

LESSONS LEARNED FROM THE EDUBADGES PROOF OF CONCEPT

INITIAL EXPERIENCE WITH DIGITAL BADGES IN DUTCH HIGHER EDUCATION



SURF

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INTRODUCTION

Together with higher educational institutions, SURF is examining the prerequisites necessary to award digital badges to students. A study was conducted as part of these efforts in 2015, resulting in the publication of the white paper ‘Open badges and micro-credentials’¹. The paper explains the basic principles and applications of such credentials within the field of higher education.

To follow up on this study, SURF worked closely with various institutions on a proof of concept (PoC) from September 2017 to May 2018. Nine institutions tested the infrastructure developed by SURF to create and award edubadges, i.e. badges issued within the field of education. This publication sets out the lessons learned from this PoC. It is intended for ICT & Education representatives and project leaders at institutions who want to start awarding badges to students in recognition for formal and/or informal learning activities. Before presenting the lessons learned, we provide a brief description about what edubadges are, why they are important and how SURF is contributing to this field. The final chapter looks at the next stage following the PoC, a pilot that SURF will perform with the institutions in 2018-2019.

1. WHAT ARE BADGES?

Badges are digital indicators (images) that prove the recipient possesses certain knowledge or skills. The image contains digital information about the issuer and value of the badge. This information cannot be copied or amended. Three parties are always involved in the badge process: the badge issuer, the badge earner and the badge consumer. The badge issuer issues the badge to serve as proof that the badge earner possesses certain knowledge or skills. The badge earner possesses the badge and can display it to other people, for example via LinkedIn. The badge consumer could be a future employer or a higher educational institution at which the badge earner wishes to continue their studies. The badge consumer can check online to read the criteria for awarding the badge and verify that the badge has been issued by the institution specified in the image. The overall procedure of issuing badges, making them available to view and verifying them is called the badge process (see Figure 1).

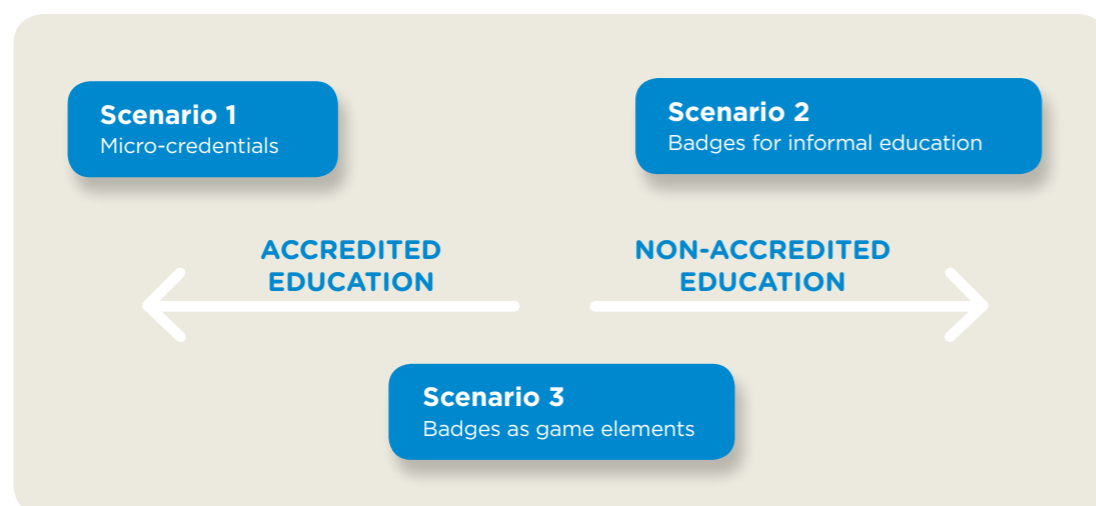


Figure 1

1. <https://www.surf.nl/en/knowledge-base/2016/white-paper-on-open-badges-and-micro-credentials.html>

How can badges be used in education?

In its white paper, SURF has set out the various scenarios for using badges in higher education. Institutions can use edubadges to indicate that students have successfully completed accredited units of study (scenario 1 in the figure below). This makes education as a whole more flexible and facilitates the concept of lifelong learning. Another option is to award edubadges for informal or non-formal (non-accredited) education, such as in recognition for acquiring soft skills. Examples include presentation skills and the ability to collaborate with others (scenario 2). Badges can also be used to add a gamification element to lessons/courses (scenario 3 in the figure). A lecturer could, for example, award a badge to students for submitting all their assignments on time, thus encouraging them not to procrastinate.



Why are badges important?

SURF anticipates that badges will primarily be able to offer added value within higher education in the form of micro-credentials, i.e. the breakdown of accredited education into units smaller than diplomas. The interest in micro-credentials is growing due to the desire to make higher education more flexible. Tests and pilot projects involving digital badges are being carried out all over the world. If these developments continue as expected, this could have a significant impact on how the education system in the Netherlands is organised.

2. PROOF OF CONCEPT

Dutch higher educational institutions are aware of this development. Following the publication of the white paper, the institutions showed a great deal of interest in gaining some experience in the use of badges, which is ultimately why SURF decided to conduct a PoC. The aim of the PoC was to develop an infrastructure that would make it technically possible to create, issue, receive and validate edubadges. Nine institutions experimented with creating and issuing edubadges within this infrastructure. SURF selected Badgr as the application for creating and issuing the badges, in part because the supplier, Concentric Sky, is the only one that has made its product available as open-source software. During the PoC, SURF modified the software so that the application was more able to meet the needs of the Dutch institutions.²

The infrastructure designed and built by SURF uses the IMS Global Open Badges standard.³ This standard ensures that the added value of the badges is not lost beyond the walls of that particular institution; with institutions making use of the same reference framework, badges can be compared with one another and combined as applicable. Badges that meet the IMS Global standard are called open badges.

The institutions were able to create and issue badges within the PoC environment. This resulted in hands-on experience regarding the criteria that need to be met in order to be able to create and issue badges. It also provided insight into which internal factors educational institutions need to organise to be able to issue badges. The PoC enabled the institutions to determine the opportunities and challenges associated with badges in Dutch higher education, including with regard to micro-credentials. SURF acquired insight into the requirements that potential services (whether provided by SURF or otherwise) relating to badges will have to cover for educational institutions in future.

Overview of participants in PoC

- **Windesheim University of Applied Sciences** looked at the criteria that had to be met in order to award badges to students on honours degree courses.
- **Rotterdam School of Management** awarded badges (alongside paper-based diplomas) to participants who had completed the Finance & Investments Advanced programme.
- The **University of Amsterdam** and **KU Leuven** used badges for the Microeconomics for Scientists MOOC. The institutions experimented with awarding badges for units that made up the MOOC and for completing the MOOC as a whole.
- Lecturers at **Utrecht University** who participated in the workshop entitled '(Re)Design your courses with blended learning' received a badge, as did the participants who completed the full blended training course and a number of students who finished an online training course to become student assistants.
- **University Medical Center (UMC) Utrecht** wanted to award badges to participants in its Fields of Interest, which are combinations of short courses that form part of a Master's degree in clinical epidemiology. However, the badges needed to be integrated with the digital learning environment Moodle, and the option for integration was not available when the PoC was performed.
- The RBS Career Academy at **Rotterdam University of Applied Sciences** used the PoC to reward participants in five part-time courses for passing their assessments.
- **Maastricht University** issued badges to participants that completed the online training course entitled We Mediate.
- Students at **Eindhoven University of Technology** who took on extra-curricular activities received a badge based on a reflective report that they submitted.
- **Fontys University of Applied Sciences** performed a number of experiments focusing on issuing badges for extra-curricular activities. The institution also developed a governance model for creating, managing and issuing badges.

With two exceptions (Erasmus University (RSM) and Rotterdam University of Applied Sciences (HR)), the participants sought to experiment with rewarding participants for informal and non-formal education.⁴ Virtually all the institutions see this as a prelude to issuing badges for units of accredited education in the longer term.

² The modified code is available to use by anybody via <https://github.com/edubadges>.

³ <http://www.imsglobal.org/activity/digital-credentials-and-badges>

⁴ Informal learning is where a person learns something as a by-product of a different activity; non-formal learning refers to organised learning, but is not focused on acquiring a diploma or certificate. For more information, see: <https://www.onderwijsraad.nl/publicaties/2003/leren-in-samenspel-ontwikkelingen-en-inspiraties/item694> (in Dutch)

3. LESSONS LEARNED

The PoC has made it clearer as to which individuals institutions need to involve and what they require in order to be able to award digital badges. During the experiments, badges were used on a small scale, often in order to recognise informal or non-formal learning. Issuing badges as micro-credentials is more complex than issuing badges for informal education or as a gamification element during a lesson. To make this work, a vision on flexible education is essential above all else, both at the level of education and the institution and with regard to the education system as a whole.

The participants understand that it takes a lot of work to use badges within education in a scalable and sustainable manner. In terms of infrastructure, there are multiple challenges relating to technology, privacy and security. The key lessons learned for each role with regard to the badge infrastructure are set out below.

Badge issuer: educational institution

The institution is responsible for creating and issuing badges. One of the most important lessons learned is that a strategy is required prior to creating and issuing badges. The institution has to decide what status the badge has within its system and how it relates to other badges, i.e. a 'constellation'.

Steps to be taken by the institution

1. Decide which badge strategy you wish to adopt. Determine what status badges have within your education and how they interact with one another (this means deciding on the overall constellation). Can they be combined? Do they have a joint purpose? How can students use the badges to determine their next steps?
2. Establish the content and value of each individual badge. What skills does the badge embody? What value does a badge represent? What can the students do with it? Do students have to pass a test before being awarded a badge?
3. Determine the metadata that the badge needs to contain. It is essential that all institutions include the same metadata so that badges can be compared between the various institutions.
4. Consider the graphic design of the badges.
5. Decide on who is entitled to award badges. Can lecturers do this themselves? Do they decide on the subject themselves? Through what process do you award the badges?

Adopting the use of badges leads, in particular, to various organisational issues that must be resolved. Participants in the PoC invested a great deal of time into determining which internal parties would be involved in issuing badges and in which capacity. In the evaluation report, Maastricht University wrote: *The main question to be answered by the institutions is: who is set to benefit from this system? If an institution is seeking to adopt micro-credentials, it needs to work closely with the legal department and those responsible for drawing up the teaching and examination regulations.*



BADGE ISSUER (EDUCATIONAL INSTITUTION)

Lessons learned

- Badge strategy; determine the status that the badge has within the education system and how it relates to other badges.
- Badge governance; who may issue badges, when may they be issued, and to whom?
- Badges for micro-credentials require a vision on flexible education.

Badge earner: student

Students are not familiar with badges. They need to know what benefits the badges offer and how they can use them. And as long as badges continue to fly under the radar as far as employers are concerned, it will not be possible to fully exploit their potential. Utrecht University quite rightly states that badges only have an intrinsic value if people want them, but that awareness of these badges has to be raised before demand for them can be

fostered. At present, there is not enough awareness, though lecturers and students are now recognising their potential. The small-scale experiments in the PoC show that students have a generally positive attitude toward badges. It is important to raise enough awareness and provide sufficient explanation for the badges that are issued. As part of the PoC, Rotterdam School of Management prepared a short film that provided students with step-by-step instructions on how to download, save and display (e.g. on LinkedIn) a badge they have received. Instructions such as this are evidently essential.



BADGE EARNER (STUDENT)

Lessons learned

- Possibilities offered by badges not yet known.
- Uploading badges to social media takes time and effort, and they are not displayed prominently.
- Managing badges is still an issue to be resolved.

Saving and displaying edubadges

If the badges are to be accepted by students, it is important that it is easy to download and store the badges as well as to display them to other people. During the PoC, students found it difficult to upload badges to LinkedIn and other social platforms, as the upload procedure was not especially user-friendly. Badges are not displayed as effectively as they could be on LinkedIn either. If, for example, LinkedIn could have an optional section of the profile for these badges, this would encourage people to share them, which once again helps to raise awareness. SURF will contact LinkedIn to determine where improvements can be made in this regard. The fact remains that if students have to go to great lengths to use something whose value to them is not yet apparent, the use of badges will continue to be limited.

Managing edubadges

One question that has yet to be answered is how students should manage their badges (including after they complete their studies). As badges contain valuable information, it is essential that they are sent to the right person and that only that person is able to manage the badges. The badge owner must therefore be able to identify themselves. A student number or institution e-mail address is an unsuitable form of identification in this respect, as it could be misused by other people and ceases to exist after the student finishes their studies. Institutions generally communicate with students using the e-mail address provided by the institution. Therefore, it is not convenient to use this address in conjunction with badges. The disadvantages of using a private e-mail address are twofold: the student has to remember – for the rest of their life – which badges are associated with which address, and they have to keep using these same e-mail addresses. The PoC showed that this is an issue requiring a solution. A 'persistent ID' – a means of identification for the student that lasts throughout their life – would be able to solve this problem. An obvious option would be an individual's citizen service number (BSN in the Netherlands). Unfortunately, legal restrictions prevent the BSN from being used in this manner. SURF is now working on an alternative solution in the form of an eduID.⁵

Student privacy

Students have to give their explicit consent to the use of their information in badges, because a badge contains personal information. The GDPR provides guidelines and limitations on this. For example, the students should know which personal information

5. <https://www.surf.nl/innovatieprojecten/betrouwbare-en-veilige-omgeving/trust--identity-infrastructuur/gastgebruik/eduId/index.html> (in Dutch)

is being stored and for what purpose. During the PoC, Rotterdam School of Management (RSM) created a separate online landing page. This page contains information about the badges issued by RSM and an overview of the rights to which students are entitled. Students can provide an (alternative) e-mail address that will last longer than the account provided by the institution, and consent to the use of this information. RSM expects that this framework will make it simpler to scale up the use of badges.

Badge consumer: employer or other educational institution

A future employer or other consumer of a badge – such as an institution which the student wishes to attend in future – should be able to verify that the badge was issued by the institution stated on the badge. The consumer is also able to review the criteria online on whose basis the badge is awarded. No findings were made during the PoC as to the options for guaranteeing the authenticity of the badge, but the upcoming pilot will no doubt address this issue.



BADGE CONSUMER (EMPLOYER OR OTHER EDUCATIONAL INSTITUTION)

Lessons learned

- No experience acquired through the PoC (to be discussed in the future).

Infrastructure

SURF developed the edubadge infrastructure in consultation with the institutions. Two aspects of this process should be highlighted here: data storage and standardisation. On top of this are a few other prerequisites that are critical for ensuring the badges are implemented successfully.

Storing data

To be able to perform the PoC, SURF reviewed multiple badge applications, ultimately settling on an open-source application that SURF can continue to develop while providing it within its own infrastructure. This offers maximum flexibility in terms of (additional) features and integration. It also means that personal information and other sensitive data (e.g. for privacy reasons) exchanged and stored during the badge process do not end up on servers operated by third-party suppliers. Student data was stored on infrastructure operated by SURF during the PoC, and then deleted afterwards.

If the institutions intend to store badges themselves in future, they are legally required every four years to request consent from the students for their data to be stored. SURF held talks with the government's executive agency for education (DUO) during the PoC. DUO could serve as an ideal link within a definitive edubadge-based infrastructure. In addition to managing the digital diploma register, DUO could set up a supplementary register that records accredited edubadges. The government agency has indicated its willingness to do this, and is currently looking into how it can fulfil this role. Another advantage is that if the data is stored via DUO, consent does not have to be obtained from students every four years. This is because DUO has a legal basis for storing this data.

Standardisation is essential

To ensure the added value offered by edubadges is recognised at an administrative level and there is both the vision and a policy in place to utilise badges in higher education, the Dutch higher education sector (and, preferably, European higher education as a whole) needs to determine exactly how to put badges into practice. This applies in particular to micro-credentials. Micro-credentials are only worthwhile if the awarding of badges and the system behind it are standardised. Version 2.0 of the open badge standard – managed by IMS Global – is now definitive. This standard ensures that everybody completes the same fields in the same way. During the PoC, a start was made on mapping this standard for badges in conjunction with the subject-specific metadata and assessment systems used in higher education. The minimum number of fields required in order to use badges in accredited education has now been determined.

These fields were compared with the fields in the open badge specification 2.0, and it was found that a number of fields are not compatible.

IMS Global has since proposed using extensions to add a number of fields critical for the Netherlands and Europe to the specification.

Metadata

By completing the same fields in the same manner, institutions are able to ensure their badges remain comprehensible beyond the walls of that particular institution. The data provided in these fields is called metadata. Metadata describes a badge's content and value. Metadata displayed on an edubadge could include: the name of the course or degree, the assessment criteria for the course or degree, the badge issuer, the standard or agreement to which the badge is bound (e.g. the Dutch qualifications framework NLQF) or agreements that apply within the discipline or domain to which the course belongs), the number of ECTS (European Credit Transfer System) credits, the level at which the student was tested, a description of the learning outcomes or the learning objective, a declaration from the institution that the badge earner has met all criteria to be awarded the badge, a reference to the badge earner and (as appropriate) evidence or an overall rating such as 'expert' or 'competent'.

Other prerequisites

It is imperative for the institutions to integrate the edubadge features provided into their own digital learning environment and student information systems (SIS). The LTI standard can facilitate this process. This standard enables the various systems to 'talk' to one another. SURF has since developed an LTI link that will be tested as part of the pilot phase. A number of other prerequisites pertaining to the infrastructure have either been met already or are in progress. Single sign-on is now available via SURFconext (SAML and openID Connect), which means students and institution employees can use their credentials provided by the institution to log in. A code audit has also been performed to identify vulnerabilities in the software code. SURF arranges for code audits to be performed in order to guarantee the code's security (whether it was developed in-house at SURF or by a supplier).

SURF remains committed to privacy by design and security by default⁶ as far as the ongoing development of the code is concerned. One future upgrade will involve expanding the roles and permission structure. This is something that is high on the institutions' wish lists, as this will enable them to see who is permitted to create and/or issue badges on the institution's behalf.

SURF is working on a solution that will allow badges to be signed. Signing involves guaranteeing the authenticity of the badge's content, the awarding party and the badge earner. A technical code enables the institution awarding the edubadge to 'sign' for it.

The code is a type of watermark that indicates a respected party has validated the badge. A solution of this kind was not yet sufficiently available during the PoC, which is why it is one of the priorities for the pilot.



INFRASTRUCTURE

Lessons learned

- Important focus is storage of edubadges.
- Standardisation: alignment required on subject-specific metadata and value system.
- Integration of the edubadge features in the digital learning environment and student information systems (SIS) is imperative.
- Important focus is on guaranteeing the authenticity of the badge's content, the awarding party and the badge earner.
- A persistent ID to manage the badges is a prerequisite (e-mail address is not sufficient).

The persistent ID mentioned above is also an important prerequisite, and SURF is exploring the various possibilities. An e-mail address is not sufficient for managing badges; another solution is required. An eduID will be used during the pilot to link badges to a student. At policy level, the various stakeholders will be identified and engaged in order to determine how to coordinate their requirements and interests.

6. This means the software developer is committed to setting up the design and settings of the software to provide maximum security and privacy for the user.

LESSONS LEARNED EDUBADGES POC

Lessons learned

- Badge strategy; determine the status that the badge has within the education system and how it relates to other badges.
- Badge governance; who may issue badges, when may they be issued, and to whom?
- Badges for micro-credentials require a vision for flexible education.

BADGE ISSUER (EDUCATIONAL INSTITUTION)

BADGE EARNER (STUDENT)

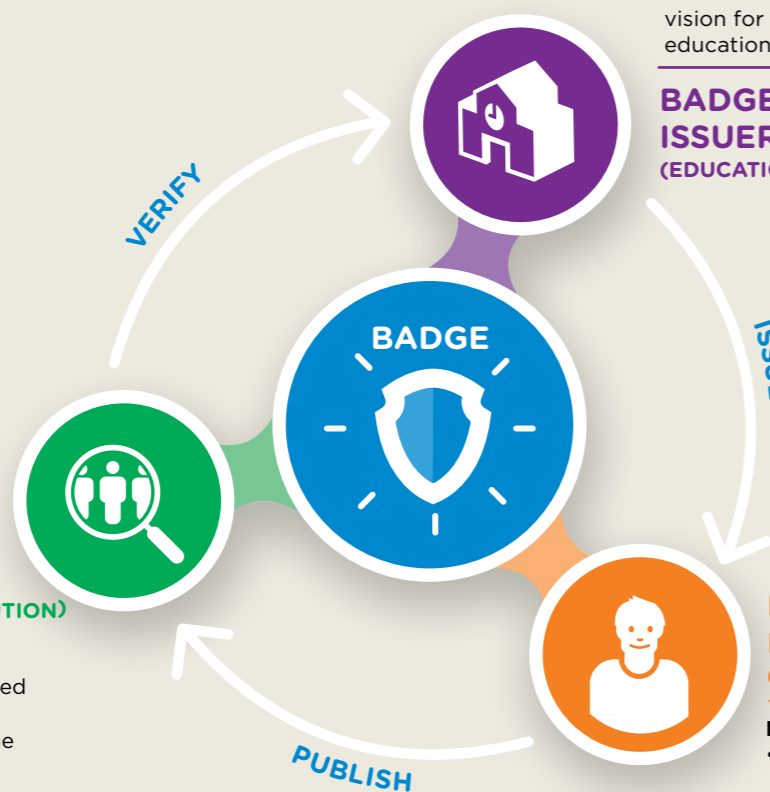
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BADGE CONSUMER (EMPLOYER OR OTHER EDUCATIONAL INSTITUTION)

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- No experience acquired through the PoC (to be discussed in the future).



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4. CONCLUSION AND NEXT STEP: PILOT PROJECT

The institutions that acquired experience in the badge process during the PoC have indicated that they definitely want to continue using badges. Edubadges provide added value as it enables the institutions to indicate a student's skills (whether as part of or outside the curriculum) in a more transparent and clearer manner. Edubadges make it possible to accurately describe exactly which learning objectives the student achieved and the skills they acquired as part of formal, informal and non-formal education. Generally speaking, the information contained on a Bachelor's or Master's certificate does not go into this much detail. Edubadges thus contribute added value to a student's ongoing professional development.

What are the next steps?

To follow up on the PoC, SURF is organising a pilot project from September 2018 to summer 2019. The project will make use of an upgraded version of the infrastructure. This infrastructure contains new features that were requested by the institutions during the PoC. The provisions of the GDPR will continue to be observed.

The aim of the pilot is to find answers to the following questions:

- How can we, together with the institutions, organise the process of issuing and storing edubadges and make this future-proof? The focus here is on long-term storage, integration into the learning environment and the SIS, and finding a solution for signing edubadges.
- What do the parties that play a role in the edubadge process want and need? These parties include the institution (issuer), the student (earner) and the employer or institution (consumer).
- How can we implement the edubadge process as effectively as possible? (see Figure 1)
- How can we involve the external parties who play a role in the edubadge process, e.g. DUO?
- What prerequisites require further clarification in order to provide a SURF service for Dutch higher education ultimately?
- What can we learn from the experiences of the participants taking part in the pilot?

Areas of focus for the pilot

1. Ease of use

Ease of use is critical in ensuring badges are utilised successfully. Issuing, storing and displaying badges all have to be as simple as possible. Ease of use goes hand in hand with awareness among students, lecturers, employers and so on: if it is easy to display badges, this will draw peoples' attention and raise more awareness. Technical integration into the learning environment and the SIS is essential. Badge recipients also need to be able to display their badges easily on other social media sites.

2. Adding metadata

If badges are to be used to contribute to flexible education, it is important to be able to easily add metadata that clearly sets out the content and value of the edubadge. The higher educational institutions need to agree on the metadata to be used (preferably in a European context). If badges end up being used in accredited education, their value should be consistent with the levels specified by the European Qualifications Framework (EQF)/NLQF and ECTS. They should also be consistent with Dutch and international standards. Badges should meet the formal criteria for higher education, and this requires discussion and coordination among the various stakeholders.

3. A vision on micro-credentials

Given the enthusiastic responses to the PoC, SURF believes that the use of badges will continue to develop. At present, momentum is primarily evident in the fields of informal and non-formal education. However, the moment it concerns the usage of badges in accredited education, there are still reservations. Ensuring flexibility beyond the boundaries of a specific

institution affects the institutions' business models as well as legal frameworks as set out in the Netherlands Higher Education and Research Act (WHW). An important lesson learned from the PoC is that the institutions need to develop a vision as far as micro-credentials are concerned. The institution will only be able to settle on which learning units it wants to 'divide up' and certify through the use of badges once it identifies how it wishes to bring about flexible education and the consequences this will have on how it shapes its educational services. In this case, the institutions need to show willingness to work together to determine how to introduce this flexibility to Dutch higher education. The Ministry of Education, Culture and Science has a role to play in this process. During the pilot, SURF will seek to involve various stakeholders, with the ministry being one of them.

APPENDIX

USE CASES OF INSTITUTIONS THAT PARTICIPATED IN THE POC

Windesheim University of Applied Sciences

Participants in honours degree courses at Windesheim University currently receive a certificate at the end. Windesheim used the PoC to look at what is required to be able to issue digital badges in addition to – or in lieu of – a certificate in future. During the PoC, the project management team assessed which information is required, who is responsible for what and how to design the badges as effectively as possible. In the evaluation report, the team wrote: *In our opinion, badges are extremely well suited to Windesheim's strategic direction, which prioritises personalised learning paths. This is partly why our Executive Board is highly enthusiastic about this development. This will help to build up enthusiasm throughout the organisation.*

Rotterdam School of Management (Erasmus University Rotterdam)

Each year, around 50 students at Rotterdam School of Management (RSM) enrol in the Finance & Investments Advanced course. The aim of the PoC was for RSM to award all students that successfully completed the course a digital badge alongside a paper certificate. This goal was achieved. RSM found that more organisation and coordination was required than initially expected. It took some effort, for example, to align the badge issuing process with the provisions of the GDPR, as the team had to find a convenient way to inform students about it and obtain their consent regarding the use of their data. The actual process of issuing the badges went well. However, in future RSM wants to improve its communication with the students. Instructions on how students can use badges need to be clearer.

University of Amsterdam / KU Leuven

For UvA, badges served as an evaluation tool for the massive online open course (MOOC) entitled Microeconomics for Scientists. During the PoC, two scenarios were established in which the badges could be used:

1. As a reward for successfully completing the full course. To receive the badge, students had to pass an exam that was administered in two locations: at KU Leuven and at the VU. The badge was formally awarded by KU Leuven.
2. As a reward for successfully completing one of the MOOC's online modules. A total of six badges are available for each of the six modules. Each badge shows which learning objectives the student has

achieved in the module or whether they have completed all activities in the MOOC that are relevant to the exam. This serves an indicator as to whether the student will be successful in the exam. The data used to issue the six badges is directly linked to the learning analytics data that is collected in the MOOC.

The badges were successfully designed, developed, implemented and awarded. In its evaluation report, UvA wrote: *Participation in the PoC was much more worthwhile than we initially envisaged. Edubadges offer new opportunities for the MOOC that has been developed [...] Based on the results of the PoC, we can conclude that badges are an important tool for making higher education more flexible.*

Utrecht University

Educate-it is an education innovation programme that applies throughout UU. The aim of the PoC in conjunction with Educate-it was to devise a concrete way to generate more awareness about badges within UU and UMC Utrecht. The result was a workshop entitled '(Re)Design your education with blended learning'. Lecturers who participated in the workshop received a badge. Badges were also awarded to participants who completed the full blended training courses, which consisted of the workshop and a number of online activities. During the PoC, a number of students expressed the desire to receive a digital certificate for completing the online training course to become a student assistant. They also received a badge.

The aim was to establish an interface between the badge application used during the PoC (Badgr) and the Educate-it lifelong learning platform. While some steps were made in the right direction, the institution has not (yet) managed to test the interface.

Utrecht Medical Center Utrecht

UMC Utrecht wanted to issue badges for its Fields of Interest, which are combinations of short courses that form part of a Master's degree in clinical epidemiology. At present, professionals that study a Field of Interest instead of a full Master's degree (e.g. due to a lack of time) do not receive a certificate to recognise their efforts. UMC Utrecht hopes that badges will be able to rectify this situation. Integration within the digital learning environment Moodle is essential for this. UMC Utrecht collaborated with UU on this and jointly published their findings.

Rotterdam University of Applied Sciences

The five part-time courses offered by the RBS Career Academy (business economics, business IT & management, business administration (management, economics and law), commercial economics and human resource management) divided their curricula into learning units of 30 European credits (EC). Each learning unit has a single learning outcome, and an assessment is used to test what the student has learned. If the student passes the assessment, they receive a badge. In time, the RBS Career Academy would like to issue badges for all future learning units. The Academy is planning to get started on this shortly. The metadata for each module has already been decided on and the infrastructure is being developed. During the PoC, Rotterdam University of Applied Sciences gained experience in the organisational and technical consequences of creating and issuing badges.

Maastricht University

Participants in UM's We Mediate project complete a three-week online training course that ends with an online mediation exercise. This enables the students to learn skills relevant to the 21st century, such as active listening, strategic thinking and the ability to give and receive feedback. As the project is part of a larger discipline, it is not specifically indicated on the student's list of grades. A badge, however, does allow students to show others that they possess these skills. For UM, the badge is a great opportunity to draw attention to the project both within and outside the institution. UM has awarded around 300 badges. Although students showed enthusiasm, there is still a great deal of work to be done on improving the way students can save and display their badges.

Eindhoven University of Technology

TU/e used the PoC to grant badges for informal education. Students who took part indicated that they would do extracurricular activities, whether organised by TU/e or performed in a workplace. They received a badge based on their reflective report. There were six different badges available, with three levels per badge. The organiser of the activity took on the role of badge issuer. The trial gave students a great deal of freedom to make choices about career-related activities. The PoC was a success for TU/e, though it was noted that they did encounter some technical challenges. Furthermore, it was time-consuming to provide individual feedback for the badges and to verify them.

Fontys University of Applied Sciences

Fontys conducted a number of experiments into awarding badges for various applications. The team looked beyond the SURF infrastructure at how badges can motivate students on a course. The project managers drew up an inventory of which activities are considered to demonstrate 'extremely desirable behaviour' by the lecturers at Fontys and for which credits are not currently awarded. The activities are divided into five categories. The team also used these categories as the basis for developing a governance model for creating, managing and issuing badges. The model was then used as the basis for creating a number of badges for desirable conduct. In some cases, the badge was issued. Fontys challenge encountered during the otherwise successful PoC is that Fontys needs an institution-wide policy on badges.

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October 2018

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The SURF logo consists of the word "SURF" in white, bold, uppercase letters inside a black rounded rectangle. A black line extends from the bottom right corner of the rectangle, ending in a solid black circle.