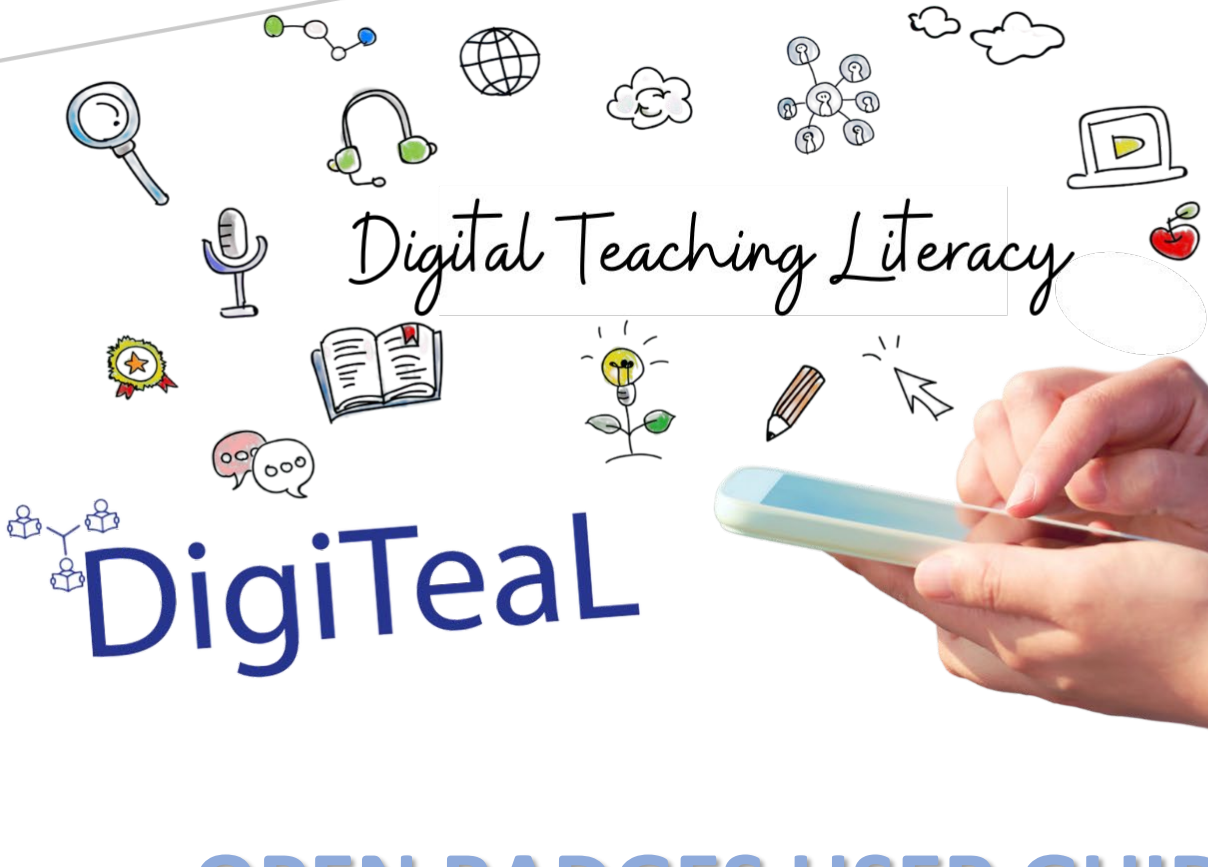


OPEN BADGES USER GUIDE

N.C.S.R. “Demokritos” - September 2022

Abstract

This Open Badges User Guide shows teachers how to produce an Open Badge for any topic they teach, and includes example videos of set-up of the MeLDE Open Badges system.

DEMOKRITOS

Emphasys CENTRE

UNIVERSITY OF WOLVERHAMPTON

UNIVERSITATEA DIN BUCUREȘTI

Bennohaus
Arbeitskreis Ostviertel e.V.

This project has been funded with support from the European Commission. This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein. Funded by the Erasmus+ Programme of the European Union. Project Number: 2020-1-UK01-KA226-SCH-094429

Co-funded by the Erasmus+ Programme of the European Union

TABLE OF CONTENTS

TABLE OF CONTENTS 1

TABLE OF FIGURES 3

INTRODUCTION 4

1. THEORETICAL BACKGROUND 5

1.1 What are Open Badges? 5

1.1.1 Digital Badges 5

1.1.2 Digital Badges and Open Badges 7

1.2 Brief History of Open Badges 11

1.3 Why Use Open Badges? 14

1.4 How to Get Started 15

1.5 Open Badges Actions 17

1.5.1 Authoring 17

1.5.2 Issuance 17

1.5.3 Awarding 18

1.5.4 Earning 18

1.5.5 Displaying 19

1.5.6 Sharing 20

1.5.7 Verifying 21

1.6 Open Badges Considerations 23

1.6.1 Audience 23

1.6.2 Badge Taxonomy (Badge Categories) 24

1.6.3 Collections of Badges - Learning Pathways 25

1.6.4 Credibility of Open Badges 27

1.6.5 What to Avoid 29

1.6.6 Open Badges Endorsement 30

2. PRACTICAL ELEMENTS 33
2.1 Open Badges Life Cycle (Eco-System) 33
2.2 Learning Management Systems (LMSs) for Setting Up an Open Badge Eco-System 37
2.3 Minimum Technical Specifications of an Open Badge 41
2.4 Anatomy of an Open Badge (Metadata) 43
2.5 How to Write Open Badges Metadata 45

3. MOODLE OPEN BADGES EXAMPLES (VIDEOS) 49
3.1 How to Issue an Open Badge 49
3.2 How to Set Up the Criteria for an Open Badge 50
3.3 How to Award an Open Badge 52
3.4 Where to Find the Open Badges you Have Earned 53
3.5 How to Push an Open Badge to Badgr Backpack 54

4. CONCLUSIONS 55

5. GLOSSARY 55

6. REFERENCES 55

TABLE OF FIGURES

FIGURE 1: OPEN BADGE CYCLE 8

FIGURE 2: OPEN BADGES PROS 9

FIGURE 3: OPEN BADGES PAINT A BETTER PICTURE... 10

FIGURE 4: DISCOVERING OPEN BADGES: THE 4 KEY WORDS 11

FIGURE 5: MOZILLA BACKPACK BECAME BADGR BACKPACK ..... **ERROR! BOOKMARK NOT DEFINED.**

FIGURE 6: LEARNING AND EARNING 19

FIGURE 7: WHAT IS A BADGE REALLY WORTH? 21

FIGURE 8: BADGE TAXONOMY 24

FIGURE 9: BADGE PATHWAYS 26

FIGURE 10: CREDIBILITY OF OPEN BADGES 28

FIGURE 11: OPEN BADGES ENDORSEMENT 30

FIGURE 12: AN OPEN BADGES ECO-SYSTEM (LIFE CYCLE) 36

FIGURE 13: MOODLE LMS LOGO ..... **ERROR! BOOKMARK NOT DEFINED.**

FIGURE 14: EXAMPLE BADGE IMAGES 41

FIGURE 15: OPEN BADGES METADATA 44

INTRODUCTION

This comprehensive Open Badges User Guide is addressed to teachers and educators and aims at guiding those with no experience with Open Badges in the theoretical and practical processes of setting up an Open Badge assessment system for their teaching material.

The guide also contains example videos of setting up the MeLDE Open Badges Platform for more visual learners.

In particular, this guide is a resource for educators interested in understanding how Open Badges work and how they can be implemented in their classroom.

Some teachers may find this guide too detailed and perhaps a little technical. For this reason, a shorter version of this guide is available to accommodate also those who have already some knowledge of Open Badges.

Download the shorter guide in English, German, Greek or Romanian.

The Open Badges User Guide is divided into three sections:

1. Theoretical Background – history and context of the Open Badges system
2. Practical Elements – what you need to have in place, to use Open Badges
3. Moodle Open Badges Examples (Videos) – if you are ready to set up an Open Badge, you can go straight to this section for a quick-start guide.

The shorter guides contain less content in Sections 1 and 2, while Section 3 is exactly the same in both documents.

1. THEORETICAL BACKGROUND

1.1 What are Open Badges?

1.1.1 Digital Badges

Digital Badges are a digital representation, recognition and proof of skills, learning outcomes, achievements or experience such as hard skills (knowledge, competences, etc.), soft skills (collaboration, communication, etc.), participation and community involvement, official certification, etc.

At some point in everyone's life, there comes a time to clean out our closets/storage rooms only to come across old books and exercise books from our school years covered with slogans and/or stickers. **Stickers** earned from our teachers for some sort of achievement we had accomplished, which we proudly displayed to our parents and peers.

These stickers or badges are an important symbol used to quickly understand more about people. For example, let's consider police officers, service members, and retail workers. Their physical badges represent many hours of training, education, etc. and give us confidence at-a-glance in their competencies and achievements.

Digital stickers (badges) are essentially the evolution of these badges in order to be in line with the digital evolution and advancements we have all experienced over the years. Digital badges provide a shortcut to understanding the competencies and achievements of the people we're teaching, recruiting, and collaborating with online.

These digital badges are credentials awarded to individuals to publicly certify competencies and achievements.

In the words of the MacArthur Foundation, which first introduced the concept of **Digital Badges** in 2011:

Digital Badges *are an assessment and credentialing mechanism that is housed and managed online. Badges are designed to make visible and validate learning in both formal and informal settings and hold the potential to help transform where and how learning is valued.*

To put it simply, a **Digital Badge** is an indicator of accomplishment or skill that can be displayed, accessed, and verified online. These badges can be earned in a wide variety of environments, an increasing number of which are online.

There are two types of Digital Badges:

- Achievement Badges, awarded upon completion of some sort of transaction
- Competency Badges, which represent direct measures of competence

Achievement badges are awarded upon completion of some sort of transaction which can either be an automated or manual evaluation procedure. Proof of attendance of an event and/or the successful completion of a course fall into this category. Upon confirmation of the completion of an achievement, this is certified and transformed into a badge. Of course, this achievement badge cannot be considered as a direct measure of a learning outcome but it does have a level of relevance and value in itself.

While achievement badges are transactional in nature, **competency** badges are qualitative in nature in that they represent direct measures of competence. As such, competency badges are typically awarded as the result of a performance assessment. Competency badge awarding is triggered when some machine or human evaluator completes an assessment - often a direct, authentic assessment - of evidence or artifacts that demonstrate learning outcomes or skills. The awarding criteria found within a competency badge is directly linked to an underlying rubric chosen and sometimes (but not necessarily) authored by the badge's issuer, and used by an evaluator to score competency evidence. An issuer may determine a score threshold at which a badge is to be awarded, and can make that threshold transparent to the public. The rigor behind competency badges make them especially valuable as career currency.

Example:

John attends a crash course on Media Literacy and is awarded with an achievement badge. Mary completes a test at the end of the course such as a quiz, receives an 85% grade and gets awarded a competency badge.

It must be noted that the term "digital badge" for some may mean any form of digital credential, which is not accurate. Digital badges are just one subset of the large digital credentials' ecosystem. There are many ways to recognize an achievement, and many forms of proof for a variety of needs such as:

- Test-based digital credentials (awarded to individuals who can prove competency in some subject through a scheduled exam)
- Digital Certificates (issued for completion of a course or seminar) and
- Digital Badges

A digital badge serves both as recognition of learning or achievement and digital proof of that accomplishment.

Badges are still very much in their early stages of growth, and as a result are much more ambiguous in their application, which is one of the reasons why this guide is necessary. Sometimes they're awarded for higher stakes accomplishments, such as completing a rigorous examination or passing a course. Other times they're given out for low stakes tasks such as going through an HR training program. Whereas test-based digital credentials and digital certificates are designed to look similar to their physical counterparts, digital badges have a more unique look.

1.1.2 Digital Badges and Open Badges

A Digital Badge is an online representation of an earned skill or a set of skills. However, it is just an image depicting a newly acquired skill.

Open Badges, on the other hand, take that concept one step further and allow the verification of skills, interests and achievements through credible organisations.

Open Badges are verifiable, portable digital badges with embedded (baked) metadata about skills, achievements and experience, and they are shareable across the web. Each Open Badge is associated with an image and information (metadata) about the badge, such as its recipient, the issuer, and supporting evidence; information which is crucial for the credibility of the Open Badges.

Open Badges can be used to set goals, to motivate behavior or convey success. They can be particularly useful for recognizing new forms of learning beyond the traditional classroom environment. Learning happens everywhere, and badges provide a way to validate the outcome.

Thus, in the same way that you bake ingredients together to make a cake, so you bake a badge. And again, just as you can't then remove an ingredient from the baked cake, likewise you can't change an Open Badge once it's been 'baked' i.e. once the metadata (information on the badge) has been finalized and locked.

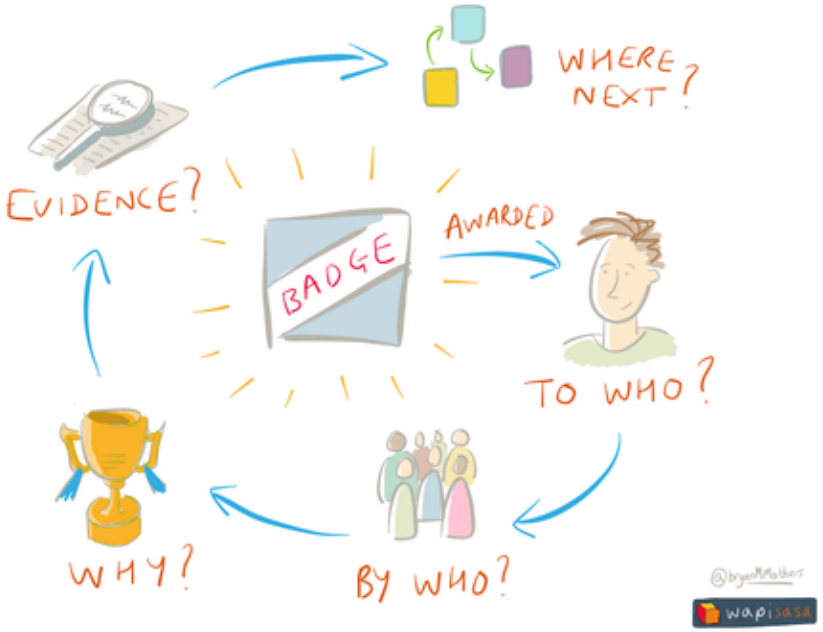


Figure 1: Open Badge Cycle

There are numerous important differences between Open Badges and Digital Badges as Open Badges are:

- **Free and open i.e. not controlled** by any one organisation but rather by a worldwide community, as the Open Badges Infrastructure (OBI) is a free, open-source technology.

- **verifiable,** as they contain built-in data (metadata) that link back to the issuer, criteria and any verifying evidence.

- **evidence-based**, as information about who, why and for what the badge was issued is hard-coded into it as metadata.

- **stackable**, as Badges from one organisation's system can build upon ones from another system. This creates a rich ecosystem that individuals can use to build the story of their skills, knowledge, and experience.

- **transferable**, as Badges earned in one environment can be shared in another.

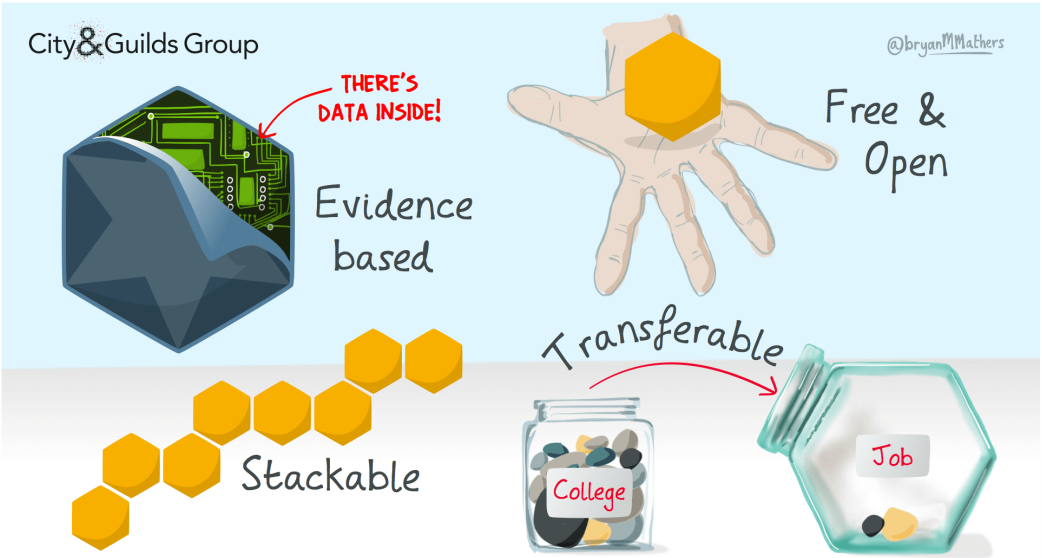


Figure 2: Open Badges Pros

Open Badges put the **user in control**. Badges are private until they are published by the user. They provide an easy way to show a portfolio of skills without third parties having to wade through a mountain of data.

The following video introduces what Open Badges are and their role in contemporary learning.

Video: What is a Badge?

There are many definitions for Open Badges, the most accurate of which are presented below.

Open Badges…

- are a digital representation, recognition and validation of learning and skills
- are visual tokens of achievement, affiliation, authorization, or other trust relationship sharable across the web
- are used to motivate students/learners and make the learning process more engaging
- allow the creation of synergies between the (l)earners, the badge issuers and the potential future employers, college admission officers, etc., who are also known as badge consumers
- promote open access and participation of all stakeholders involved in the badge process
- can be earned after certain criteria have been successfully met

- represent a more detailed picture than a CV or résumé, as they can be presented in ever-changing combinations, creating a constantly evolving picture of a person's lifelong learning

Figure 3: Open Badges Paint a Better Picture...

There are 4 words that sum up the essence and the necessary actions when using Open Badges (Figure 4):

1. **Issue**: Anyone can create (design) and issue Open Badges to recognize and validate the achievements of others.

2. **Earn**: Anyone can earn Open Badges for skills they acquire and knowledge they learn either online or in person.

3. **Display**: (L)earners can display and share their newly acquired Open Badges on their digital profiles across the web as verifiable records of their learning.

4. **Understand**: Potential employers and/or College Admission Officers or, in other words, Badge Consumers, can verify these Open Badges and accept them as records of achievement.

Figure 4: Discovering Open Badges: The 4 Key Words

1.2 History of Open Badges

Digital badges were first introduced on 1/3/2011 when the Peer 2 Peer University and The Mozilla Foundation in collaboration with The MacArthur Foundation co-authored a paper entitled "An Open Badge System Framework: A Foundational Piece on Assessment and Badges for Open, Informal and Social Learning Environments." In this paper, a badge was defined as "a symbol or indicator of an accomplishment, skill, quality or interest." According to the report, badges "have been successfully used to set goals, motivate behaviors, represent achievements and communicate success in many contexts… Badges can have a significant impact and can be used to motivate learning, signify community and signal achievement."

To put it simply, Badges are verifiable, portable digital awards, issued to individuals for learning or displaying skills or knowledge, or successfully undertaking a specific task or activity. Badges can also be issued for belonging to a certain group or sharing a common interest.

Badges are free to use and can be issued, earned and displayed across a range of different systems including Learning Management Systems (LMS), portfolio and résumé applications, dedicated badging applications, and social networks.

This paper also highlighted a very important fact about badges, that is that "context is more important than design: The information linked to or 'baked' or 'behind' each badge serves as justification and even validation of the badge."

Following this, the Mozilla Foundation went a step further and developed an innovative open online educational technical standard called Open Badges in 2011, which served as a common system for issuing, collecting, awarding and displaying digital badges (qualifications) across various websites and non-profit organizations.

Partnering with more than 300 non-profit organizations and government agencies and funded by the MacArthur Foundation, The Mozilla Foundation sought to utilize these open badges to create "a world where your skills and competencies were captured more granularly across many different contexts, were collected and associated with your online identify and could be displayed to key stakeholders to demonstrate your capacities.

The first organizations to issue Open Badges were social, humanitarian, professional associations and NGOs as well as educational institutions such as universities and professional schools. Later, training companies and some businesses followed their footsteps.

Contextual information such as:

- who earned it (name of learner)
- what the badge represents (what was learned)
- how it was earned (set criteria)
- when they earned it (date)
- who issued it (name of educational institution(s))

and (whenever possible), evidence examples of the work and process that preceded the earning of the badge, is critical to the definition of a badge in this standard. This information is called metadata and will be analyzed further in the next sections.

Figure 5: The Open Badges standard was founded in 2011 by the Mozilla Foundation

In late 2012, Mozilla released the Public Beta version of the Open Badge Infrastructure, making the technical infrastructure supporting Open Badges publicly available for use. Open Badges 1.0 was launched in 2013 followed by a full launch of Mozilla Open Badges and by that year over 1,450 organizations were issuing badges. The Badge Alliance, a network of organizations and individuals committed to building and advancing Open Badges, was formed in 2014.

In 2014, Concentric Sky and edX partnered to launch Badgr, an open source project/platform to serve as a reference implementation for Open Badges, which eventually replaced Mozilla Open Badges. In particular, Mozilla retired its Open Badges Backpack platform (Open Badges repository) and helped users move their Open Badges to Badgr. Badgr has all the same features as Mozilla Backpack, but in addition, it gives users complete control over their achievements and data, so they can organize and share all their badges from one place. Users can even create and award badges for free.

Figure 6: Badgr open source project/platform replaced Mozilla Open Badges

In 2015 IMS Global Learning Consortium announced their commitment to Open Badges as an interoperable standard for credentials. By 2016, millions of Open Badges had been awarded to hundreds of thousands of recipients and the Open Badges community was actively working toward the release of Open Badges 2.0, the most significant upgrade to the specification since its release. Later in 2016 it was announced that stewardship of the Open Badge standard itself would officially transition to IMS Global on January 1, 2017, which was the case as IMS did in fact assume responsibility to lead the evolution of the Open Badges specification and to ensure the sustainability of the future Open Badges ecosystem.

In 2018, the Open Badges Specification 2.0 was finalized and publicly released. Open Badges 2.0 provides powerful new features such as endorsements, internationalization, and multi-lingual capabilities, versioning, improvements for accessibility, etc.

In 2019, Mozilla officially retired the Mozilla Backpack and entered an agreement with Concentric Sky to migrate users and badges to the Badgr Backpack.

Since 2019, Open Badges are being used at the highest level and have integrated various measures such as the SIP (Skills Investment Plan), the FIP (Future Investment Plan) and Erasmus+ projects. In addition, many Open Badges initiatives have been launched in many countries. In particular, several Open Recognition collectives have been created, which are members of the Open Recognition Alliance.

Finally, in 2020 Open Badges 2.1 was released.

1.3 Why Use Open Badges?

Traditional credentials such as diplomas offer an opaque view of a person's competences. Diplomas do not certify competencies at the granular level of an employer's job requirements. As such, job candidates are asked to supplement their applications with references and often must complete pre-employment assessments. Similarly, college applicants must submit essays and standardized test scores to accompany their high school diplomas.

This creates situations where applicants do not make it beyond the initial screening stages as basic variables, such as the applicant's educational history act as strong filters. These filters are important roadblocks to student success and career advancement.

Open badges are infinitely reusable. They offer a highly scalable system for assessing competencies beneath the surface in order to get a more transparent view into a candidate's abilities and potential. In other words, a badge may be issued just once - e.g., in connection with a classroom or co-curricular activity - to certify a particular skill set, but can be considered later by multiple employers and/or College admissions officers.

Additionally, most learners need some sort of motivation and encouragement in order to go through with their studies. Recognition of an achievement usually does the trick and this is where Open Badges come into play. Open Badges are a simple, effective and visually appealing way to recognize achievements, as well as a way for learners to share across the web and compare the development of their skills and knowledge with their peers.

Training is more effective when individuals are motivated to learn, share, interact, and collaborate. Open Badges can be awarded to (l)earners for actively participating in a course and

displaying certain soft skills, thereby encouraging these behaviors. In addition, Open Badges can also advertise knowledge, skills and qualifications to prospective employers and college admission officers, and can add a level of gamification to learning environments.

In general, Open Badges promote the idea that for achieving a better recognition of our everyday achievements and acquired knowledge (>70% of our knowledge capital), recognition should be open and thus, everyone (organisations, communities and individuals) should be able to recognize and to be recognized.

In a nutshell, the benefits of using Open Badges are:

- Badges can demonstrate a wider range of skills and achievements of a learner acquired through formal, non-formal and informal learning methods and activities.
- Badges can motivate participation and collaboration as they provide an incentive to and encourage individuals to participate in a training program and collaborate with their peers.
- Badges are portable and verifiable digital objects. All this information may be packaged within a badge image file that can be displayed via online CVs and social networks.
- Badges include the description of the achievement: i.e., they describe the particular path a learner undertook for his/her achievement, accompanied by the evidence to support the badge award.
- Badges include information about the earner's identity, a link to information about the issuer and a link to a description of what the badge represents.
- Badges can be used to unlock learning and career pathways. They can be used to support individuals to achieve learning goals, to provide routes into employment; and to nurture and progress talent within organizations.
- Badges can represent personal attributes that matter to employers (such as soft skills)
- Badges can be used in a professional context. Thousands of organizations, including non-profit organizations, major employers or educational institutions, issue badges in accordance with the Open Badges Specification.

1.4 How to Get Started

For teachers working in a school or any other educational setting, the first step is to ensure that the school/educational center they work at possesses a modern, reliable and flexible system to issue and award Open Badges such as a Learning Management System (LMS), which is properly maintained and supported by a technical team. This system will need to run for as long as you want your learners to be able to verify their badges, so consider a long-term operation and support plan.

It must be noted that some LMS platforms natively support Open Badges, while other LMS platforms offer interoperability with specific badge platforms based on partnerships with these badge platforms.

In addition, it is essential that all teachers and students understand how badges work in order to use them in such a way to maximize their benefit and add value to a training program. Especially for students, it is imperative that they fully understand how they might earn and display their badges, as this is vital to the success of any implementation. This could be achieved by providing an initial badge for a very simple task, such as adding a picture to their digital profile on the used LMS in order to get learners started with badges. In addition, they can be provided with a guide as to where and how they can be shared either on their digital profile, an external backpack such as Badgr and/or their Social Media profiles.

The next step is to establish a framework for the design and issuing of badges. This framework can be revised at any time but it should include an outline of how badges will be:

Designed → Issued → Earned → Displayed → Shared

The actual design of a badge should not be overlooked as it is crucial to use a sustainable and extensible standard, one which takes into consideration not only the icon and wording but also the shape and colour in order to represent different skills, knowledge area, and/or type of badge.

Furthermore, teachers should try to use a range of badge types across the LMS to help keep learners and trainers engaged in the badging process. Given that badges can be linked to gaining skills or knowledge, completing tasks or gaining membership to a group, teachers have the opportunity to offer variety in how badges are awarded and used within their LMS. For example, since LMSs offer the opportunity to award badges both automatically and manually (by an authorized person such as a teacher) as long as the set criteria have been met, teachers should use both methods wherever possible.

Following this, teachers should set some measures for success such as enrolment numbers, engagement, completion and learner satisfaction rates across courses before and after badges are incorporated into their training programs. Being able to quantify and qualify the benefits of badging within an educational organization might encourage further investment into both badging and training.

Finally, it is important to include a degree of gamification and fun into the badging system. Learners and teachers finding excitement, enjoyment, surprise and a little competitiveness within their learning process will help improve performance and engagement in educational programs.

1.5 Open Badges Actions

Open Badges encompass the following seven actions by all involved stakeholders:

1.5.1 Authoring

The first step in the authoring process is probably to determine what skill or achievement to recognize, and then to define badge levels. In addition to this, badge authoring encompasses all visual (design), syntactic and semantic construction of the badge. Badges may be created and designed using local (desktop or mobile) or web-based graphic design programs. These can include:

- Adobe Photoshop
- Adobe Illustrator
- Vectr

There are also online services that offer “point-and-click” badge creation along with access to badge design libraries, including

- Portfolium
- OpenBadges.me
- Canvas

1.5.2 Issuance

For issuance, badges must go through an issuer for distribution, known as a badge issuer. Any individual or organization that has access to a system that supports Open Badges can issue badges. Any entity that can be described with a name, description, URL, image, and email address is a possible candidate to become an Issuer. The important part is that the Issuer profile should represent the person or organization considered trustworthy by badge earners and those that view the badge's information, i.e. the badge consumers (employers, college admission officers, etc.).

As mentioned before, the way one issues badges depends on the system used. These act as an official allocator of badges to individuals as validated by an educational organization. This could include Portfolium, Credly, Badgr, etc. but in an educational environment this is likely to be a Learning Management System (LMS) such as Moodle, which offers the capability to upload badge images, set the criteria to earn and also to display and share them and perhaps most importantly, host the curriculum (educational material) available to the users. Here is where the activation process of an Open Badge takes place. It must be noted that the LMS does not produce the actual badge image but rather hosts it once it is uploaded by the user. In order to design and create a badge image one has to do so through an online credential or badging platform as mentioned above. The most advanced badging platforms offer integrations into LMSs that automate the awarding process after a course or program is successfully completed. Badge issuers may simply issue a badge, or go as far as to insert a badge into a recipient's portfolio.

1.5.3 Awarding

Next, the evaluation of those who meet/fulfil the set criteria (complete the task/course) takes place, to determine who will receive the badge. Once the set criteria have been met, the badges can be awarded to the (l)earners either automatically or manually by an authorized person such as the teacher of the course through the LMS. As mentioned before, teachers should use both methods wherever possible. A suggestion would be for easier to earn badges, such as for course or online activity completion, to be awarded automatically by the LMS while harder to earn badges or awards for soft skills or behaviour that need to be observed or assessed can be issued manually. This will significantly reduce unnecessary administrative overhead.

1.5.4 Earning

(L)earners should take the necessary actions in order to successfully fulfil and meet the set criteria and become eligible to earn a badge. The range of activities is vast and can be the completion of a course, the successful completion of an assessment (quiz, assignment, etc.), etc. If (l)earners interact with the LMS, the earning of a badge can be an automated process, otherwise it will be manually awarded to them by their teacher through the LMS. (L)earners can use the earned Open Badge as an indicator of accomplishment or skill that can be displayed, shared and verified online.

Typically, the Issuer will contact the Earner when a badge is awarded via email or other notification. Earners are often prompted to log into the issuing system and claim their badge. Sometimes badges are delivered as an attached image file that contains the metadata baked as code into the image file. An Earner then logs into the Issuer website and is guided through a flow to claim the badge and potentially send it to other systems such as their preferred backpack, wallet, or portfolio tool.

Once a badge has been earned, it is time to display, share and verify this badge, which is the culmination of the Open Badges process.

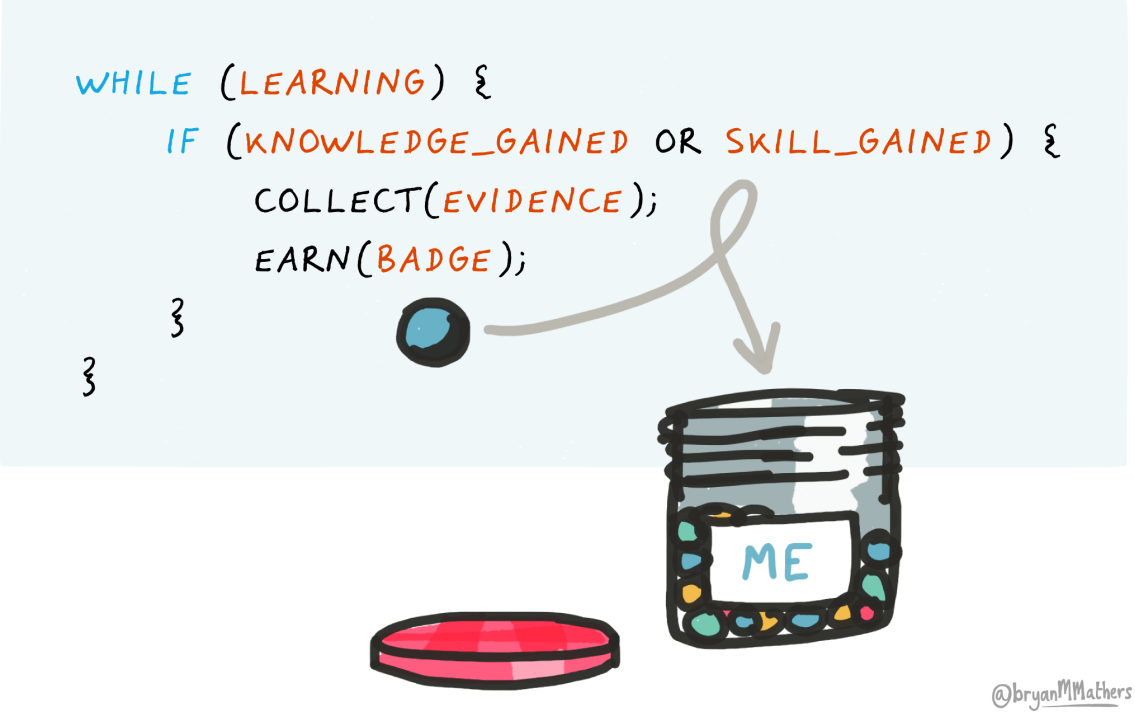


Figure 7: Learning and Earnin

1.5.5 Displaying

A badge is linked to an individual's email address, so it is personalized and usually exportable to an external Backpack service such as Badgr, which is a repository system for storing, managing and sharing badges. Through a Backpack, badges can be shared individually, or as a collection in different formats and to a variety of sites such as an LMS Digital profile page, social media, personal websites, job sites, professional profiles (e.g. LinkedIn), blog sites, email signatures and online resumes.

(L)earners try to earn badges either for self-improvement, but more often to prove current or potential future employers that they care for their Continuous Professional Development (CPD) and/or have acquired new skills. This means 2 things:

1. (L)earners wish to display or share their digital badges
2. Third party "verifiers" (e.g employers) wish to be able to verify whether the badge is legitimate.

1.5.6 Sharing

It's one thing to earn a badge, but that doesn't mean anything if no one can see it. This is where the significance of sharing comes to play. Open Badges are designed to be shared. By sharing them, individuals exhibit their achievements to others and turn them into a valuable currency to unlock new opportunities.

A primary agent in hosting and sharing badges, along with the evidence and artifacts linked to them, is the fast-growing technology of the Backpack. Backpacks are repositories for evidence (work samples, artifacts, projects) and certifications that link to an individual's competencies and achievements.

The growing usage of badges in Backpacks have proven to play an effective role within the competency marketplace, specifically in its ability to promote discoverability for competency and desired skill-sets among the marketplace actors. With this digital tool, competencies are made discoverable via badges when badge metadata is indexed. Competencies are also discoverable when competency badges are embedded in other sources, such as on blogs, websites, e-Portfolios, professional networks, job applications, social media sites/profiles, email signatures and resumes.

1.5.7 Verifying

If a (l)earner can't share their badge, and if a third party can't verify it, then its value is significantly diminished. This is one of the main reasons for the Open Badge standard. Third party verifiers (consumers) such as Employers and/or College Admission Officers can see the various metadata associated with the badge (Badge name, Issuer, Criteria, Earner, Date, etc.) to determine who issued it and whether it is valid.

When consumers view an issued Open Badge, they may initiate a verification process that communicates with the server that hosts the original badge metadata. The server verifies that the badge is valid and communicates back to the consumer with confirmation details.

Oftentimes people wonder how Open Badges are different from CVs, diplomas, etc. The answer is simple and lies in the fact that CVs are static and need to be continually updated, while badges are inherently dynamic, as they can be presented in ever-changing combinations, creating a constantly evolving picture of a person's lifelong learning. Open Badges can represent a more detailed picture than a CV and can be verified before being displayed.

At the end of the day, the overall value of an Open Badge depends on the consumers' perception and the following values (Figure 7):

- **Issuer** who can be anything from an institution, company, etc. to a group of people or an individual
- **Badge** meaning (attribute, knowledge, achievement, competence, participation, etc.)
- Who has **endorsed** the badge (institution, company, group of people, individual etc.)
- **Journey** (learning pathway, mapping, milestone, etc.)

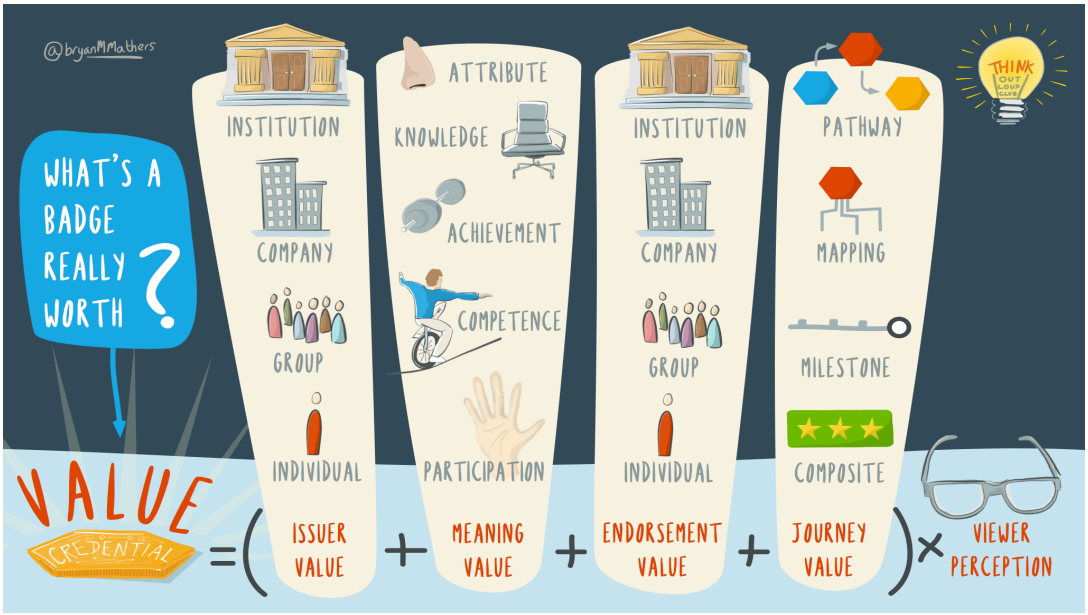


Figure 8: What is a Badge Really Worth?

1.6 Open Badges Functions and Usage

Depending on the Issuer and the Earner, Open Badges can be used in a variety of contexts and for different purposes, the most important of which are to:

1. Motivate Participation

This is one of the most important functions as it provides an incentive to and encourages individuals to participate in a training program.

2. Motivate Collaboration

The use of Open Badges as a reward can encourage collaboration, resulting in a wider variety of voices and perspectives to be elicited, which can in turn help to engage more individuals in discussion or data-sharing.

3. Recognize & Assess

In education, Open badges are often associated with various types of assessments, including summative (evaluation of prior learning), formative (provide guidance and feedback) or transformative (reshape the learning process). Open badges are most commonly associated with online formative assessment where individuals are provided with feedback and their progress is tracked.

4. Act as Alternative Credentials

Some consider Open badges a potential threat to diplomas given the fact that more and more online education programs are adopting Open badges to mark achievement. However, this notion is hotly contested. It is more common for individuals and organizations to recognize the modular nature of badges versus the comprehensive nature of a diploma or degree.

5. Represent Competencies

In most educational programs, traditional time-based assessments provide a single quantitative grade, more often than not on some kind of “pass - fail” scale. Open Badges provide a more modular and flexible way of showing various levels and combinations of competency or mastery.

Open Badges allow us to see the whole picture of someone’s skills as they can be issued for literally anything. They can recognize a prolonged piece of learning such as a degree, they can identify skills at a micro-credential level such as character attributes, or emphasize the kinds of generalized skills (soft skills) employers want, such as collaboration, creativity, empathy, curiosity, work ethic, which may be developed in an informal learning context.

Figure 9: Open Badges: Seeing the Whole Picture

1.7 Open Badges Considerations

1.7.1 Audience

The audience an Open Badges Issuer addresses is not only the direct audience, i.e. the (l)earners who are the Badge Recipients but also the indirect one, the so-called Badge Consumers, who could be potential employers or college/university admission officers.

The Open Badges ecosystem is filled with various badges, which serve many different purposes. Every badge audience is different, so one needs to think carefully about their audience.

Issuers have to be specific about what they are trying to achieve. To do that, they need to know more about their audience, the (l)earners who will earn these badges as well as those who will see and assess them.

When issuers think about their audience, they should consider the following questions:

1. Who are they?
2. What motivates them?
3. How do they want them to change, learn, or develop?

It is therefore crucial to spend some time with colleagues in order to map out for whom the badges are designed and to ensure that they make sense to the badge earner. As already mentioned, it is also important to consider not only the badge earner, but also the secondary (indirect) audience, that is those who could view the badge (consumers) and how they will perceive/assess the badge.

1.7.2 Badge Taxonomy (Badge Categories)

We know that Open Badges can be issued for literally anything, including:

- Traditional credentials: (e.g. Diploma, Bachelor, Master of Science)
- Formal learning: (e.g. completing a course)
- Informal learning: (e.g. curiosity, problem solving, mentoring)

- *Figure 10: Badge Taxonomy*

However, it is always a good idea to categorize badges in order to keep track of things. Figure 8 depicts a simple badge taxonomy to help issuers think through different situations. Of course, this is not an exhaustive list, but could be a good start for a new badge system.

For example, you might start in the following way by issuing badges for:

- Signing up for membership of a particular group or organization.
- Demonstrating mastery through a commitment to excellence.
- Participation in an event-activity or registering on your system.
- Showing capability by reaching a particular skills standard.

1.7.3 Collections of Badges - Learning Pathways

More often than not, issuers realize the need to move beyond single badges and start connecting badges in numerous ways such as:

- Collections of badges based around a particular theme/topic
- Badges that add up to an overall badge, e.g. a meta-badge
- Badges that would lead to an opportunity

Badges can be sequenced in a way that narrates a learning journey or "pathway" that (l)earners follow and vary in duration and complexity. As depicted in Figure 9, these pathways can be formed as:

- **Stepping stones**, where badges must be earned in a particular order
- **A collection** of badges relating to a subject, from which someone must earn a specific number
- **Pathways** forged by the individual themselves from badges that all relate to a particular theme

Badge pathways can also be used to reflect retrospectively and describe a learning journey undertaken by the learner.

Figure 11: Badge Pathways

Pathways vary in duration and complexity based on the number of milestones and requirements. For example, the types of requirements for earning a single badge could range from attending an event to getting 75% on a course assignment.

In complex cases, an earning path could be constructed as a linear, contiguous series of assignments, courses or milestones, known as a sequential learning path. In more basic cases, earning paths could work as non-sequential paths, discontinuous increments that may be "stacked" to add up to equal a larger / macro credential.

It is proven that a single badge cannot and does not narrate a student's complete learning story. When combined with a pathway, students earn badges as they move along any type of curriculum. Instead of one piece of paper awarded at graduation, with badging students have the ability to showcase how they got to that point and the competencies earned along the way. Open badges simply make it easy to translate those competencies into a specific skill that is viewable and verifiable by employers.

When moving beyond a single badge, issuers need to think about how their badges work together and should consider things such as:

- Could this single badge be split up into more granular badges?
- Should a collection of badges add up to a meta-badge?
- Should different badges be used to show levels and progressively deepen understanding of the learning or skills the badges represent?
- Should badges connect earners to an opportunity?
- Should badges be followed strictly in order by individuals or should groups of badges be created, which earners can choose from to personalize their pathway?

1.7.4 Credibility of Open Badges

One of the most important questions that Issuers of Open Badges ask themselves is:

"How do you create a credible badge system?"

Likewise, when Consumers receive a badge and want to check its validity, they often wonder:

"How do I know I can trust badges?"

Credibility is a key issue when using Open Badges. Issuers should aim to issue badges that are credible:

- to their direct audience ((l)earners) and
- their indirect audience (consumers)

In other words, issuing badges that are:

- Viable
- Valid
- Reliable

It goes without saying that the more endorsements an Open Badge receives, the more credible it looks to both (l)earners and consumers. However, the number of endorsements doesn't necessarily tell anything about a badge's credibility as long as the quality of those endorsements (i.e. how credible and competent are the endorsing parties?) remains unclear. Therefore, particular attention should be paid to this aspect as well.

It is important to always bear in mind that the 'value' of a badge doesn't depend on how difficult it is to earn it, but rather on whether the action taken to earn the badge was meaningful or not.

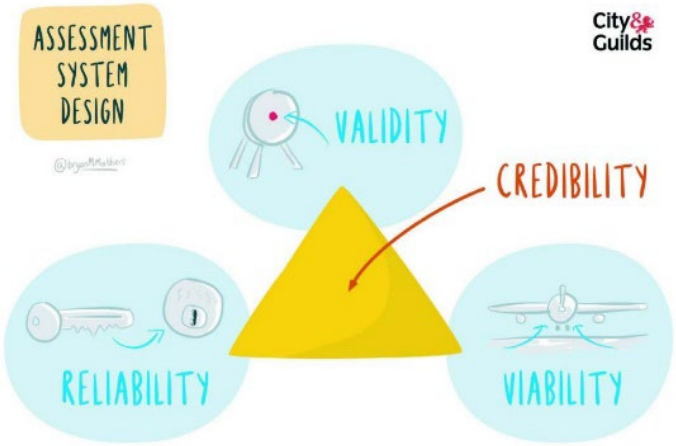


Figure 12: Credibility of Open Badges

Figure 10 illustrates that credibility is actually a function of three different elements:

- **Validity**: Will the badge meet a specific need? Will it have value for the (l)earner and consumer?
- **Reliability**: Will the badge be assessed consistently? Will the technology used to issue, earn and display the badge work well?
- **Viability**: Does the badge have the correct criteria for what needs to be recognized?

'Assessment' is usually thought of in terms of formal education, but any educational organization issuing credentials must think about what's appropriate in this regard.

There are many ways to assess, including:

- **Self-assessment** - verification by the individual
- **Peer assessment** - verification by the individual's co-learners
- **Expert assessment** - verification by a recognized authority

In addition, there are three different types of awarding a badge to someone:

- **Automated** - a badge is automatically awarded by the system (LMS) implemented by an educational organization once a learner has met the specified criteria.
- **Manual (Bestowed)** - a badge is manually awarded by an educational organization to a learner who has met the criteria for a badge, whether or not they have applied for it.
- **Manual (Claimed)** - a badge is manually awarded by an educational organization after being applied for by a learner who believes they meet the criteria.

Consider a simple badge pathway. The first step is a badge issued for turning up to an educational event or registering on a LMS. This obviously does not require expert assessment as it would be a waste of time. Ideally, badges for participation in an educational event or for registering on an LMS would be automatically awarded to participants.

Continuing with a simple pathway and moving on to a badge for membership of a particular group, this could also be automated, but the chances are that some level of peer assessment would be required. Again, the badge could be claimed by someone who asserts they met the relevant criteria and awarded via peer assessment. Alternatively, it could be bestowed.

The process changes when higher-stakes badges are put into play. In this case, it is a good idea to include some expert assessment. By using other forms of assessment for lower-stakes badges, we ensure that we save time, money and effort for the badges that really matter. Having said that, the awarding of high-stakes badges could also be automated, which is possible through an LMS as it can monitor completion of activities. However, when dealing with mastery badges, it is likely that these should be reviewed by an expert and then bestowed.

1.7.5 What to Avoid

One should consider things to avoid when using Open Badges in order to ensure their credibility such as:

Overbadging

Offering badges for the majority of or all course activities could potentially diminish the value of each badge. The optimum number of badges within a course depends on the length, type and structure of the training.

Zero Challenge Badges

Offering too many, and at the same time easily earned, badges, could limit the sense of achievement a learner may feel from obtaining that badge, and again diminish the perceived value of the award. Earning a badge should provide some type of challenge to the individual.

Meaningless Badges

If badge issuers find any difficulty in describing what the badge represents, they should consider whether the badge has any meaning or relevance to the (l)earner or others viewing the badge.

1.8 Open Badges Endorsement

Open Badges are like commercial products that have to be endorsed by a certain institution in order to be promoted in a wider sphere and to gain credibility and ultimately, the support of the Open Badges Consumers.

The more endorsements an Open Badge receives, the more credible it looks to both (l)earners and consumers as long as the quality of these endorsements (i.e. how credible and competent are the endorsing parties?) remains absolutely clear.

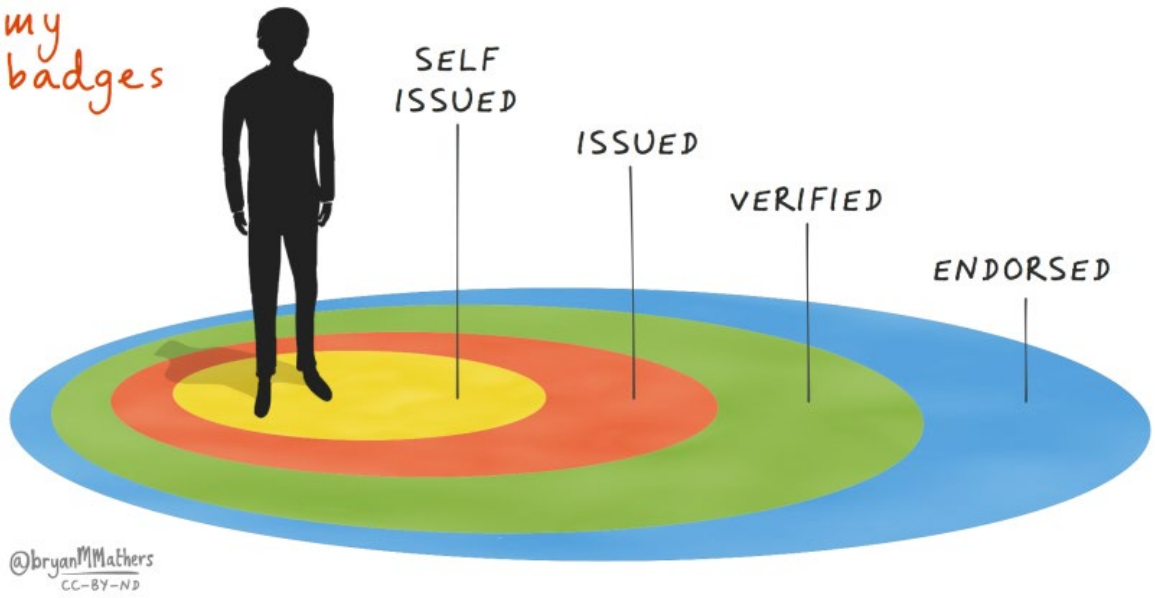


Figure 13: Open Badges Endorsement

1.8.1 Governmental Institutions

The Council of the European Union is one of the intergovernmental institutions which have expressed its support to Open Badges as one of the nonconventional approaches to recognize someone's work and skills. In a conclusion made by the Council and Representatives of the Government of the Member States released in 2016, it was stated that "To appeal to young people and to ensure greater impact on their lives, new settings where young people spend their time, such as modern city infrastructure and virtual space, as well as new approaches using innovative online and offline tools (such as gamification, GPS based activities, learning badges or design thinking), should be reflected upon and taken into account in the further development of education and training of youth workers." (Council of the European Union, 2016). This statement affirms that learning badges such as Open Badges are one of today's trends in recognizing learners' skills and knowledge acquired by training.

Within the EU, the Lithuanian National Commission for UNESCO together with the Lithuanian Association of Non-Formal Education recommend the use of Open Badges to other UNESCO affiliated schools in the country (Lithuanian National Commission for UNESCO, 2016).

Aside from these EU bodies, in 2013 the U.S. Department of Education's Office of Vocational and Adult Education (OVAE), funded a study which "explores the feasibility of developing and implementing a system of digital badges for adult learners and the implications for policy, practice, and the adult education delivery system" (Finkelstein, Knight, & Manning, 2013). In the US, the following institutions have a long tradition implementing the Open Badges Eco-System as a recognition tool:

- EDUCAUSE - a leading association in the field of information technology focusing in higher education.
- The Society for Science and the Public administers the Intel International Science and Engineering Fair (Intel ISEF), - the largest precollege science completion in the world.
- The American Association for State and Local History
- The Yale Center for Emotional Intelligence

These institutional endorsements from various governmental bodies show that Open Badges are a legitimate tool to be considered and one of the trends in the 21st century which should be further explored in the field of formal and non-formal education.

1.8.2 Private Sector Endorsement

Aside from the Mozilla Foundation which started the idea of Open Badges, various entities in the private sector have also been using Open Badges. For instance, the American company Microsoft "developed a badge system for the Partners in Learning Network (PiLN) of educators and school leaders to promote technological competencies and relevant skills in today's digital age." (Chow, 2014). On its official website, the company explains why they are offering Open Badges: "Your digital badge allows you to easily share the details of your skills in a way that is trusted and verifiable" (Microsoft, 2016). One of the well-known institutions which is using Open Badges is the National Aeronautics and Space Administration (NASA). In 2012, NASA together with Project Whitecard and the Wheeling Jesuit University collaborated to convince the California Academy of Science to implement Mozilla's Open Badges system in "recognizing life's achievements" (NASA, 2016). Aside from companies, formal education institutions have been also using Open Badges as a recognition tool. In Europe, some of these institutions include Beuth University of Applied Sciences Berlin in Germany, Newcastle University in the United Kingdom and University of the Balearic Islands in Spain (Mozilla Foundation, 2016).

2. PRACTICAL ELEMENTS

2.1 Open Badges Life Cycle (Eco-System)

Open Badges put learners in control of how and where they share verifiable evidence of their skills and achievements with people, organizations, and social platforms.

Open Badges enable learner-control of sharing their credentials and communicating their meaning to educational institutions and employers. These credentials show evidence of rigor of the academic achievement through the inclusion of criteria, assessment details, learner's evidence, alignment with external frameworks, accreditation details, and endorsements.

Open Badges v2 introduces features that significantly improve the verifiability, portability, reliability, and discoverability of Open Badges.

The following Figure 10, depicts the life cycle of an Open Badge.

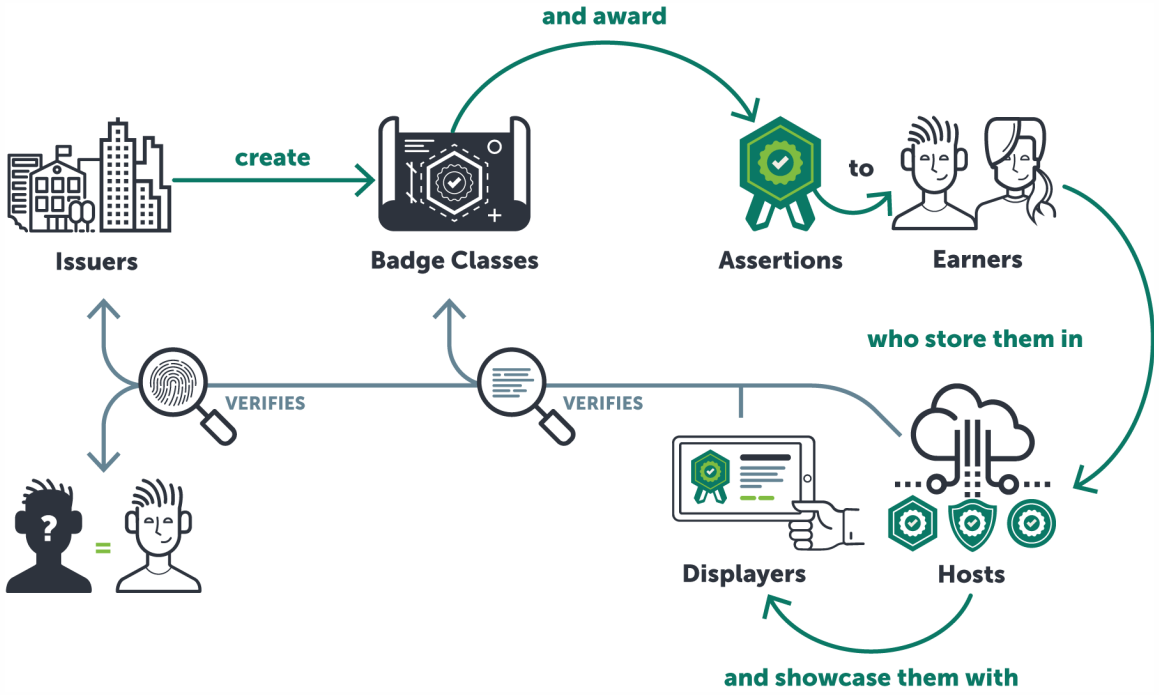


Figure 14: Open Badge Life Cycle

Initially, the **Issuer** (Individual, Organization, etc.) creates/issues the so-called **Badge Classes** to build a catalog of badges that may be available to earn from the issuer. They may include information about the set achievement including how to earn it or learn more about the issuer and the achievement itself.

With a catalog of badges (Badge Classes) prepared, one can award those badges to recipients (earners) by creating **Assertions**. The Assertion is the representation of an awarded badge and may include evidence and supporting information on how the recipient became eligible for it. Assertions are packaged for transmission with a set of mandatory and optional properties. Typically, an Open Badge is made available to recipients through an email message or other notification that contains instructions and a mechanism for downloading the badge.

Following the earning process, Earners can store their newly acquired Open Badge in a Host (Backpack) before showcasing them through a Displayer. Typically, when an Open Badge is displayed, the Assertion and related objects such as contextual information on how to learn more about the Issuer, the Badge and how to earn it are displayed on a screen in human-readable format. Supporting this enables the recipient to showcase their earned achievements and choose to allow others to view those (Badge Consumers). Here, it must be noted that privacy considerations are of paramount importance.

Earners can share their badges in a number of ways, which include downloading the baked badge image file, integrating it in their social media accounts, retrieving the HTML code to display the badge, etc.

Finally, Open Badge viewers (Consumers) can verify the validity of these Open Badges, which is a critical feature of Open Badges and one that enhances its significance. Badge Hosts must support the function of importing Open Badges. This involves a process by which an Assertion and related objects are validated for format and integrity. Import of Open Badge data results in the subsequent display of that data.

If the above text seems too **technical** and perhaps confusing especially for non-technical teachers that is perfectly normal. To simplify the above text, let's just say that a **badge class** is information written by the badge creator (issuer). It is a kind of template used to generate (bake) the content of the badge.

In other words, a **Badge Class** is the formal description of a badge and contains information that will be common to everyone who earns that badge, e.g. badge name, the badge image, badge description, criteria to earn the badge, alignment to standards, tags, and general expiry information (if any). Think of a badge class as the mold that is used to cast all the unique assertions (i.e., instances) of a badge that can be earned by individuals.

Figure 15: What's Inside an Open Badge? Badge Classes & Assertions

On the other hand, a **badge assertion** can be defined as the unique badge received by a recipient. A badge assertion is unique, it carries information about the badge issuer and the badge earner and it has a URL (assertion URL) used to validate the badge.

Badge Assertions are the unique instances of a badge that individuals earn. In other words, an assertion is the actual digital credential, or claim, that the earner receives and that serves as the record of their achievement. In addition to containing all the general information of the badge class, the assertion contains all the information that makes it a unique instance of the badge, e.g., the identity of the badge recipient, and optionally a link to evidence and an expiration date.

The above Figure 11, depicts exactly what Badge Classes and Badge Assertions really are.

To clarify even further, a badge class contains the name of the badge, a description, and a criteria page. The description field is the place where badge creators (issuers) write descriptions of their badges. The criteria page, which is "the heart of the badge", is where badge issuers present the criteria used to recognize the skills, achievements or competences of their badges' recipients, which the latter have to fulfil in order to become eligible for that badge.

Figure 12 depicts the life cycle of an Open Badge (Open Badges Eco-System):

Issuers, who can be anyone from Education providers to a website or any organization, first **create** (**design**) and then **deliver** (**award**) a **Recipient** (**Earner**) baked Open Badge images.

Earners then **store** in a **Backpack** or any other **displayer**.

The **displayer** is **connected** to the **Issuer** who **verifies** the content and **displays** the verified **information** (**Metadata**) to any **Consumers** (Employers, College Admission Officers) who are interested in their accomplishments and wish to **verify** the **validity** and **credibility** of the awarded badge.

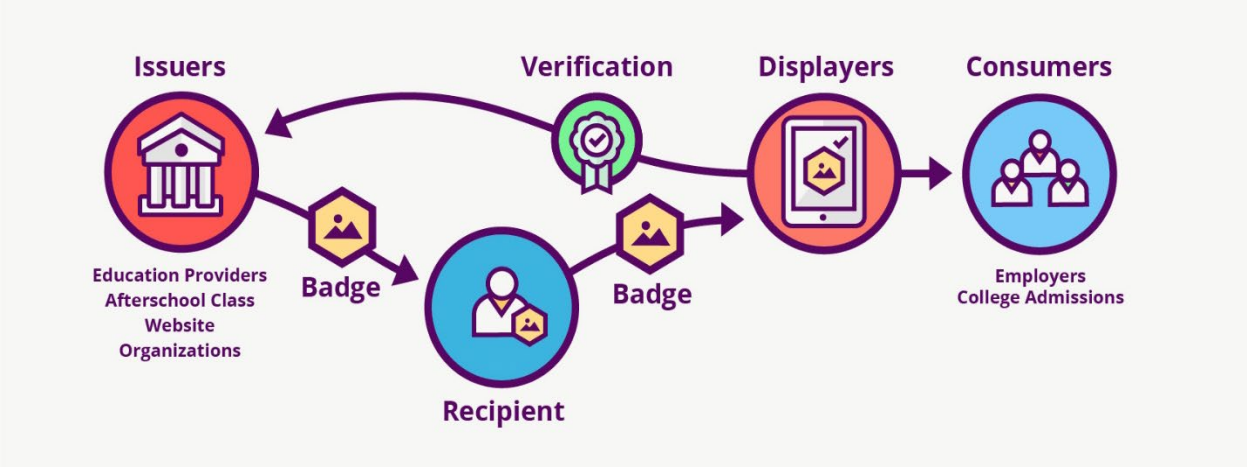


Figure 16: An Open Badges Eco-System (Life Cycle)

Technically speaking, an Open Badge is a digital image, which contains metadata-information about who has issued the badge, to whom, and on what basis. Therefore, it is more than a digital image. It is a standard and verifiable digital credential, the metadata of which aligns with the Open Badge Standard created by the Mozilla Foundation and further developed by IMS global. To create a standard Open Badge, one doesn't need to know about the standard's technical specifications. Instead, one can use a standard-compliant Open Badge platform such as the popular Moodle LMS.

Over the years, many companies have created badge issuing platforms compliant with the Open Badges Specification. They provide a wide range of services which allow non-technical users to issue Open Badges credentials. The e-platforms used for issuing Open Badges offer a variety of custom services including online badge designers, issuing, assessment workflow, display, user profiles, social sharing and tools to integrate with existing LMSs. All Open Badges issuing e-platforms allow recipients to export their badges to other online options such as backpack platforms. This allows users to stack and share their badges earned on different platforms of their choice.

There are numerous ways to issue and award badges to (l)earners, but this guide focuses on standalone LMSs and in particular on the Open Source and most trusted online learning solution, Moodle LMS, which is used by over 250 million learners worldwide.

The Moodle LMS, and how to use and exploit Open Badges in it, is presented in detail in Chapter 3, together with useful and easy to follow step-by-step videos. Before that though, it is important to go through some practical elements regarding Open Badges.

2.2 Learning Management Systems (LMSs) for Setting Up an Open Badge Eco-System

Open Badges are portable credentials. Collections of badges, which may have been issued by different organizations, can be displayed and shared in a way that makes sense to the user in a variety of ways including a Badge Profile page, a professional profile such as LinkedIn, in a CV, or simply stored in a LMS, where they were initially earned.

A LMS is an essential tool for eLearning. It can also be a major expense, especially if looking for a robust, versatile LMS that can accommodate eLearning development needs. Thus, education administrators tend to favor Open Source LMSs because it's a great solution for learning when having the end user in mind.

Open source LMSs offer the opportunity to develop and deploy e-learning courses and much more if one dedicates the time to master all their features. In some cases, an open source LMS may come with a learning curve, but the cost-savings and design freedom may be well worth it in the end.

Fortunately, there are a variety of different Open Source LMSs that can offer a dynamic and flexible eLearning platform without having to go over a specified budget. This guide presents a short list of Open Source (free) Learning Management Systems which incorporate the Open Badges Eco-System as well as gamification principles below.

Studies have proven that gamification in education engages learners with learning activities by applying game principles (points, progression, competition, badging) and can be useful in helping learners further comprehend and apply new information.

Hence, educational entities and teachers just need to choose a specific open source LMS that is suitable to their needs, but this process can be challenging. A good start would be to first answer some questions such as the following:

1. Does the LMS have a supportive online community?
2. Is it compatible with third-party plug-ins offered by external developers?
3. What's the quality of its user interface?
4. Is the software mobile-friendly?
5. Does it provide gamification principles such as points, progression, badging, etc.?

2.2.1 Learning Management Systems

Moodle is the world's most trusted online learning solution as it is a globally supported effort. The engine of the Moodle ecosystem is Moodle LMS, the secure and customizable open-source platform used by over 250 million learners worldwide. Moodle LMS is the open source learning management system with inherent security and privacy features used by hundreds of millions of learners worldwide. Designed in collaboration with Moodle's global community, Moodle LMS allows educators in any sector to create flexible, safe, accessible and highly engaging online spaces for their learners as it comes with a full kit of features that allow educators to create a private learning space online, filled with tools that easily create courses and countless activities, which are all optimized for collaborative learning. In addition, it provides a Mobile App, which is available for both Android and iOS and possesses an extensive Moodle plugins directory for extra activities, blocks, themes, and more.

Chamilo is an open source LMS that improves access to education. Backed up by the Chamilo Association, it aims at the maintenance of a clear communication channel and the building of a network of services providers and software contributors. Its features allow users to easily create content, as they're offered tools for all types of learners. In addition, Chamilo has online mobile learning support available, making it easy for users to choose their own pace and place for attending courses. To get support for Chamilo you can turn to the online community, the knowledge base, or one of the several one-on-one options available.

The Open edX is a tool empowering learners to access course content, including videos and textbooks, while checking their progress in the course. The Open edX LMS has a discussion forum and a wiki that both learners and course team members can contribute to, whereas the latter can also use an instructor dashboard. It is a tool for building courses, creating structure and then adding content. Teachers can also manage their course schedule and course team, set grading policies, publish different parts of their course, and more. There's a discussion forum and the Open edX Insights, which are particularly useful as they are part of the community structure and learners can benefit from interaction with experienced members. The Open edX community includes webinars, upcoming events, and blog posts.

Canvas is an open source LMS that is free for instructors. It makes teaching and learning easier in terms of implementation, adoption, customer support, and success. It is adaptable, reliable, and customizable with an interface and features crafted to save time and effort. Over 300,000 Canvas users are involved in sharing, collaborating, and shaping Canvas. It offers simple mobile use and a time-saver that gets adopted in growing rates. Its extensive, open API, published to the world, paves the way for third-party apps to plug right into Canvas, pulling and pushing its data. In-house Canvas experts are there to ensure the speediest, most frictionless interactions. Canvas LMS has become the most widely used LMS by colleges and universities in North America, and the fastest growing worldwide. In K12, Canvas LMS becomes the digital learning hub that brings students, teachers, and tools together whether in the physical, blended, or fully online classroom. Delivering dynamic, engaging learning experiences, its 99.99% uptime ensures instant connection between students and educators, anywhere, anytime.

Finally, if you are familiar with WordPress, there are various paid LMS plugins, which one can use in order to transform a Content Management System (CMS), website or portal into a LMS. This WordPress plugins allow the creation and running of online courses in WordPress and are growing in popularity and usage. They include features for managing online course content, handling subscriptions, running and grading quizzes and more. The most popular are MemberPress Courses and LearnDash.

Of course, there are also paid LMSs that do have a gamification focus, which an educational organization can use but these are beyond the scope of this Guide. Indicatively, these include:

Designed by Growth Engineering, Academy LMS is built entirely around gamification - in fact, their other products include a game-based content authoring tool and custom content creation focused on engagement. It's not an LMS that has gamification added, it's an LMS that relies on gamification to function at all. If you're looking for a ground-up gamified system, Academy might be a good choice. Core features include Points, Badges, Leaderboards and Social learning.

TalentLMS is highly-rated software that supports points that can be customized per action (such as when someone logs in, completes a course, a test etc.) and makes it easy to provide the right training for any team and every use, while giving expert guidance and support every step of the way. Each course can award a different amount of points depending on its scale of difficulty. TalentLMS delivers great learning experiences on any device, adds gamification for even better adoption and stays connected with communication tools. It also offers customizable badges that are compatible with Mozilla's OpenBadges initiative, which is a well-known system that carries weight in a lot of industries, letting learners collect and display all of their badges in a single place.

Blackboard

Blackboard Learn is a scalable, reliable foundation for a world-class learning experience. Its flexible learning platform enables to extend online learning, increase learners' engagement and optimize learning outcomes. Intuitive new features make it even easier to manage content, personalize courses, foster collaboration and connect with learners. It can deliver instructor-led training and virtual learning that will keep learners engaged anywhere, at any time.

2.3 Minimum Technical Specifications of an Open Badge

Badges are very easy to create, as long as some minimum technical specifications are met. Specifically, there are some minor constraints in the format and size of the image.

An Open Badge is comprised of an image file with structured metadata (JSON or JSON-LD) embedded inside it. Images need to be square (equal width and height), although different shapes can be used within a transparent square.

The file also needs to be in .PNG or .SVG format. In addition, the image cannot be smaller than 90 x 90 pixels (ideally 100 x 100 px) and the file size should be a maximum of 256KB.

Recommended image size varies by badging platform. For PNG files, an image size of 400 x 400 - 600 x 600 pixels is recommended.

Figure 17: Example Badge Images

The badge image, together with the badge name, are typically the first thing badge consumers will see, and together the name and image should be capable of providing a sense of what the badge is about.

The badge image may contain the issuer logo. However, because badges can be displayed at sizes as small as 90 x 90 pixels, special care should be taken so that branding remains legible and visually appealing.

Open Badges may be displayed at different sizes. Images should be previewed at around 90 x 90 pixels to ensure that elements are clear. This is the smallest size that applications commonly embed badge images on the web. Badges are portable and may be displayed in a variety of digital contexts and against different background colors.

If the "alt text" option is available, it is advisable to use it so that badge images are accessible to all users.

Badges can include text, different shapes, and colors. Logos can be created using any design tool. For non-designers, there are free badge creation tools, such as openbadges.me and Canva.

Once you have created an image, you can define the criteria for awarding that badge and add other relevant metadata to the badge via an Open Badges Platform such as a LMS.

An Open Badge platform may provide any or all of the following features:

1. **Issuer**: Create, manage and distribute badges and enable earners to receive and share badges
2. **Displayer**: Render information about the earner's badge and allow a viewer to verify the badge
3. **Backpack**: Enable an earner to import Open Badges from other systems and potentially organize and share the badges with others

2.4 Anatomy of an Open Badge (Metadata)

Metadata is data that describes other data or information.

For example, when you take a picture with your smartphone, your phone records additional data such as:

- when (and possibly where) the picture was taken
- how big the image file is
- who the author is

That additional data is called 'metadata'.

Open badges capture essential information about learning and achievements by "baking" (storing) this metadata inside the badge image. If made public, this information can be accessed and viewed by anyone. A verified issuing organisation, together with attached evidence by a badge earner, improve the credibility of Open Badges, as does the number of endorsements it attracts.

Therefore, an Open Badge is an image file with a range of 'built-in' information (Metadata). Contextual information such as:

- who earned it (name of (I)earner)
- what the badge represents (what was learned)
- how it was earned (set criteria)
- when they earned it (date)
- who issued it (name of educational institution(s))

is critical to the definition of a badge in this standard.

This metadata is crucial for a Digital Badge to be Open Badge Compliant and not just be a digital badge. It is added to a badge by the issuing system and provides useful information about the badge to anyone wishing to verify it or learn more about the context of the achievement it signifies.

In simpler terms, if one virtually "peels off" the exterior image they will see that there is data inside that image, as depicted in Figure 15. It must be noted that a subset or all of this information will be displayed in a visual format (badge image) wherever the badge is displayed, but it is also stored within the digital badge's metadata so it can be verified any time.

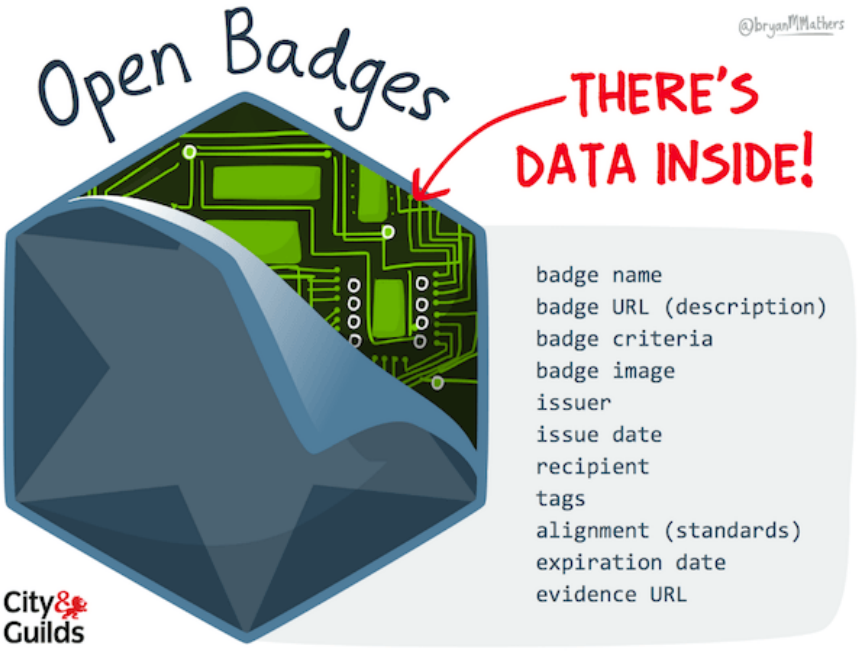


Figure 18: Open Badges Metadata

The Open Badges Standard specifies the required and optional information to be included in the badge image metadata. The more information is provided, the easier it is to explain its context and current state to anyone interested (Badge Consumers).

Required Metadata include:

- **Badge Name:** Recalls the content of a skill or achievement in a few words. It can be the name of the skills/competence.
- **Badge Criteria:** The assessment process to be followed by the candidate (l)earner or in other words, the tasks set by the badge issuer and completed by the badge earner to qualify for a specific badge.
- **Badge URL (Description):** Provides the details of achievement: describes the context, specifies the achievement, refers to completed tasks, explains the assessment procedures.
- **Issue Date:** The exact date the Badge was issued
- **Issuer:** An account or record associated with the organization issuing the badge - at least their name and e-mail address. The organization can be a company, institution or private person that issues a badge to recognize learning and achievements.
- **Earner (Recipient):** An email or user account associated with the badge in order to identify the earner/recipient.

Optional Metadata include:

- **Alignment (Standards):** The educational standards the Badge adheres to.
- **Expiration Date:** The exact date the badge expires (if it expires).
- **Evidence URL:** It is very much encouraged to enrich and backup the claim for specific achievement. It can be of a variety of formats: text input, file upload, image, video, badge code or even another badge. The proof and the evidence of the acquired skills will have to be specified here, i.e. quiz grade, task (link, photo, video) etc.
- **Revocation / Revocation Reason:** A badge could be awarded by mistake and must be revoked with an explanation.
- **Tags:** Terms or phrases to describe the badge's topics, competencies, or type of achievement.

Badges are awarded to an individual, either automatically or manually, when they have met the required criteria (the criteria that the badge has been assessed against) or provided the required evidence. The evidence that the earner submits to earn the Open Badge can be included in the metadata inside the badge image. If added, it links back to the actual proof of mastery that the earner submitted and the issuer approved.

An individual may collect badges from different issuers and choose where to store and display these badges. When an individual displays one of their badges, the metadata can be viewed and verified by others simply by clicking on the badge.

2.5 How to Write Open Badges Metadata

Since metadata play a crucial role towards the validity and credibility of Open Badges, this section provides a comprehensive guide for Open Badges Issuers on how to author Open Badges Metadata in order to transfer all the necessary information to both (I)earners and consumers.

(*) denotes required fields.

Badge Name (*)

The Badge Name should be short and the content of the achievement should be easily understandable. Since the Badge Image and Badge Name are typically the first things a badge consumer will see, it is crucial that together they should be capable of providing a sense of what the badge is about.

Description (*)

A Description is a short explanation of the claim being made by the badge and a brief overview of what a recipient must do to earn the badge. When badges are listed, shared or displayed, descriptions can be read by badge consumers, e.g., employers, as well as by learners who are considering earning the badge.

Although there are somewhat different categories of badges, a good badge description will briefly describe as many of the following badge characteristics as are relevant:

1. It should describe the context in which the badge was earned.
2. It should specify the achievement.
3. It should refer to completed tasks.
4. It should explain the assessment procedures.

Issuer (*)

The Issuer name is the name of the individual, entity, or organization that issues the badge. If a badging platform is used to issue badges, most likely the Issuer information will be provided when setting up an issuer account.

Any individual or organization can create an Issuer profile and begin defining and issuing Open Badges. This is being done by a diverse range of organizations and communities, including:

- Schools and universities
- Employers
- Community and nonprofit organizations
- Government agencies
- Event organizers and science fairs
- Companies and groups focused on professional development (such as the MeLDE and DigiTeaL consortia)

An entity that can be described with a name, a description, a URL, an image and an email address is a possible candidate to become an issuer.

Criteria (*)

Criteria list all of the detailed requirements that a badge earner had to meet in order to become eligible and ultimately earn a badge. Criteria are written for potential badge earners, to provide them with as much specific detail as they need in order to earn the badge. Criteria are also written for badge consumers, to provide a detailed account of exactly what badge earners had to do to earn a particular badge. If there is an assessment rubric associated with the badge, teachers should consider sharing it here.

- A badge may be associated with multiple criteria
- Criteria can be required or not
- Criteria should be associated with a description and indication of acceptable evidence
- Criteria should be exhaustive, i.e., they should include all requirements needed to earn the badge
- If a badge is associated with a competency-based assessment, the badge criteria should align very tightly with the competency statement

Criteria can also specify the type of evidence needed to earn the badge. For example, a badge may require potential recipients to submit writing, record video of themselves demonstrating a skill, or submit proof of having attended an event.

As much as possible, badge criteria should follow the SMART acronym. That is, criteria should be:

- **Specific**: what will the badge earner have accomplished by earning this badge?
- **Measurable**: how will the assessor know when the level at which the badge is awarded has been achieved?
- **Achievable**: in what ways can the badge be achieved?
- **Relevant**: is this badge worth earning? what opportunities does it unlock?
- **Timely**: should this badge expire after a certain period of time?

Alignment

The alignment field enables a badge to be aligned to recognized academic or professional standards. A badge aligned to recognized standards is easier for badge consumers to find and understand, which adds value for badge earners, consumers, and issuers. The contents of the Alignment field should consist of a URL/URI that points to an element of an educational or professional standard, or at a competency definition used by multiple organizations.

Tags

Tags are alternate terms or phrases to describe the badge's topics, competencies, or type of achievement. Tags are intended to help badge consumers and potential badge earners find relevant badges. As such, the tag field should contain as many relevant keywords as will be helpful.

Expiry Date

If the achievement has some notion of expiry, this indicates a timestamp when a badge should no longer be considered valid. After this time, the badge should be considered expired.

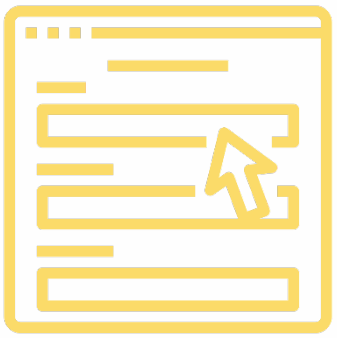
Date Issued (*)

This is the date the badge is issued (as the name suggests). Most badging platforms should take care of this automatically.

Evidence

The evidence field contains evidence of an accomplishment that is (or at least can be) unique to each badge. Whenever possible, the Evidence field should include links to documents, videos, images, or other artifacts that support the badge's claim about the earner's accomplishment. Such evidence makes a badge earner's claim more credible.

The Evidence field can also include textual evidence. When entering text in the evidence field, it is advised to avoid simply repeating what's already in the Criteria field. Instead, Issuers should provide specific and unique details about how a particular recipient earned the badge. One might use the Evidence field to describe an earner's particular contributions to a project, or describe what the earner did during an event.



3. MOODLE OPEN BADGES EXAMPLES (VIDEOS)

In order to issue an Open Badge, you should first login to the MeLDE e-Platform, or any other Moodle platform you may be using, with the role of a Trainer. In order to become a Trainer, you can ask a former Trainer or the administrator of the e-Platform (on meldeeu@gmail.com for MeLDE) to assign you this role.

Note: *If students do not possess or do not remember their e-mail address, then the teachers can create fake e-mail addresses on the LMS and move on to the issuing and awarding of the open badges, which will then be stored on their LMS Profile page. It goes without saying that the ideal situation would be if students possess a personal e-mail in order to subsequently display and share their badges on other backpack platforms of their choice.*

3.1 How to Issue an Open Badge

1. Click the **Course Archive Page button**.
2. Choose the Module whose Open Badge you want to issue.
3. Click the **gear** button of the Module.
4. Click the **More…** option from the drop-down menu.
5. Find the **Badges** sub-menu and click the **Add a new badge** button.
6. Fill in at least the required fields.

   The fields with the red exclamation point on the left side are the ones that are required and they should be filled in.

   i. **Badge Details**: Name, Description, Image

   ii. **Issuer Details**: Name
7. Click the **Create badge** button.

Watch the **video on how to issue an Open Badge**

or scan the following QR code:

3.2 How to Set Up the Criteria for an Open Badge

In order to set up the criteria for an already issued badge (see sub-chapter: "**3.1 How to issue an Open Badge**") follow the following steps:

1. Click the **Course Archive Page button**.
2. Choose the Module whose Open Badge you want to issue.
3. Click the **gear** button of the Module.
4. Click the **More…** option from the drop-down menu.
5. Find the **Badges** sub-menu and click the **Manage badges** button.
6. Click the **gear** button of the badge whose criteria you want to set up.
7. Click the **Criteria** tab.
8. Choose a criteria option from the drop-down menu, depending on the following:

i. **The first criteria option is if you want the Open Badge to be manually awarded by an e-platform's role.**

   1. Choose the e-Platform role that will be eligible to award an Open Badge manually to the students.
   2. Choose if the criterion is complete when all of the selected roles award the badge, or if any of the selected roles awards the badge.
   3. Add a Badge description that will be integrated to the Badge's metadata.
   4. Click the **Save** button.

ii. **The second criteria option is if you want the Open Badge to be automatically awarded by the e-platform, upon the completion of the course.**

   In order for badges to be awarded upon course or activity completion, **Course completion** must be enabled for the course with a specific condition of at least an activity that can be graded. These activities must have as an activity completion criterion that **teachers must receive a grade** to complete them.

1. Fill in the Minimum grade required in order for a student to acquire a badge.
2. Add a description that will be integrated into the Open Badge's metadata.
3. Click the "Save" button.

iii. The third criteria option is if you want the Open Badge to be automatically awarded by the e-platform, upon the award of another Open Badge of the course.

1. Choose which badges should have been awarded before the specific badge can be awarded as well.
2. Choose the badges that should have been earned before the specific badge can be awarded automatically.
3. Choose if the criterion is complete when all or any of the selected badges have been earned.
4. Add a description that will be integrated into the Open Badge's metadata.
5. Click the "Save" button.

iv. The fourth criteria option is if you want the Open Badge to be automatically awarded by the e-platform upon the completion of some specified activities of the course.

In order for badges to be awarded for course or activity completion, **Course completion** must be enabled for the course and in order for the activities to appear as a criterion, their Completion tracking should have been enabled.

1. Choose the activities of the Module/Course that should be completed in order to earn the badge.
2. Choose if the criterion is complete when all or any of the selected activities are complete.
3. Add a description that will be integrated into the Open Badge's metadata.
4. Click the "Save" button.

Watch the **video on how to set up the criteria** or scan the following QR code:

3.3 How to Award an Open Badge

In order to award an Open Badge, we first need to enable it by following the steps below:

1. Access the **Course Archive Page.**
2. Choose the Module whose Open Badge you want to enable.
3. Click the **gear** button of the Module.
4. Click the **More…** option from the drop-down menu.
5. Find the **Badges** sub-menu and click the **Manage badges** button.
6. Click the **gear** button of the badge you want to enable.
7. Click the **Enable access** button.
8. Confirm the enable by clicking the **Continue** button.

There are 2 ways an open badge can be awarded:

i. **Manually,** if we have chosen as a criterion of the Open Badge to be issued by a specific role (See subchapter: "**3.2 How to set up the criteria for an Open Badge**").
   1. Click the **Recipients** tab.
   2. Click the **Award badge** button.
   3. Choose the recipients from the list on the right (hold the Ctrl key to choose more than one).
   4. Click the **Award badge** button.

ii. **Automatically,** if we have chosen any of the other criteria of the Open Badge (Course completion, Awarded badges, Activity completion) (See sub-chapter: "**3.2 How to set up the criteria for an Open Badge**").

Watch the **video on how to award an Open Badge** or scan the following QR code:

3.4 Where to Find the Open Badges you Have Earned

There are 2 ways to find the Open Badges you have earned:

1. By accessing your Profile:

i. Click on your profile name.

ii. Click on the **Profile** option from the drop-down menu.

iii. Here you can see the badges you have earned on the **About Me** tab, on the Badges sub-menu.

iv. If you click on one your Open Badges you can access all of its metadata and even download it.

v. Click the **Download** button if you want to save the badge to your device.

2. By accessing the Preferences of your Profile:

i. Click on your profile name.

ii. Click on the **Preferences** option from the drop-down menu.

iii. Click on the **Manage badges** button of the Badges sub-menu.

iv. Here you can see the badges you have earned.

v. You can download all of your Open Badges by clicking on the **Download all** button.

vi. You can download any of your Open Badges by clicking the **Download** button.

You can make any of your Open Badges private by clicking the **Make private** button.

Watch the **video on where to find your Open Badges** or scan the following QR code:

3.5 How to Push an Open Badge to Badgr Backpack

For the following steps, you should first download the Open Badges you want to push to the Badgr Backpack, by accessing your MeLDE (or other platform) account (See sub-chapter: "**3.4 Where can you see the Open Badges you've earned**") and then create an account on Badgr and connect.

1. Click on the **Add Badge** button on the **Backpack** page.

2. Drag & drop the Open Badges you want to push or click the **Select File to Upload** option and upload them.

3. Click the **Add Badge** button.

Your Open Badges are now uploaded to the Badgr Backpack and you can easily share them.

Watch the **video on how to push an Open Badge to Badgr Backpack** or scan the following QR code:

4. CONCLUSIONS

Open Badges are a digital representation, recognition and validation of learning and skills as well as a simple and effective way to encourage learning, collaboration and reward participation and effort. They are basically digital images, which carry important information (metadata) related to what is recognized such as the badge issuer, the badge recipient, the criteria that were fulfilled, evidence and date of issue among others. They are increasingly becoming popular in the educational scene but as is often the case, the have their advantages and followers as well as their disadvantages and critics.

There are a number of issues that teachers should consider when using Open Badges in order to get the most out of them.

For instance, ensuring transparency is a key issue and teachers should be very clear in defining their awarding criteria so that those trying to verify these badges can see that it was no trivial feat to earn them.

In addition, badges should certify some type and level of competency and achievement that a student has demonstrated, either in and out of class, so teachers should be creative about introducing badging into diverse programs and co-curricular activities. This, more than anything, will provide value to (l)earners reflecting on their skills and trying to exploit them for jobs.

Badges should also be shareable across the web; hence teachers should not limit them to one LMS only, but rather provide the means for students to easily transfer them to external lifelong backpacks to increase their visibility.

Teachers should always consider automating the awarding process, as this will make it more scalable and will also ease their professional life relieving them from unnecessary workload.

Perhaps the most important question that needs to be considered by teachers is how to make a badge credible, especially since the voices arguing their skepticism about badges are increasing. How does one know for sure that a badge was actually “earned” and not simply handed out for fulfilling a low-stake task? The answer is to require that embedded records of who issued the badge are supported by links to pages explaining in detail how and why the recipient earned it and providing further details regarding their program. This gives value to a badge and thus can mitigate some concerns, but it is expected that the debate will continue.

Nevertheless, there is a consensus view that Open Badges could be used in a supplementary manner, that is they should not replace traditional diplomas, degrees etc. but rather supplement them. Everyone acknowledges that the educational scene is rapidly evolving, especially in relation to digital technologies, and educational entities are forced to adapt and keep in pace if they don't wish to be left behind.

The Covid-19 pandemic brought with it new needs for education, forcing educational entities to use technology more so than ever, in order to carry on the educational procedure. Video conference platforms and e-learning platforms hosting MOOCs and assessment procedures were brought to the forefront of education in an attempt to save the day, since traditional face-to-face teaching and learning was becoming more and more difficult. With this development, more and more students choose to learn new skills outside of traditional colleges and universities. This is not to say that traditional methods of learning will be regarded as obsolete. It simply means that a college or university diploma is no longer the only credential that can be used to evaluate the competency of an individual. It also means that the need for credible and verifiable open badges will increase in the coming years.

Studies have shown that in the near future Open badges are expected to gain popularity as a way to signify learning achievement, and the need to verify the legitimacy of badges will increase as more organizations enter the market and offer their own online courses. As a result, more and more college admission officers and employers will rely not only on traditional diplomas and degrees, but also on badges and other forms of digital credentials when making hiring decisions.

This guide provided a detailed introduction to the world of Open Badges, their theoretical background, and practical information and guidelines as to how to implement them in a real-world scenario using the popular Moodle LMS. Of course, each Open Badge eco-system will look different and will depend on the needs and objectives of each educational entity. It is a dynamic eco-system that will constantly evolve based on the needs and motivations of its audience.

5. GLOSSARY

Term	Definition
Alignment	An Open Badge can be aligned to educational or other standards, in which case its metadata will include the standard's name, URL and description. This alignment information may be relevant to people viewing an earner's awarded badges, or to a potential earner deciding whether to apply for the badge.
Backpack	The system where badge recipients can import, curate, and share earned Open Badges (sometimes referred to as passports, wallets, or portfolios). Beginning with Open Badges 2.0, the candidate platform must be able to import all formats of Open Badges as well as prove that badge metadata is not lost upon export of the badge. Example: Badgr Backpack.
Baked Badge	A badge image containing embedded (baked) Open Badges-specific metadata. Badge baking is the process of embedding data into a badge image.
Consumer	Someone who looks at an Open Badge and the information contained in the badge such as an employer or a college admission officer. Consumers may also initiate verification of the badge.
Criteria	Detailed information about what must be done in order to be awarded with a Badge. Potential recipients may use criteria to understand what they must do; consumers may use criteria to understand what recipients did in order to earn the badge.
Description	Badges are accompanied by descriptions when they are listed, shared and displayed. Each badge can include a short tagline, a description for earners and one for consumers.
Digital Badge	Badges that do not conform to the OBI standard. Often used in video games or to motivate students' behavior but not portable between platforms.

Displayer	A system that displays an Open Badge and its metadata for others to see and offers the ability to verify that Open Badge. Beginning with Open Badges 2.0, the candidate platform must display a minimum set of badge metadata and support viewer-initiated verification of a badge.
Earner	Someone who receives (earns) an Open Badge by meeting the criteria for earning the badge, often after submitting evidence of learning or acquiring a skill.
Ecosystem	Environment around the badge (actors, beneficiaries, etc.). The broad array of multiple interoperable tools and platforms that support Open Badges.
Endorsement	Action of validating, recognizing the value of a badge, an organization, or approving what is recognized to the recipient.
Evidence	Links to and descriptions of evidence related to the issuance of a badge, such as portfolio items or narratives that describe a badge recipient's work.
Issuer	A person, organization or community that creates (designs), manages, and awards Open Badges often on behalf of a program. Beginning with Open Badges 2.0, the candidate platform must issue a valid baked badge and demonstrate how the badge is retrieved by the recipient.
Issuing Platform	A platform enables individuals and institutions to issue badges to their learners. In other words, if you want to give badges to your students, you create and upload your badges to an issuing platform, along with the criteria for earning the badge and a description of the badge. You can then usually send badges to students by email. Examples of badge issuing platforms include Badgr, OpenBadges.me and Credly.
LMS	Learning Management System (e.g. Moodle)
Metadata	A set of data that provides information about other data
MOOC	Massive Online Open Course

OBI (Open Badges Infrastructure)	The technical standard for open badges developed by the Mozilla Foundation and maintained by IMS Global. The OBI facilitates the portability and interoperability of the badging system.
Open Badge	A specific type of digital badge that conforms to the Open Badges standard. Open Badges are verifiable contain detailed information about the achievement and what the recipient did to earn the badge.
Open Badges Standard	The technical specification that defines how Open Badges are constructed and transmitted.
Recipient	Same as Earner
Revoke	A badge issuer can decide to revoke a badge they issued. Badge displayers are required not to display badges that have been revoked.
Verification	A technical process defined in the Open Badges standard that enables consumers to determine an Open Badge's authenticity.

6. REFERENCES

1. Peer 2 Peer University and The Mozilla Foundation, in collaboration with The MacArthur Foundation, “An Open Badge System Framework: A foundational piece on assessment and badges for open, informal and social learning environments”, 2011.
   Retrieved from: https://dml2011.dmlhub.net/node/4440.html
2. Kyle Clements, Richard E. West and Enoch Hunsaker, Getting Started with Open Badges and Open Microcredentials, International Review of Research in Open and Distributed Learning Volume 21, Number 1, 2020.
   Retrieved from: https://files.eric.ed.gov/fulltext/EJ1240709.pdf
3. What Are Open Badges? 2017.
   Retrieved from: https://badge.wiki/wiki/What_Are_Open_Badges%3F
4. A comprehensive guide to digital badges. A Free Resource from Accredible.Com
   Retrieved from: https://www.accredible.com/wp-content/uploads/2018/07/A-Comprehensive-Guide-to-Digital-Badges-Accredible.pdf
5. Open Badges for Adult Education: Guide for Educators.
   Retrieved from: https://www.open-badges.eu/sites/default/files/attachements/open_badges_-_guide_for_educators_en.pdf
6. Digital Badging: An Introduction and Guide to Getting Started
   Retrieved from: https://www.ca-ilg.org/sites/main/files/file-attachments/digital_badging.pdf?1524597358
7. Developer's Guide to Issuing Open Badges 2.0, Concentric Sky
   Retrieved from: https://www.concentricsky.com/articles/detail/developers-guide-to-issuing-open-badges-2.0
8. Open Badges 2.0 Implementation Guide, IMS Final Release, 2018.
   Retrieved from: https://www.imsglobal.org/sites/default/files/Badges/OBv2p0Final/impl/index.html
9. Open Badges v2.0, IMS Final Release
   Retrieved from: https://www.imsglobal.org/sites/default/files/Badges/OBv2p0Final/index.html
10. About Open Badges. Open Badges Organization
    Retrieved from: https://openbadges.org/about/
11. Linda Siefer, Assessing General Education Learning Outcomes, 2011. Peer Review
    Retrieved from: https://www.aacu.org/publications-research/periodicals/assessing-general-education-learning-outcomes
12. Digital Badges as Effective Assessment Tools, 2014. Purdue University
    Retrieved from: https://learningoutcomesassessment.org/documents/Parker_Assessment_in_Practice.pdf
13. Brandye Barrington, "Digital Badges Are Now An Essential Tool for Employers and Candidates Alike, Retrieved from: https://blogs.oracle.com/certification/digitalbadges-are-now-an-essential-tool-for-employersand-candidates-alike
14. Badging is the New Assessment with Lewis & Clark College
    Retrieved from: https://www.instructure.com/portfolium/badging-is-the-new-assessment
15. Gamification in Education Stats: https://www.learndash.com/gamification-in-education-stats/
16. The Top Open Source Learning Management Systems: https://elearningindustry.com/top-open-source-learning-management-systems
17. The Best Learning Management Systems (2022 Update): https://elearningindustry.com/the-best-learning-management-systems-top-list

18. 11 Tips For Choosing The Best Learning Management System: https://elearningindustry.com/11-tips-choosing-best-learning-management-system
19. A Guide to Writing Open Badge Metadata: https://badge.wiki/wiki/A_Guide_to_Writing_Open_Badge_Metadata
20. About Open Badges: https://openbadgefactory.com/en/about-open-badges/#:~:text=Open%20Badges%20are%20created%20and,whom%20and%20on%20what%20basis.
21. Gibson, D. and Coleman, K. (2015). Digital Badges to Curate, Credential and carry forward digital learning evidence. Transforming Assessment Webinar Series, 4 February 2015. http://transformingassessment.com/sites/default/files/files/TA_webinar_4_feb_2015_slides_0.pdf
22. Hurst, E. J. (2015). Digital Badges: Beyond Learning Incentives. Journal of Electronic Resources in Medical Libraries, 12:3, 182-189.
23. Abramovich, S., Schunn, C., & Higashi, R. M. (2013). Are badges useful in education? It depends upon the type of badge and expertise of learner. Educational Technology Research and Development, 61, 217-232. https://doi.org/10.1007/s11423-013-9289-2
24. Ahn, J., Pellicone, A., & Butler, B. S. (2014). Open badges for education: What are the implications at the intersection of open systems and badging? Research in Learning Technology, 22, p. 1-13. https://doi.org/10.3402/rlt.v22.23563
25. Davis, K., & Singh, S. (2015). Digital badges in afterschool learning: Documenting the perspectives and experiences of students and educators. Computers & Education, 88, 72-83. https://doi.org/10.1016/j.compedu.2015.04.011
26. Gibson, D., Coleman, K., & Irving, L. (2016). Learning journeys in higher education: Designing digital pathways badges for learning, motivation and assessment. In D. Ifenthaler, N. Bellin-Mularski, & D.-K. Mah (Eds.), Foundation of digital badges and micro-credentials (pp. 115-138). Cham, Switzerland: Springer International Publishing.
27. Gibson, D., Ostashewski, N., Flintoff, K., Grant, S., & Knight, E. (2015). Digital badges in education. Education and Information Technologies, 20, 403–410. https://doi.org/10.1007/s10639-013-9291-7
28. MacArthur Foundation (undated). Badges for lifelong learning. https://www.macfound.org/media/article_pdfs/BADGESFORLIFELONGLEARNING_INFO.PDF
29. https://openbadges.org/
30. https://support.mozilla.org/en-US/kb/why-open-badges
31. https://info.badgr.com/
32. https://openbadges.me/
33. https://bryanmmathers.com/hashtag/openbadges/
34. https://openbadges.info/
35. https://support.badgr.com/
36. https://openbadges.info/all-about-open-badge/?lang=en
37. https://openbadges.org/about/faq