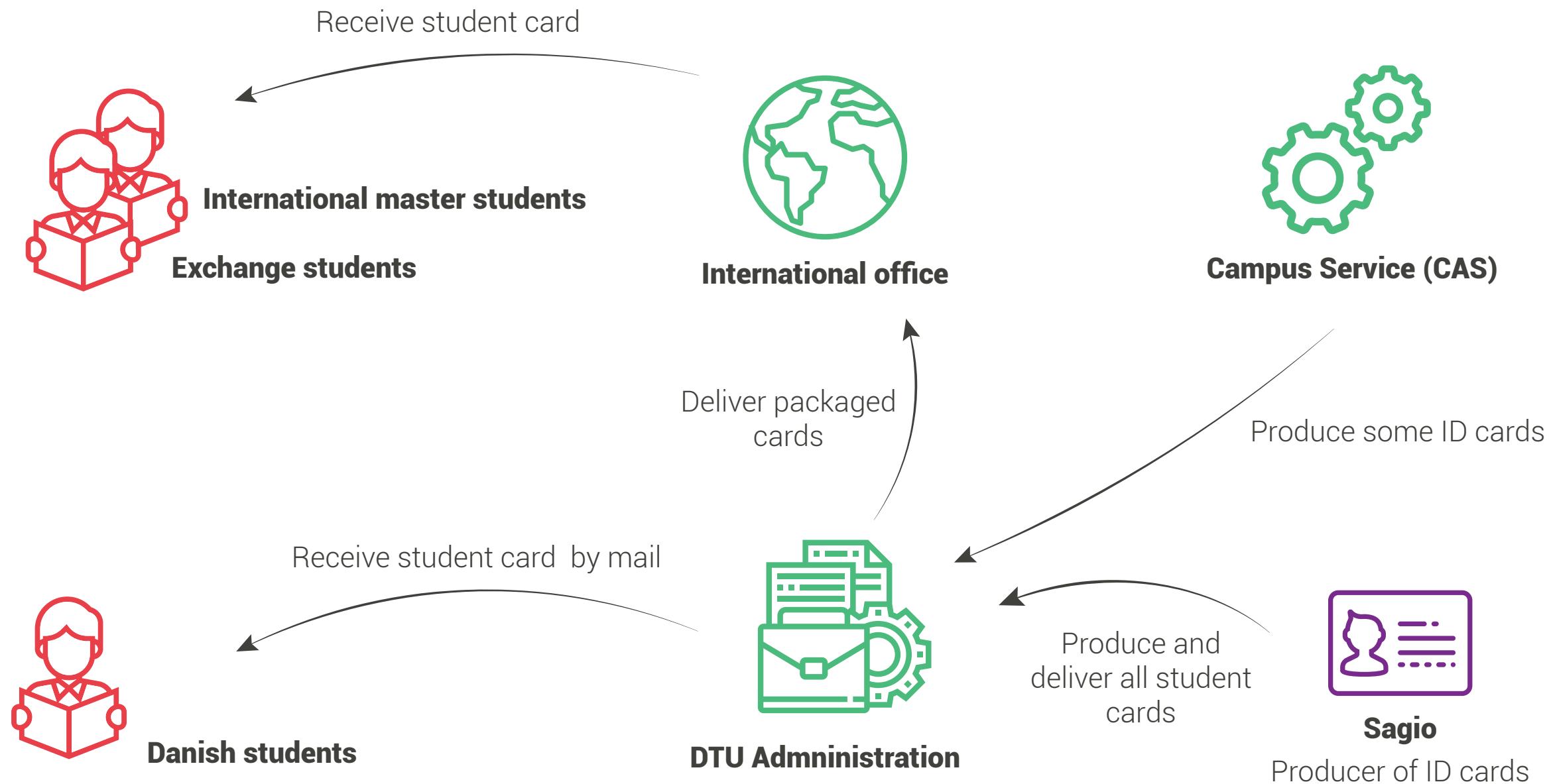
International Office at DTU

System

Student card production and delivery process

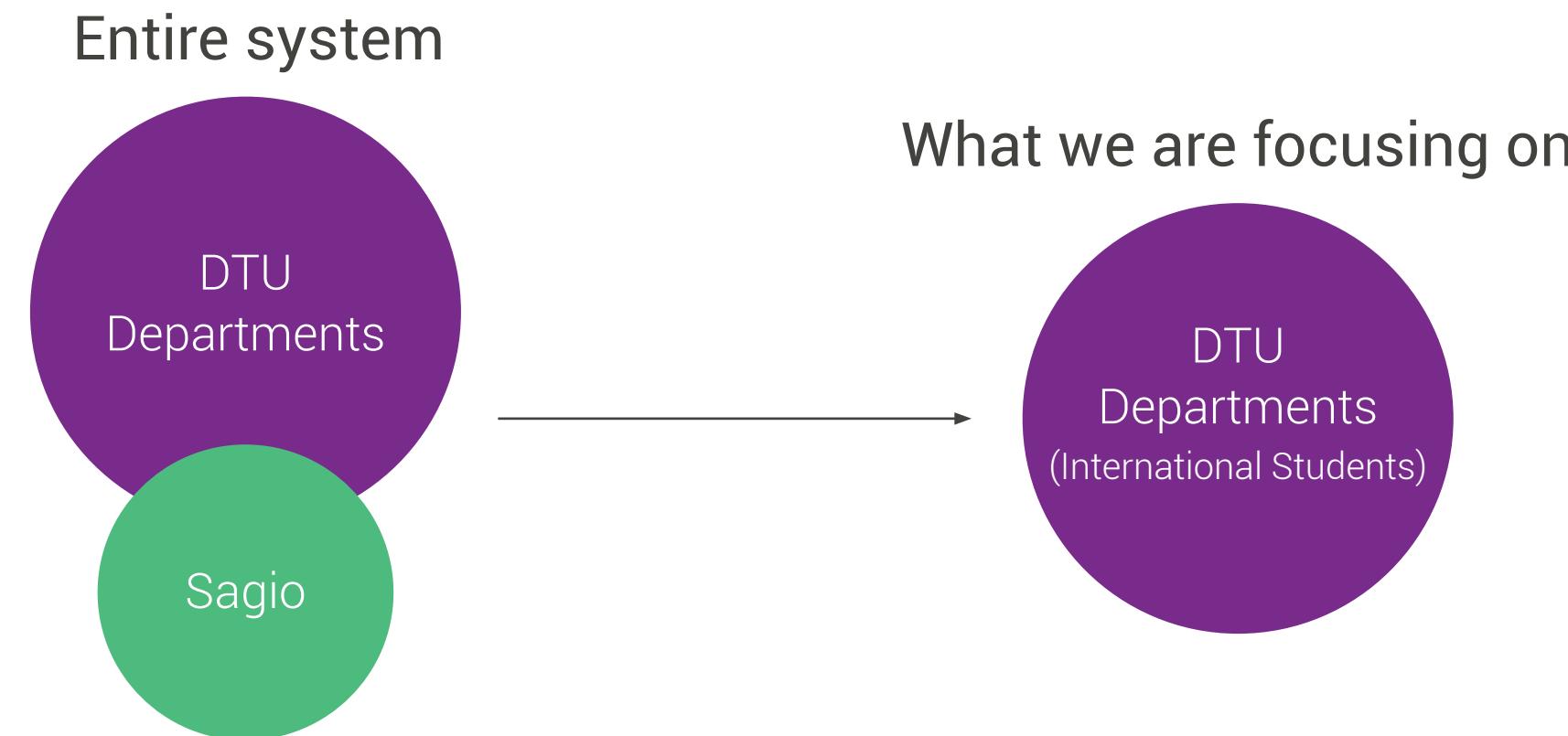
Having four international students in the group, we quickly came to a consensus that the student card system at DTU could be a potential case, based on our own experiences.

Stakeholder overview



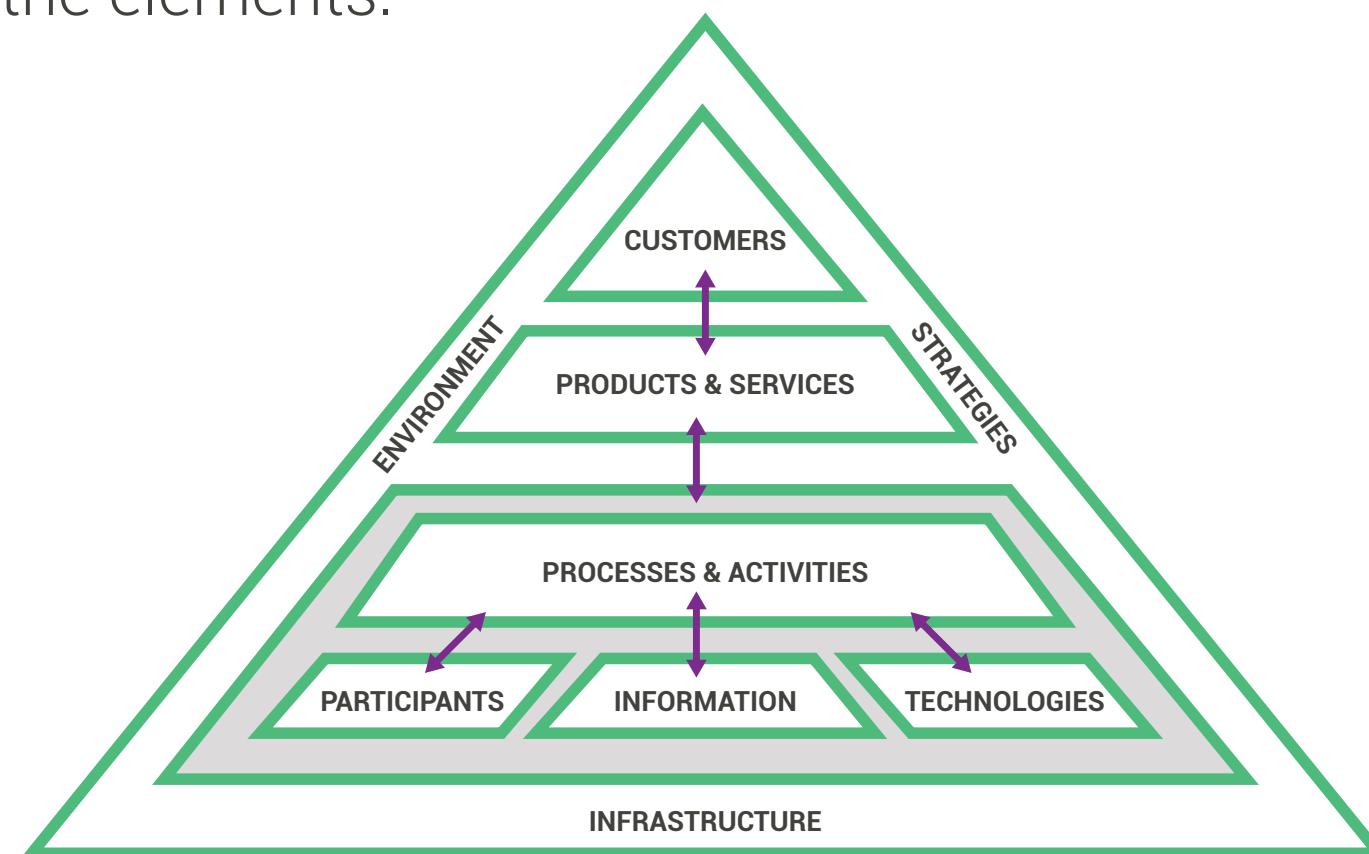
Scoping

The system has a DTU side and a Sagio side. After looking into both sides, we found out that the DTU side has some problems that need to be fixed. Therefore, we will continue with the DTU Departments that are included in the process: Administration, International Office, Campus Service, IT Service. Sagio is not within the focus area because it is already able to produce and sent the cards fast (3-5 days) and efficient.



Design process

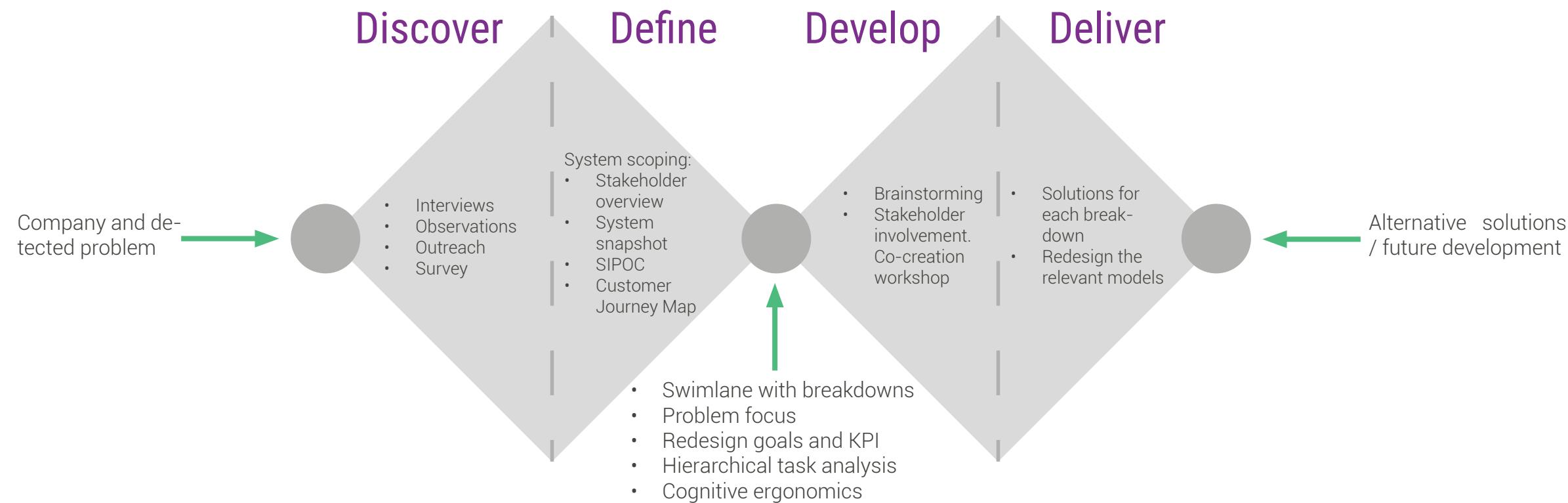
- Within this research the Work System Framework and the Work System Method have been used as outlines to analyze the system and provide a general structure for the research.
- The Work system Framework was used to identify the elements and the balance between them. The research was focused on identifying and solving any imbalances between the elements.

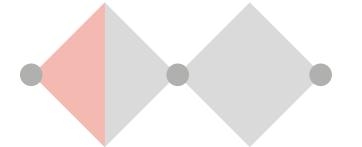


Design Process

To research the specific problematic areas of the system, define the scope and explore options before choosing a specific recommendation, the double diamond methodology has been followed. In that way, the team assured that the problem was clearly defined before developing solutions. To be sure that all relevant knowledge is applied in all the steps of the process, the method has been used in an iterative manner.

Several tools have been applied in each of the diverging and converging phases of the process:

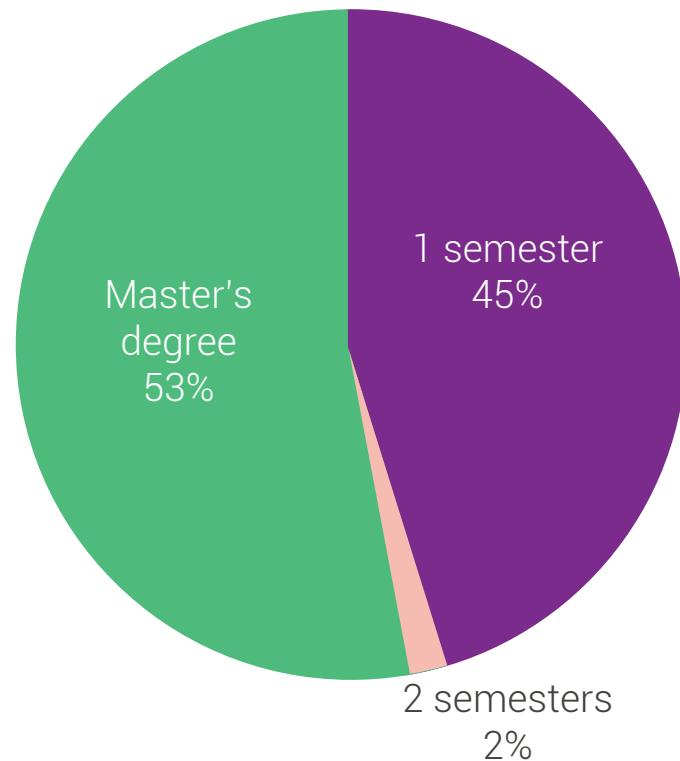




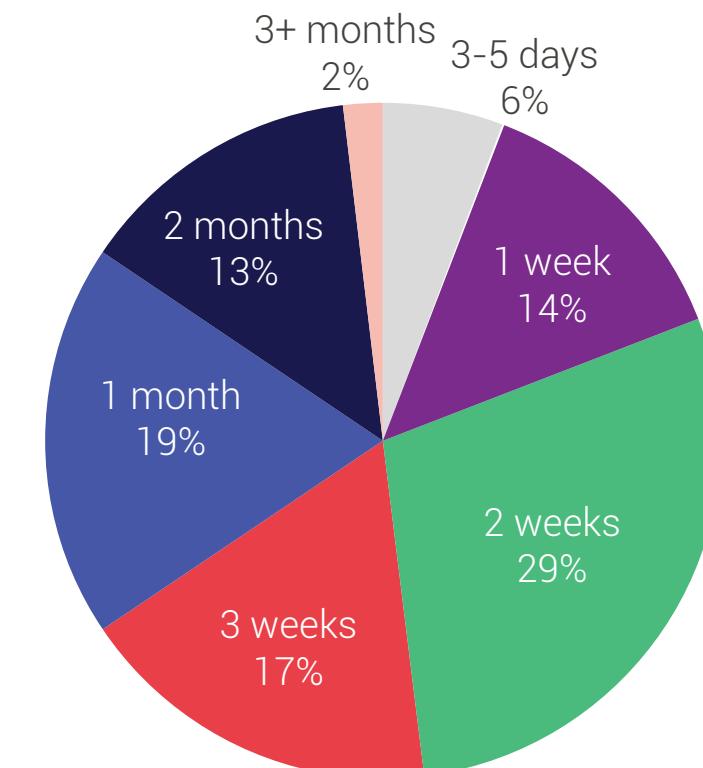
Survey of International Students

53 responses

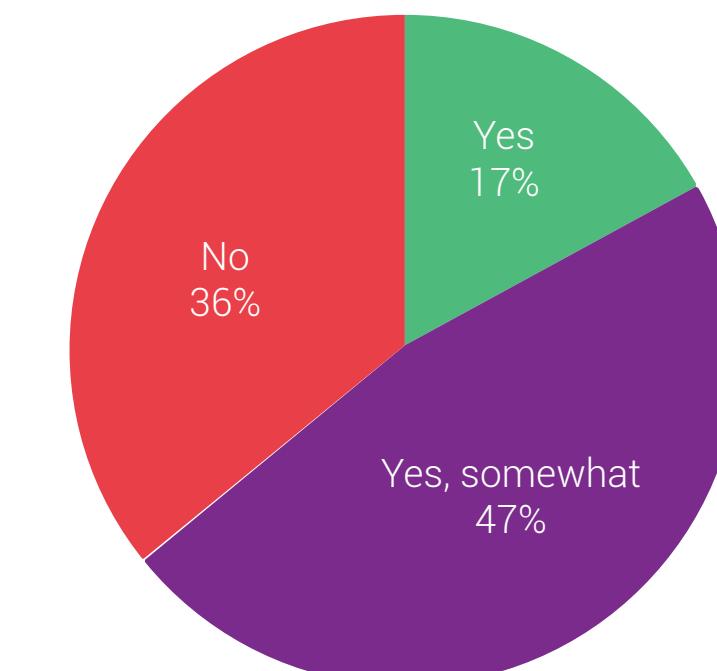
How long are you planning to study at DTU?



How long did it (student ID) take to arrive?



Did you find the student card process difficult or confusing?



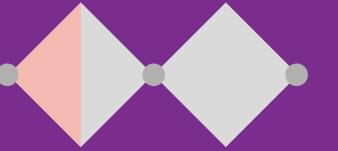
The survey was shared on Facebook and among our International connections

Student Problems from Survey



The most common problems (aside from waiting time) the students found were:

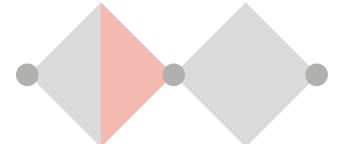
- Knowing whether your card is in progress (66.7% of responses)
- Communication from DTU about uploading a picture (47.5% of responses)
- Knowing whether your picture was approved (36.1% of responses)
- Finding the link to upload the picture (25% of responses)
- Using the upload picture page from DTUBasen.dtu.dk to upload the picture (22.2% of responses)



Interviews

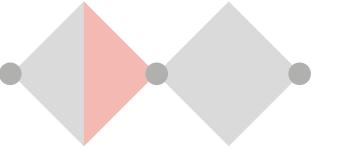
1. **Keegan van Kooten**, student helper & **Trent Coelli**, international study advisor at the International office.
2. **Keegan van Kooten**, student helper at the International office.
3. **Ian Dyrmose**, DTU BMS Technician & **Bo Carlsen**, Head of Section, BMS Campus Service.
4. **Victoria Vorting**, IT support manager and head of the card system at Copenhagen Business School.
5. **Camilla Aros Borch**, University of Copenhagen, IT support & counseling

SIPOC



The SIPOC was the first system analysis we made. To understand the card system at DTU, it was very important to gain an overview of inputs and outputs in the system and who supplies what to whom during the card creation process.

	Supplier	Input	Process	Output	Customer
1	International office	E-mail content/ student data	Receive e-mail	Notified student	Student
2	Student	Picture	Upload picture	Uploaded picture	DTU administration
3	Website/database	DTU administration	Verify picture	Declined/accepted picture	Student/Sagio
4	Database	Administration worker	Data sent to Sagio	Data transfer	Sagio
5	DTU administration/ database	Student data (including picture)	Sagio produce and send card	Student card/ student letter	DTU international office
6	Sagio/DTU	Card/letter/ international office	Prepare letter and notify student	Envelope (card,letter)/ notification e-mail	Student
7	DTU international office	Notification e-mail	Pick up and arivate card	Functioning activated card	Student

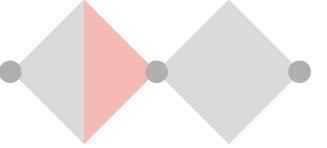


Snapshot

The snapshot was done immediately after the SIPOC. It was a good way to gain an overview of all the different stakeholders and the different artefacts in the system, such as information and products.

CUSTOMERS	PRODUCTS & SERVICES	
<ul style="list-style-type: none">• DTU students• DTU<ul style="list-style-type: none">• International office• Administration office• CAS• Sagio	<ul style="list-style-type: none">• Student cards• Student card activation letter• Student card printing (both DTU & Sagio)• Student card support (DTU administration/international office)• Printing software (Sagio)• Printing support (Sagio)• E-mail notifications (DTU administration)	
WORK PRACTICES (MAJOR ACTIVITIES OR PROCESSES)		
<ol style="list-style-type: none">1. DTU administration office sends out e-mail to student notifying them that they need a student card.2. Student uploads a picture to the DTU database.3. CAS DTU approves the student picture or declines it.4. If approved Sagio pulls the picture and student data directly from the DTU database and produces the student cards at their own facility.5. Afterwards Sagio sends the international and Danish student's cards separately to the DTU adm. office.6. A student assistant at the DTU adm. office packs each student card with an instruction letter on how to activate the card in an envelope.7. The Danish student cards get sent out through a postal service at this point. The international student envelopes are brought over from the adm. office to the international office.8. A worker from the international office then manually looks in each envelope to verify the student number and write it on the envelope.9. The worker then uses Outlook to find the students email in the e-mail database and sends out a notification to the student asking them to pick up the envelope with their student card at the DTU international office.10. The student arrives and shows a valid photo ID which enables them to pick up the card.		
PARTICIPANTS	INFORMATION	TECHNOLOGIES
<ul style="list-style-type: none">• DTU students• DTU administration office• DTU International office• DTU IT service office• DTU CAS• Sagio	<ul style="list-style-type: none">• Student database• Student pictures• Notification e-mails 1 & 2• Card activation letter	<ul style="list-style-type: none">• Sagio software• Sagio card printers• DTU card printer• DTU student database• Internet/e-mail system• Computers

Customer Journey Map

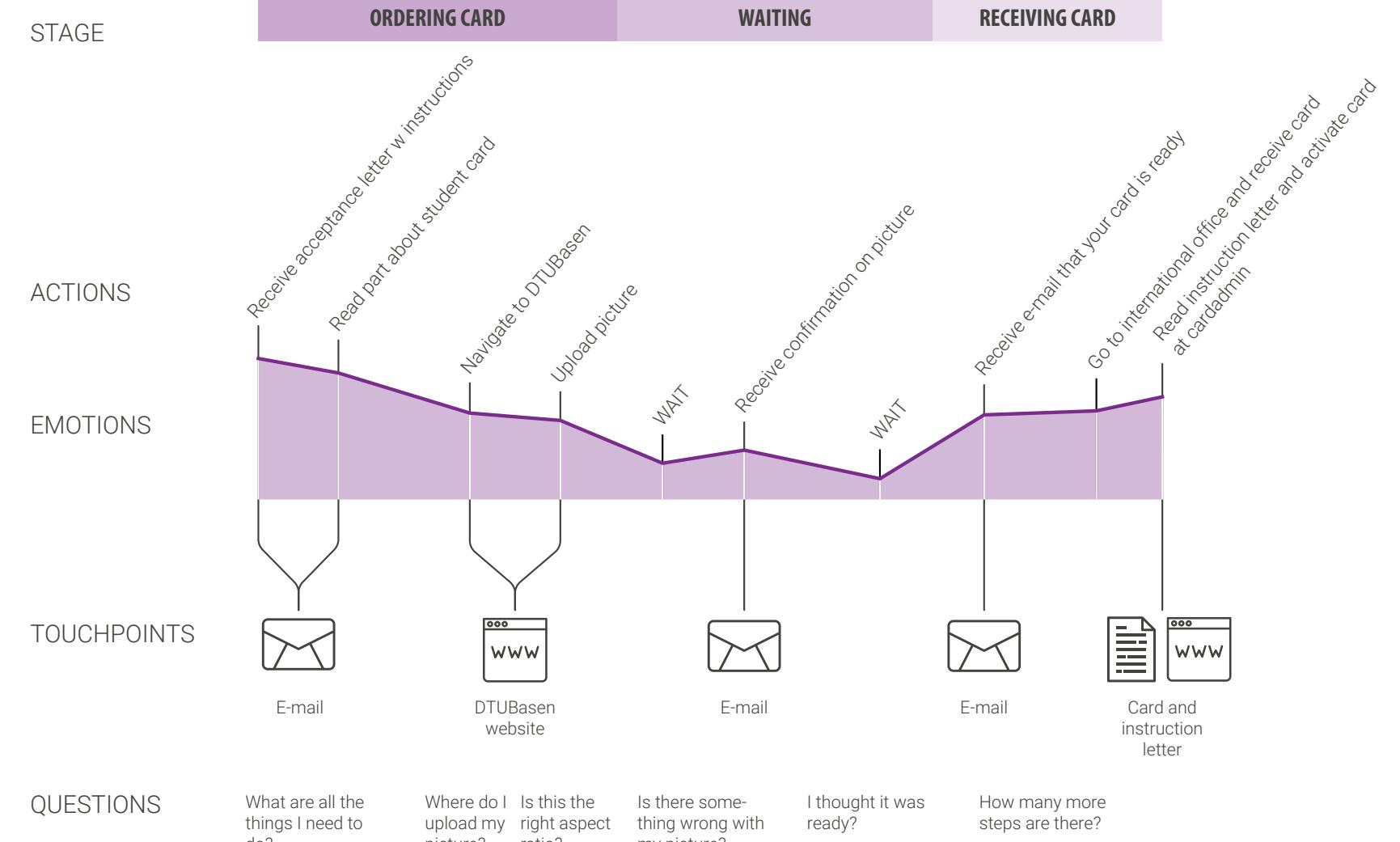


- The wait time is a big problem for the customer.
- The interaction and touch points are mainly digital.
- The students may have many questions throughout the process.

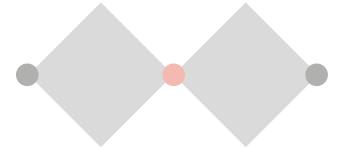


María García
24 years old
International master student
Spanish

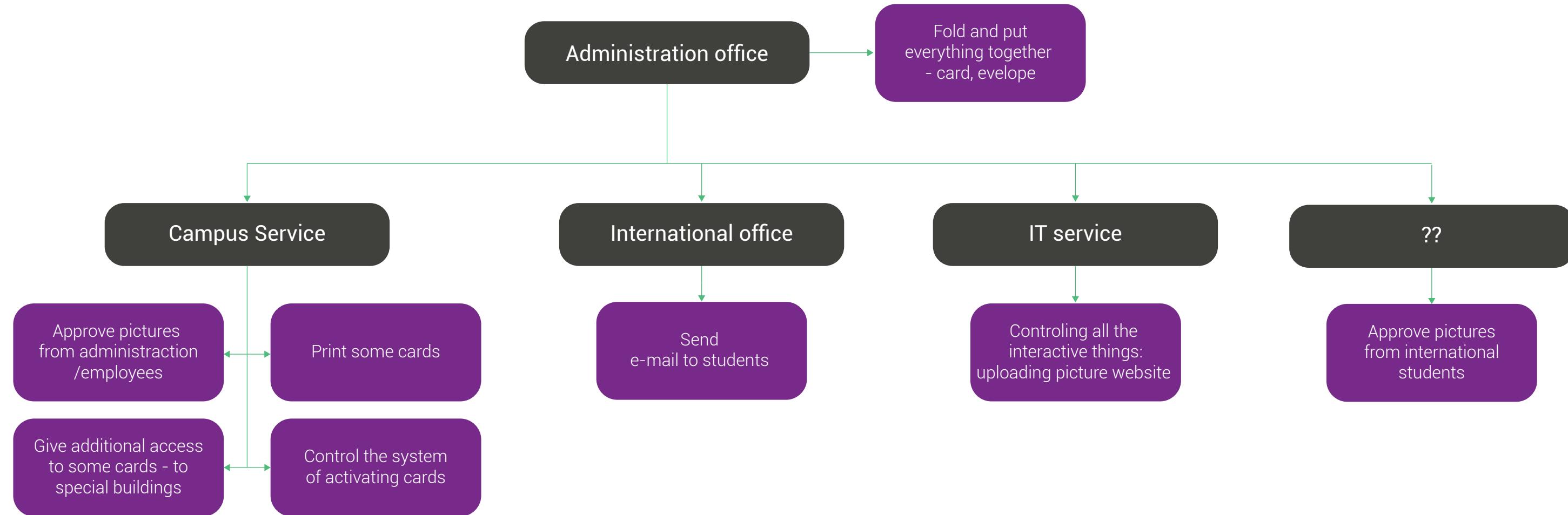
Excited about studying abroad
Likes to have things under control
Needs the card for gym access and food discount



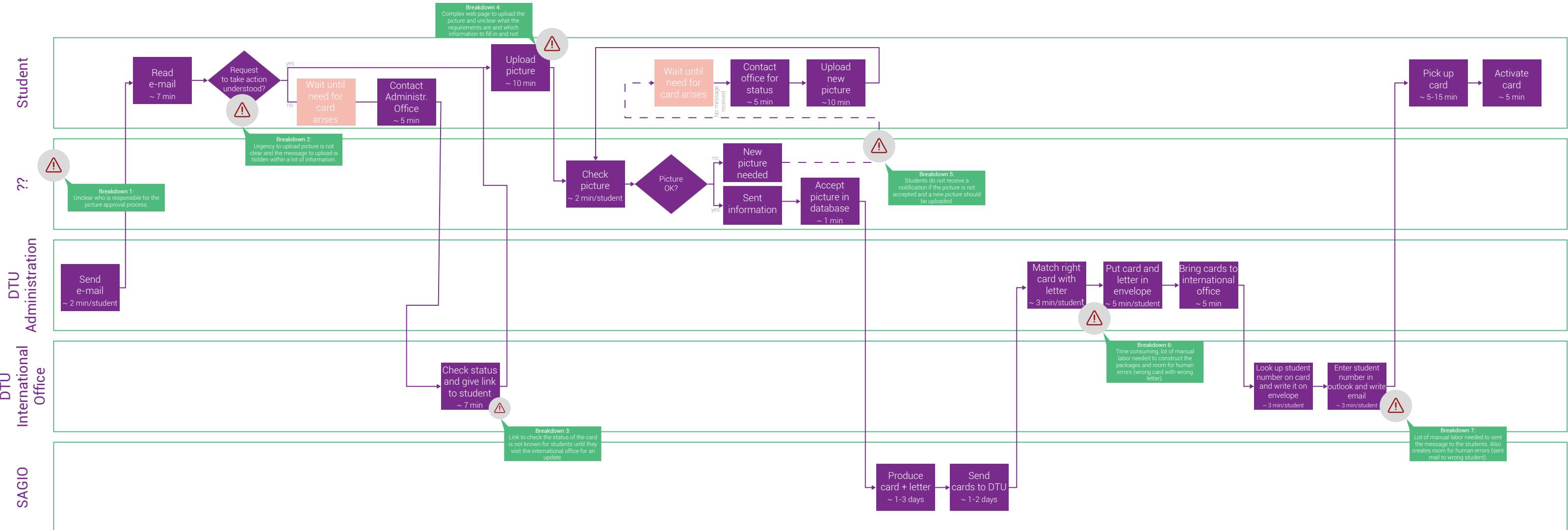
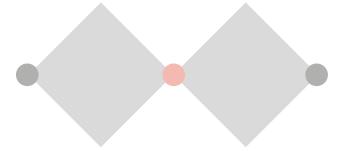
Organisational Ergonomics



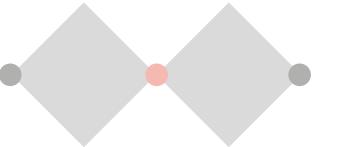
In order to understand the relationships between the different organisational units and the processes that each of these units perform we mapped the organisational ergonomics within the current situation.



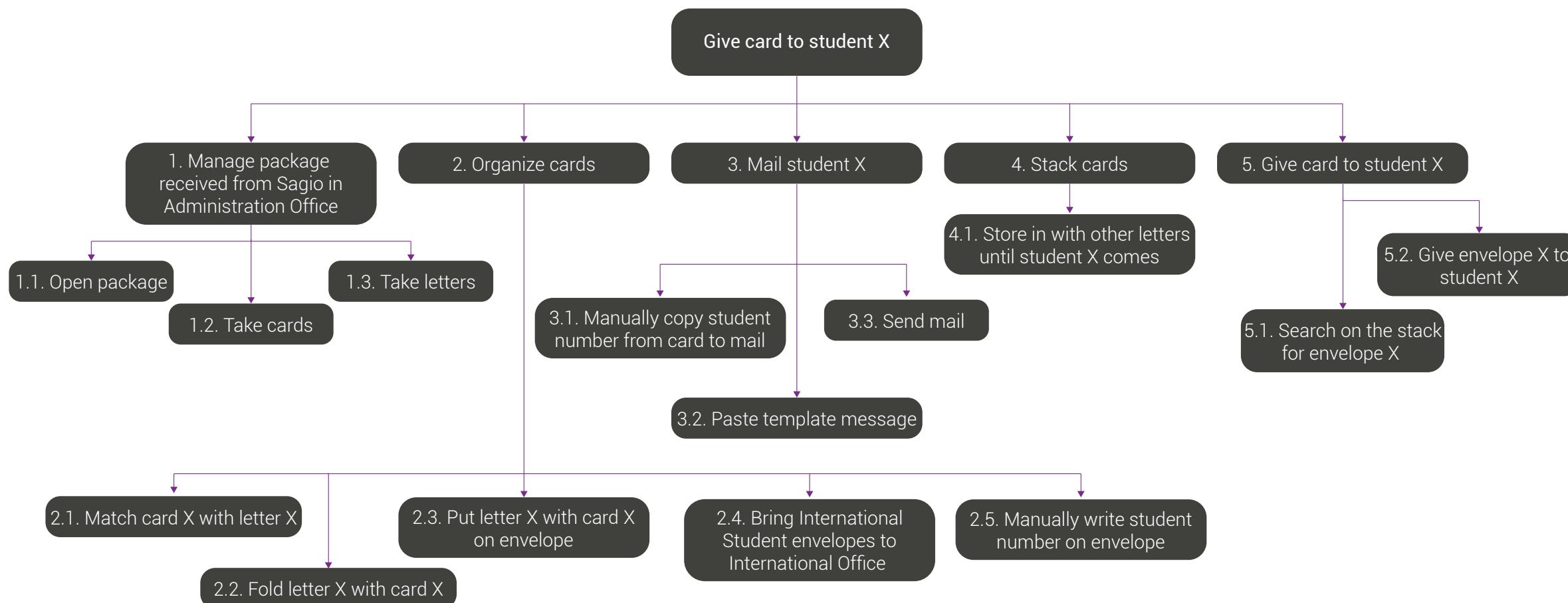
Swimlane Diagram



Hierarchical Task Analysis



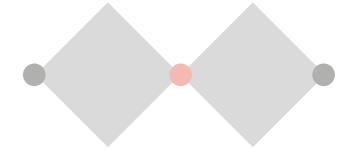
To provide students with cards require several manual steps to follow. To visualize and comprehend each of this activities, a hierarchical task analysis has been mapped:



Detected Issues:

- Each card arrives with a letter, and they need to be matched together and put into envelopes which leads to excessive work
- Manually typing student numbers and sending emails creates mistakes
- No efficient ordering and storage method

Cognitive Ergonomics



The screenshots show a user interface for uploading a profile picture. The top screenshot displays a form with various fields: Fornavn(e) (Monika), Efternavn (Scibor), Brugernavn (s180019), Officiel email-adresse (s180019@student.dtu.dk), Skjul billede (Nej), Navn på kontaktperson (nærmeste pårørende), Relation til kontaktperson, Telefonnummer på kontaktperson, and ADRESSE (Hjemmelig adresse). Annotations highlight the 'Upload billede' button (labeled 'Upload "button" is hard to spot'), the continuation of the form down the page (labeled 'Form continues down the page'), and the expectation of finding the upload button further down (labeled 'Eyes go to a form with personal info expecting the upload to be further down'). The bottom screenshot provides instructions for picture upload, mentioning file size limits (10 MB, 3:4 aspect ratio), cropping, and approval criteria. Annotations point to the 'Choose File' button (labeled 'A lot of text to read before hand') and the 'Upload' button (labeled 'This button implies that you upload your picture directly').

The cognitive ergonomics were considered for the interface where the students upload their picture. It was done by looking at the screens from a UX point of view.

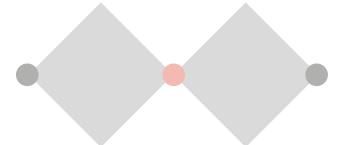
Main points were:

- upload button is hard to spot,
- there is a lot of text,
- the need to crop image is not obvious.

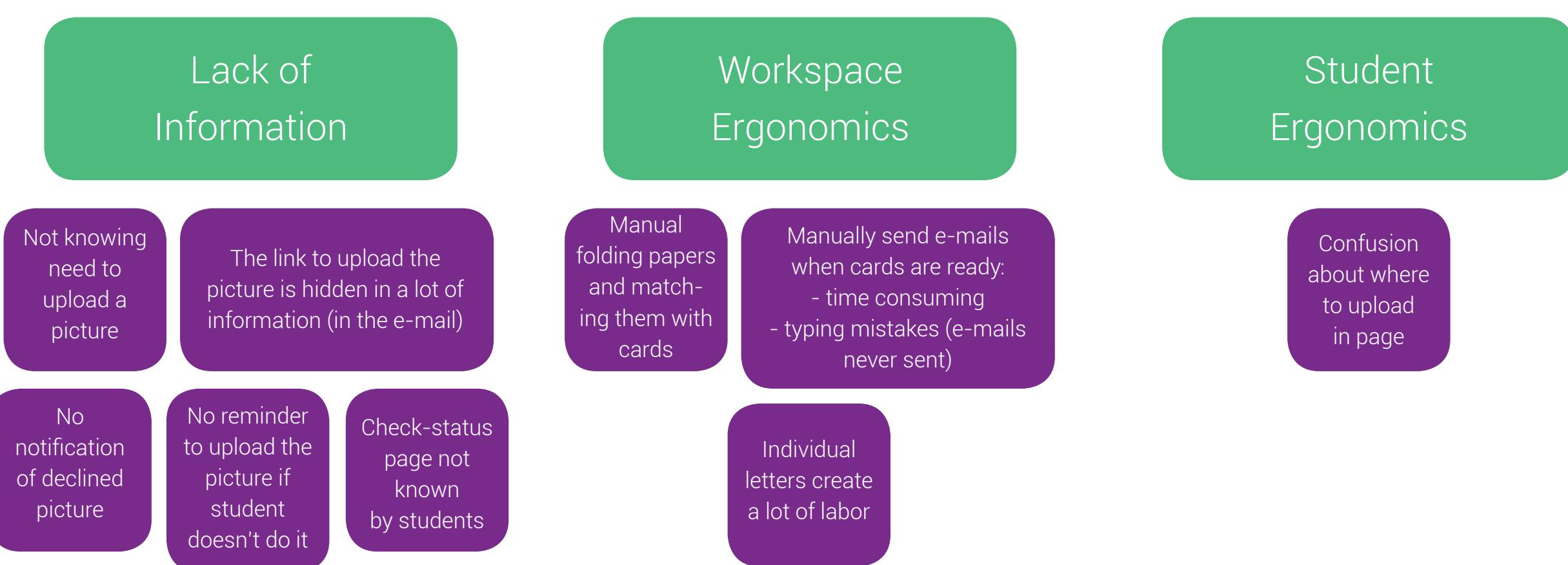
Test with users

- 4 out of 4 did not see the upload button at first,
- 0 out of 4 read all of the text,
- 3 out 4 did not understand that they had to crop.

Problem Focus



We did a small affinity diagram to collect all the issues and points from our field work and analysis. This resulted in the problem focus with three different categories: lack of information, workspace ergonomics and student ergonomics.



Breakdowns overview

7 breakdowns were defined based on analysis and affinity diagram. The breakdowns touch on different parts of the system.



Breakdown 1:

Unclear who is responsible for the picture approval process.



Breakdown 2:

Urgency to upload picture is not clear and the message to upload is hidden within a lot of information.



Breakdown 3:

Link to check the status of the card is not known for students until they visit the international office for an update.



Breakdown 4:

Complex web page to upload the picture and unclear what the requirements are and which information to fill in and not.



Breakdown 5:

Students do not receive a notification if the picture is not accepted and a new picture should be uploaded.



Breakdown 6:

Time consuming, lot of manual labor needed to construct the packages and room for human errors (wrong card with wrong letter).



Breakdown 7:

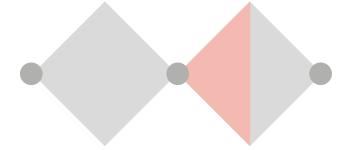
Lot of manual labor needed to sent the message to the students. Also creates room for human errors (sent mail to wrong student).

Redesign Goals & KPI's

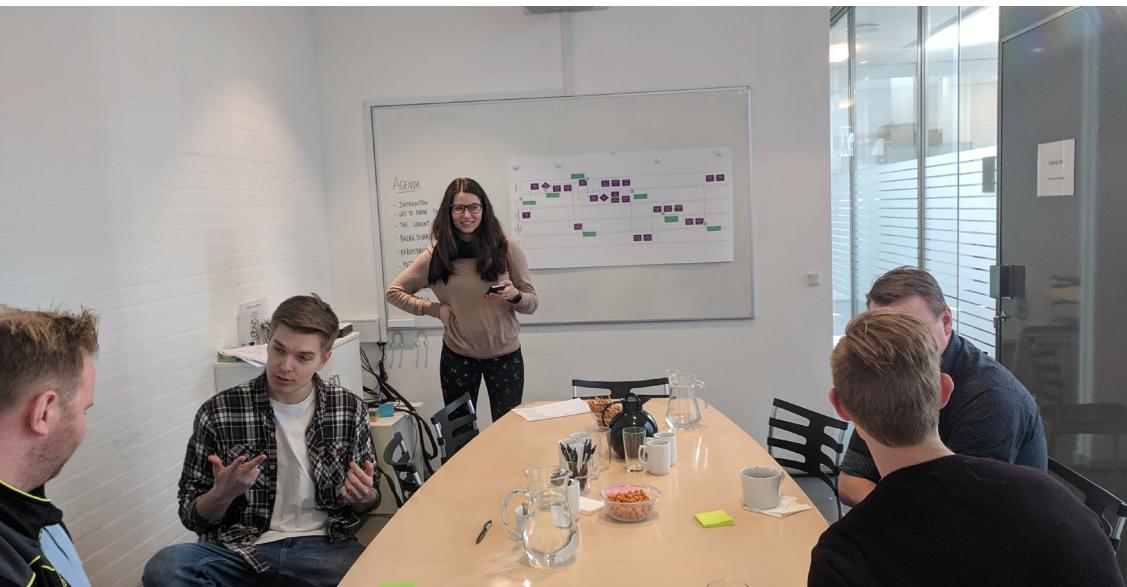


Reduce waiting time for student to get card	< 1.5 weeks
Reduce time between intro email and card application	% of students that upload within a week of receiving email Amount of urgent cards needed for exam
Reduce manual tasks within the process at	Reduce amount of tasks and human errors
Improve cognitive ergonomics for uploading picture	Time to complete task

Stakeholder Involvement



A co-creation workshop was organized the 8'th of April with some of the main stakeholders that have influence in, knowledge of, or control parts of the student card system. The workshop was located at DTU in one of the rooms at the DTU administration: LY101-R1.020A and was scheduled to last one hour.



→ International Office

- Keegan van Kooten, Student helper as spokesperson for
- Trent Coelli, International Study Advisor

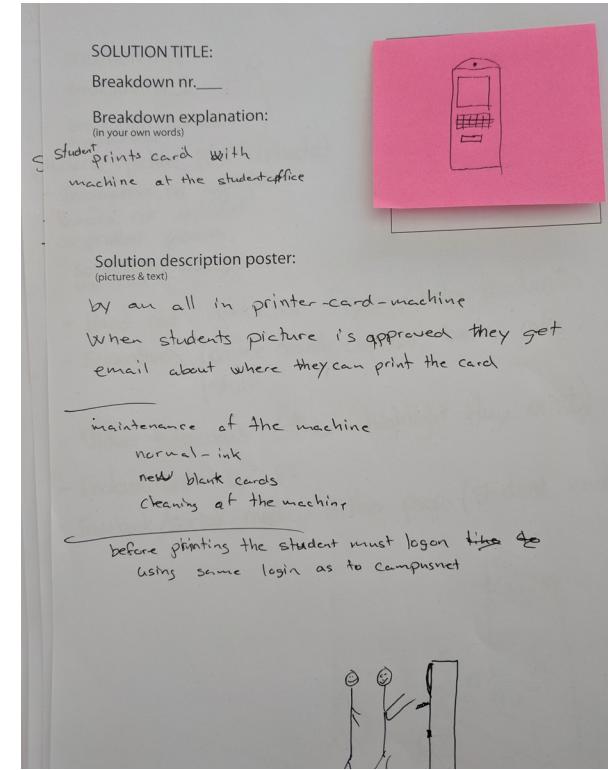
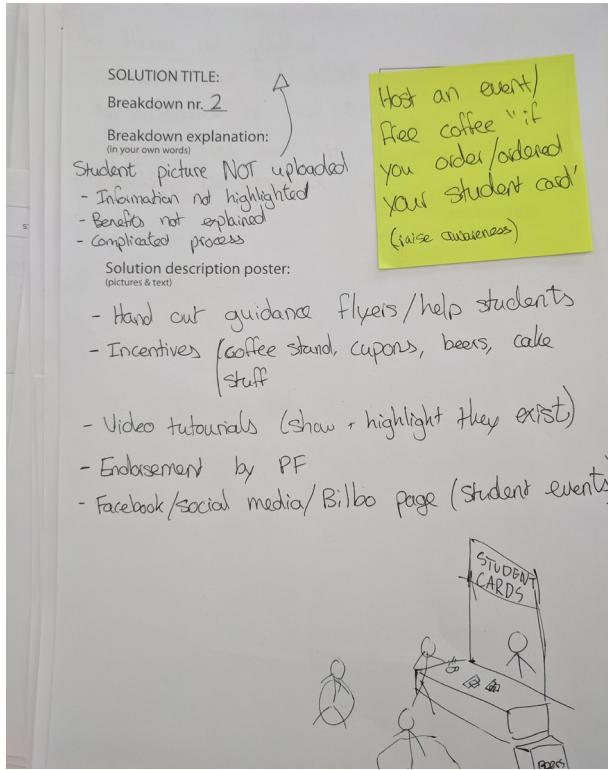
→ DTU BMS (Building Management System)

Ian Dyrmose, DTU BMS Technician

→ Study Administration System (STADS)

Hans Bredenfeld Matzen, STADS System Manager

Workshop Output



- Group 1 (Benjamin & Keegan) analyzed breakdown 2:
Urgence to upload picture not clear. Message hidden in a lot of information

Breakdown 2 - solution idea

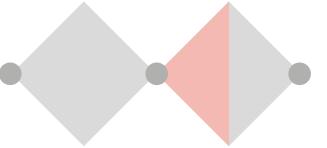
Host events at the beginning of the semester were this informations are given and promoted, together with incentives (coffee, coupons...)

- Group 2 (Ian & Hans) analyzed breakdown 7:
Big amount of manual labor to sent messages to students. Leads to human errors.

Breakdown 7 - solution idea

After the student has uploaded a picture and it has been accepted by a human, the student can enter his/hers credentials in a machine which prints the card in-situ.

Solutions Brainstorm



To generate ideas for solutions that can be developed into the design solution the brainstorm method was used. For each breakdown several ideas were generated which could solve the problem. Some of these ideas are the following:

Breakdown 1

- Have a dedicated team that checks pictures. Also make overview of these persons so they can be contacted.
- Use machine learning tools to analyze and approve the picture as replacement for employee.

Breakdown 2&3

- Move picture upload message to the top of DTU introduction letter.
- Send a separate email about picture upload request and student card with the introduction letter.
- Have upload of image be a mandatory part of application to DTU for international students.
- Pop-up reminders on Inside to upload picture.
- Access to DTU inside requires picture upload.
- Picture upload confirmation mail contains card progress link.
- Show card progress status bar where the picture is uploaded.

Breakdown 4

- Make clear which information needs to be filled in to upload picture
- Get the picture automatically from the home university when the student applies at the DTU.
- Better and easier to spot buttons.
- Design a different page without the other information but just designed for the uploading of the pictures.
- Less text and fewer pages/steps.

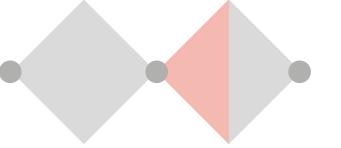
Breakdown 5

- Approve picture automatically and give immediate feedback
- Notify via inside pop-up if picture is not accepted
- Send an email with the link for uploading the new picture
- Status/decision of picture visible on the card progress website

Breakdown 6&7

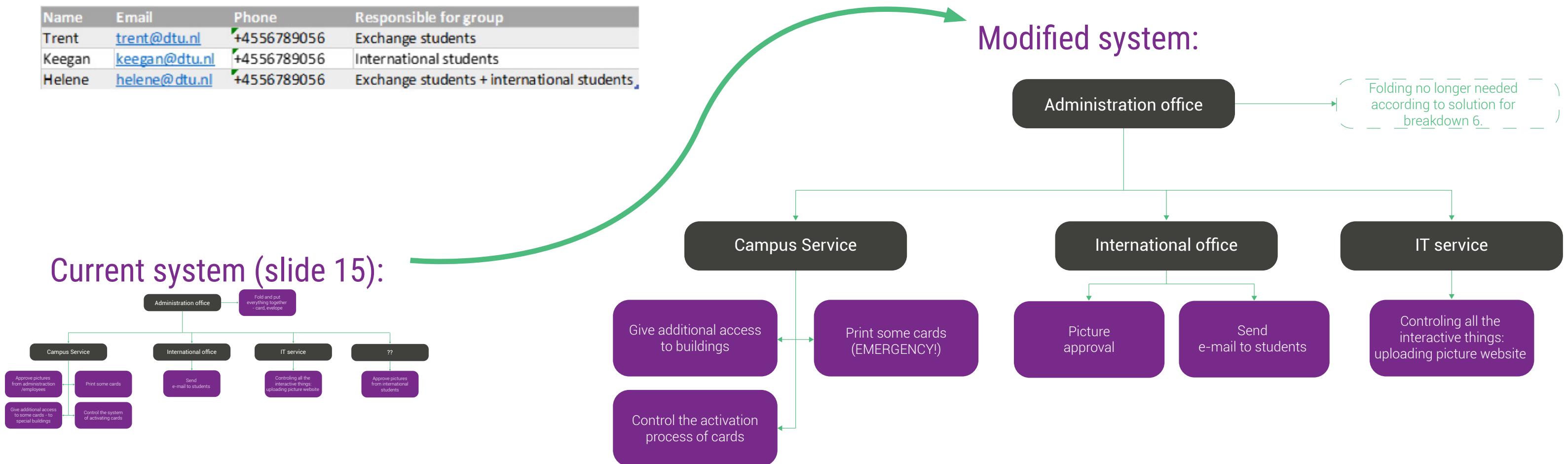
- Suppress physical letters and envelopes
- Alphabetical / numerical storage of cards
- Machine that generates the card automatically when the student uploads a picture and will give the student card directly to the student.
- Get a RFID scanner to just scan the cards, pull the student email from a database and send notification email automatically
- Pop-up in dtu inside, your card is ready
- DTU gets a QR-code in the package from Sagio that can be scanned by DTU employee and send emails automatically.
- Use a digital student card that can be shown on a mobile phone.

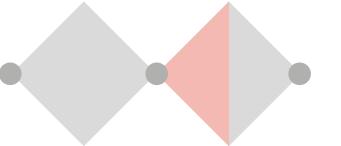
Breakdown 1



Unclear who is responsible for the picture approval process

The International Office incorporates a section with personnel responsible of approving pictures. During peak periods (semester start) it consists on their main task. A list of responsible persons (which can be consulted by Administration Office) is created with the responsible names, assigned pictures to approve and contact details.





Breakdown 2&3

Urgency to upload picture is not clear
Link to check status of the card is not known by students

Make the picture upload a mandatory part of the application for international students and provide information of the card status in the same page where the picture is uploaded.

The Introduction Week concludes with a Gala Dinner, so bring a suit or dress.
Questions related to the Introduction Week should be sent to
introductionweek@adm.dtu.dk

Student Card

Please note that in order for us to have your student card ready for the Introduction Week, you should upload a passport size photo via **DTU Inside**. You do this by choosing "Settings" -> My Profile -> Edit your personal data in the DTUbase -> Change personal data -> Upload Picture

Mail - vEB @adm.dtu.dk

Questions related to getting your Student Card should be sent to international@adm.dtu.dk
For more information, please visit our [Before Study Start page](#). You can also learn more about [Student Life at DTU](#)

Please make sure to check for messages and updates on DTU Inside at a regular basis.

The message was created 11-6-2018

You may disable notifications for new news bulletins in this group [Here](#) .

Following text should be added here:

https://www.dtubasen.dtu.dk/admin/studinfo_update.aspx

"With this link, you will also be able to track your cards ongoing progress from when you upload your picture to when it is ready for pick-up"

DTUBasen In English

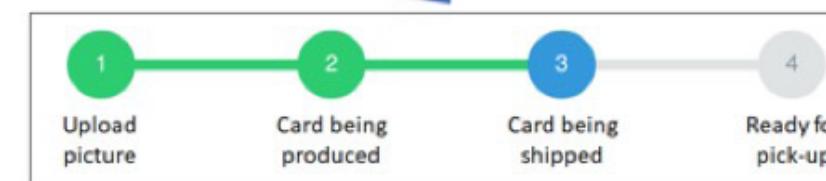
Upload billede

Formavn(e) Benjamin Joshua
Efternavn Nielsen
Brugernavn s165065
Officiel email-adresse s165065@student.dtu.dk
Skjul billede Nej
Navn på kontaktperson (nærmeste pårørende)
Relation til kontaktperson
Telefonnummer på kontaktperson

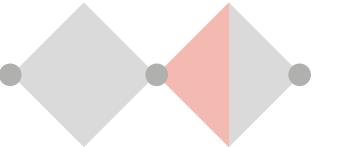
ADRESSE

Hjemmelig adresse Nej (Fra folkeregistret)
Telefon
Mobil telefon
Skjul mobiltelefonnummer Nej
SMS-telefonnummer

Progress bar like below should be inserted below the picture upload area:



Breakdown 4



Complex webpage to upload the picture and unclear what the requirements are

Redesign the webpage where the student should upload the picture. The main improvements are:

- Make the upload button more visible with color and centering it
- Include progress bar (solution from breakdown 3)
- Visualize picture requirements
- Show cropping immediately
- Less text

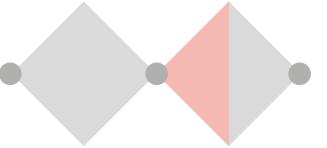
The initial webpage layout is complex and cluttered. It features a header with the DTU logo and mathematical formulas. Below the header is a 'MAIN MENU' and 'USER'S GUIDE'. The main content area contains a 'Picture upload' section with a 'Choose file' button, a crop preview area showing a silhouette of a person's head, and a list of restrictions: 'Your image will be cropped to a 3:4 ratio', 'Restrictions for picture: Cannot be larger than 10 MB, No silly photos, Only one person in picture'. To the right, there is a large, empty gray box labeled 'Accept and upload'.

This iteration shows a simplified 'Picture upload' form. The 'Choose file' button is now green and centered. The crop preview area displays a silhouette of a person's head with a dashed crop border. Below the preview are the same restrictions as the original. To the right, there is a green 'Accept and upload' button.

This iteration shows the result of a successful upload. A green box displays the message 'Upload successful! Your picture has been sent to approval in the DTUBasen'. Below this is a 'Back to Main Menu' button.

This iteration shows the final step of the process. The 'Apply for a student ID card' form includes a green checkmark next to the 'Picture upload' button. Below the form is a 'Basic data' section with 'First name: Anders' and 'Last name: Andersen'. The restrictions text is also present here.

Breakdown 5



Students do not receive a notification if the picture is not accepted
and a new picture should be uploaded

An email with information is generated automatically when the person clicks the reason for rejection.
After clicking the link in the message, the student is redirected to "Upload a picture" webpage.

A pop-up with a simple message appears informing that the picture has been declined.
When the "HERE" button is clicked, the student is redirected to "Upload a picture" webpage.

Your picture has been declined

outboundexchange
Śr 07.02.2018, 17:42

Dear student,

the picture that you uploaded has been rejected. The reason for declination of your picture:

- the size of the picture is wrong

Upload a new picture [HERE](#).

If you have futher questions, please do not hesitate to contact us again.

Best regards,

International Affairs
International Affairs Office
Office for Study Programmes and Student Affairs

Danmarks Tekniske Universitet
Anker Engelunds Vej 1
Bygning 101A
2800 Kgs. Lyngby
Telefon: 45 25 10 23
www.dtu.dk

The person who is accepting pictures has the option to choose the reason for rejection from the list:

- the size of the uploaded picture is wrong
- the resolution of the picture is too low
- the picture is too dark
- there is an unreal/famous person on the picture
- it is hard to see the face on the picture
- the uploaded picture already exists in our base

HERE'. Below it, a list of messages in a forum shows two recent posts: 'Room for rent' and 'Multiple Student Jobs at Sennheiser Communications A/S'. At the bottom, a 'STUDIESKIFT OG RETNINGSSKIFT' section is visible."/>

Undervisning Medarbejder > Mine genveje > Indstilinger English Søg på indhold eller personer

DTU INSIDE Monika Scibor

MINE KURSER OG GRUPPER VÆRKTØJSKASSE STRUKTUR OG REGLER FAGLIGE TILBUD OG VEJLEDNING SOCIALE OG POLITISK

⚠ The uploaded picture has been declined. Check the reason for rejection and upload a new one [HERE](#)

MEDDELELSER - KURSER OG GRUPPER > Alle

Alle Frit forum Nyhedsopslag Personlige beskeder

19 apr. 2019, kl. 12:17 > Frit forum > Kommenter Room for rent Master students

15 apr. 2019, kl. 10:26 > Frit forum > Kommenter Multiple Student Jobs at Sennheiser Communications A/S Master students

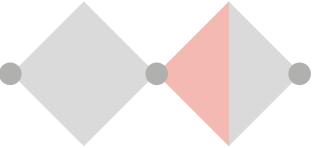
12 apr. 2019, kl. 15:00 > Nyhedsopslag > Kommenter Lions' Den (22nd May)

STUDIESKIFT OG RETNINGSSKIFT 1/6 < >

MINE KURSER OG GRUPPER

Kurser og projekter

Breakdown 6&7



Lot of manual labor needed to construct the packages and send the message to students
create room for human errors and its time consuming

- Cards are received by DTU in stacks with QR code. QR is scanned and an automatic mail is generated for all the students of the stack, notifying that the card is ready to pick up. The letter is suppressed and instead, included in the mail.
- The cards are alphabetically stored in a card organizer until the student picks them up.



Student Card Ready Inbox X

International Study Guidance <international@adm.dtu.dk> Tue, 1 May 2018, 10:32

to ▾

Dear student,

Your student card is now available. You can pick it up at the International Study Guidance Office Mondays to Fridays between 11 and 14. Please bring a valid photo ID.

If you have any further questions, please do not hesitate to contact us again.

Kind regards / Med venlig hilsen

Kristoffer
International Study Advisor
International Study Guidance Office
Study Division

Technical University of Denmark
Anker Engelundsvej 1
Bygning 101A
2800 Kgs. Lyngby
Phone: +45 4525 1023
international@adm.dtu.dk
www.dtu.dk



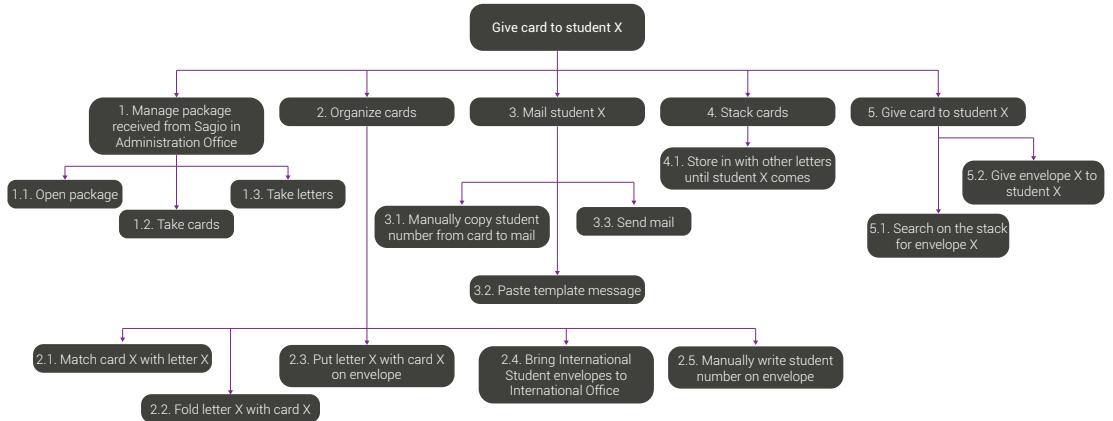
Package contents

1. s180019 - Monika Scibor
2. s175938 - Xenia Valles Gamundi
3. s182276 - Alexandra Ciobica
4. s153235 - Signe Christensen
5. s186497 - Rik Van Deursen
6. s180019 - Monika Scibor
7. s175938 - Xenia Valles Gamundi
8. s182276 - Alexandra Ciobica
9. s153235 - Signe Christensen
10. s186497 - Rik Van Deursen
11. s180019 - Monika Scibor
12. s175938 - Xenia Valles Gamundi
13. s182276 - Alexandra Ciobica
14. s153235 - Signe Christensen
15. s186497 - Rik Van Deursen
16. s180019 - Monika Scibor
17. s175938 - Xenia Valles Gamundi
18. s182276 - Alexandra Ciobica
19. s153235 - Signe Christensen
20. s186497 - Rik Van Deursen
21. s180019 - Monika Scibor
22. s175938 - Xenia Valles Gamundi
23. s182276 - Alexandra Ciobica
24. s153235 - Signe Christensen
25. s186497 - Rik Van Deursen
26. s180019 - Monika Scibor
27. s175938 - Xenia Valles Gamundi
28. s182276 - Alexandra Ciobica
29. s153235 - Signe Christensen
30. s186497 - Rik Van Deursen
31. s180019 - Monika Scibor
32. s175938 - Xenia Valles Gamundi
33. s182276 - Alexandra Ciobica
34. s153235 - Signe Christensen
35. s186497 - Rik Van Deursen

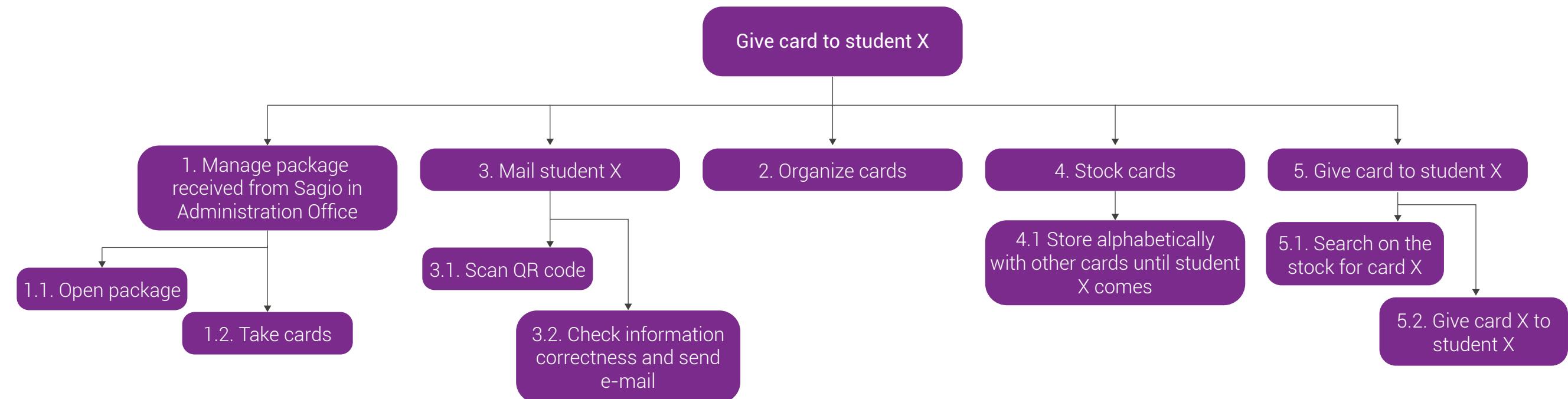


In consequence, the hierarchical task becomes more simple:

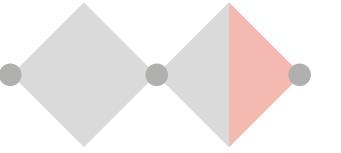
Current system (slide 18):



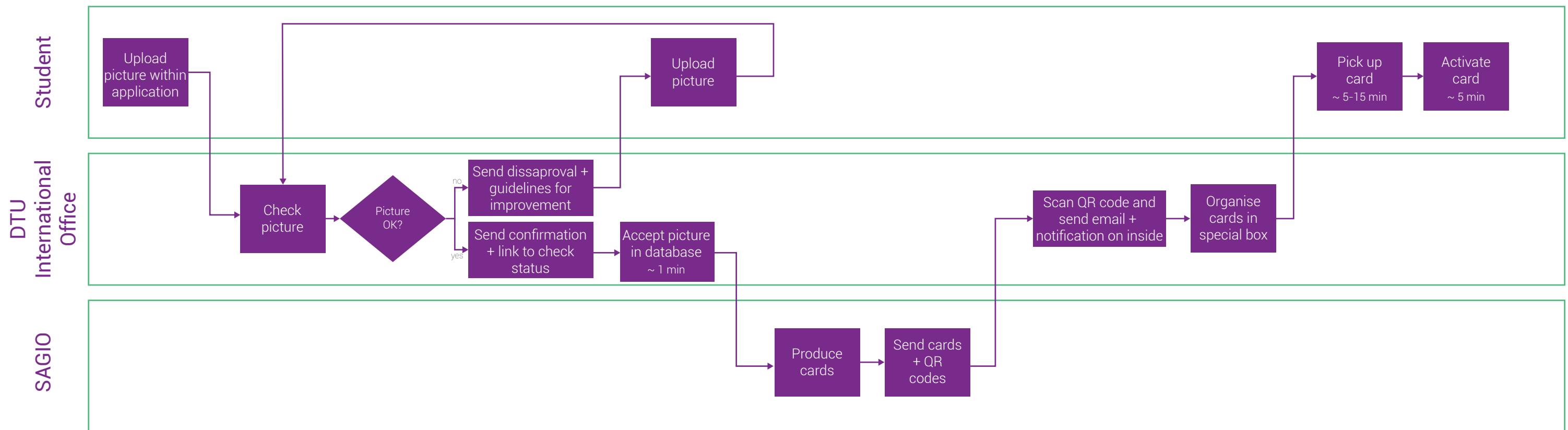
Modified system:



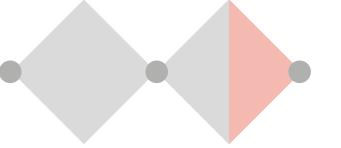
New Swimlane Diagram



- Only 3 parties responsible for the process due to simplification and giving international office more responsibilities (authorization to check and approve/disapprove the pictures).
- Less activities due to simplification and clarification throughout the process (clarification if picture is accepted or not and mentioned what needs to be improved if not accepted also link to check status is directly available and information is shared through inside).
- Amount of manual tasks are reduced (such as folding the letters and entering the mail addresses in the system).



Customer Journey Map

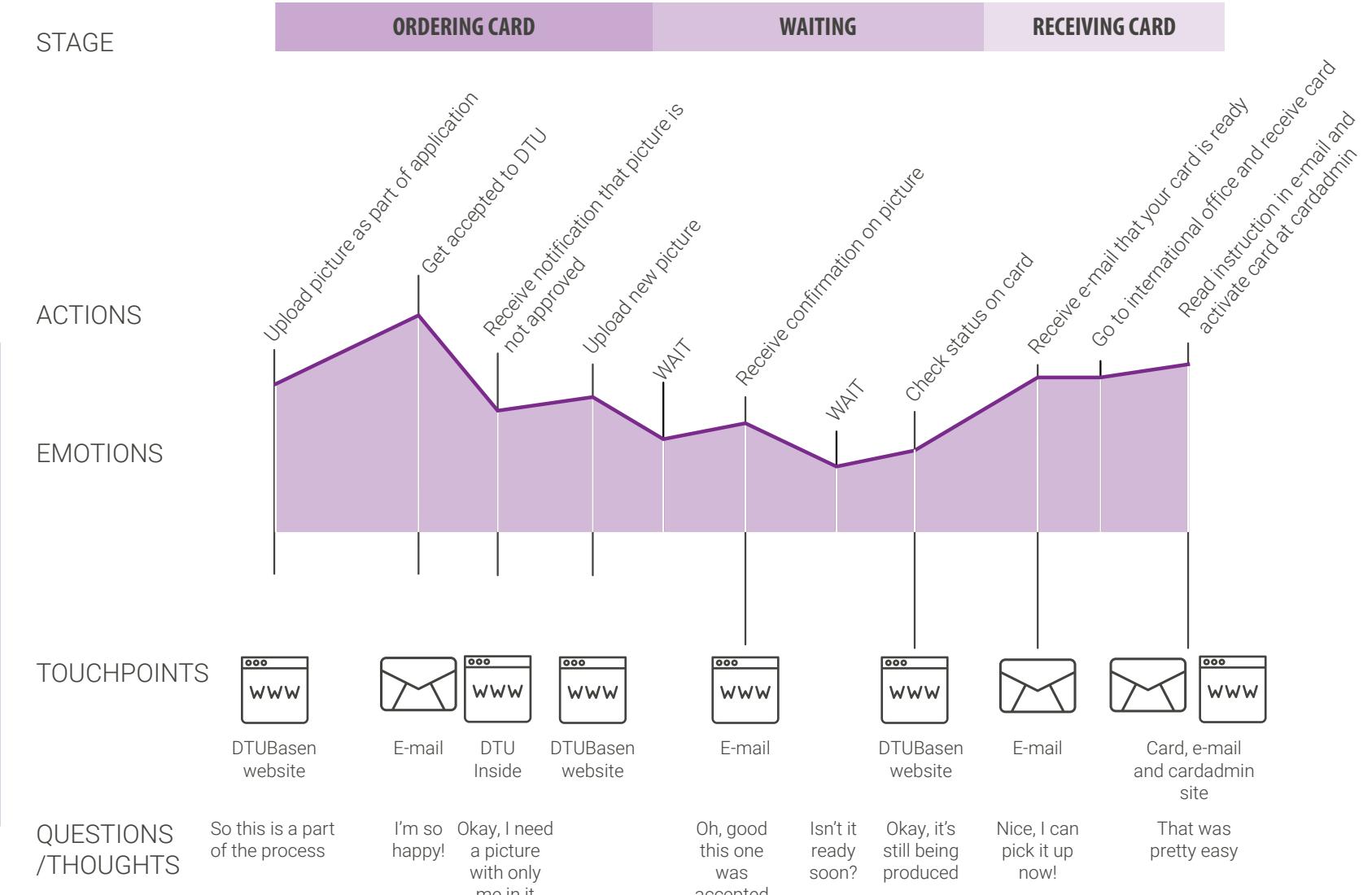


- Less waiting time.
- Better notification.
- Questions from the user are more easily answered by the system - eg. why picture was not approved and how far in the process the card is.



María García
24 years old
International master student
Spanish

Excited about studying abroad
Likes to have things under control
Needs the card for gym access and food discount



Testing and Prototype

Qualitative test - 4 students

- All said the new version was much easier
- Liked the visible upload button, progress bar and that cropping was made obvious
- Were generally quicker with new version

Quantitative test, average time to complete task - 12 students

- Current: 27 seconds
- New: 12 seconds

Alternative Long Term Solutions

One of the outputs from the workshop was the idea for a **self help card printing machine** for students located at the student office that Ian and Hans came up with.

- Student will get an email with the location and function of the card printer after uploading a picture to DTU inside that was approved.
- Student goes to printer and login using their student ID login for DTU inside.
- Easily understandable how-to guide on screen.
- Student prints card directly at the card printer.



Another long term solution could be to **digitalize all student cards** by having the cards as an app instead of a physical object.

- QR codes could be used to gain discounts ect.
- Most students own a smartphone. For those few that does not, the current printer could be used to make cards for students that do not own smartphones.



Limitations of the Project



- A survey should preferably include at least 100 subjects
- We did not contact anyone from DTU IT Service who are the ones responsible for databases and websites
- We could not get in contact with anyone approving pictures
- Although our KPI's are relevant, it was hard to measure a baseline for the second KPI
- In general, it was difficult for us to get hard data on for example time for different steps in the process
- We could not do testing on most of our part solutions due to the nature of the system