An Open Badge System Framework

A foundational piece on assessment and badges
for open, informal and social learning environments

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Learner Scenarios

First, let's consider four learners:

There's Kareem, a 16-year-old Chicago southsider, who loves robots and movies and naturally can't wait to see the new Transformers film, especially because they shot part of it in his hometown. He struggles in school because he does not understand how those things apply to his interests or to real life, so it's easy to get bored and tune out. Luckily, he's been able to develop his skills and interests through more informal learning opportunities with his peers: he's learned storyboarding and made short films in a series of youth-oriented digital media workshops, mentored some younger kids at the local FabLab, and participated in a hands-on, sustainability-focused 'hackfest' competition, in which his team took second prize for designing and building a mechanism to sort recyclables. But these experiences are currently isolated and cannot be carried with him to other contexts, including his formal school environment.

And then there's Sara, an 18-year-old web developer who started building websites when she was 13, when she got her first computer and connected via a spotty Internet connection. She has developed and refined her skill set by tinkering on her own sites and those that she has built for friends, by viewing the work of others and by reading whatever she can get her hands on. Her mother is pushing her to go to college because she claims that she needs a degree to get a job. She doesn't want to disappoint her mom, but she has already taken a few university-level classes and found them to be unchallenging and redundant for her skill level. In fact, looking through the course catalog, it seems her skill set is already well beyond that of the relevant courses in the local university degree program. She has taken a few open education courses through Peer to Peer University on specific new technologies and learned a great deal both in the course work as well as the peer community she met there. And yet she has nothing formal to put on a resume, which has made it impossible to get in the door at any employer.

There's Jin, a 22-year-old artist from Philadelphia who completed part of an associates degree at the local community college in management but her heart was not in it and so she decided

to focus on her art full-time. She works as a waitress in the evenings to make additional money. She is an active participant in a local art community through online social networking, city meet-ups and annual conferences and shows. She is quite close to several of the peers in the community, and in fact, they started a youth art-mentoring program together and work with kids two evenings a week. Jin is fairly well-known in the community and her work is very respected. She has a reputation of being a "greeter", in that she is welcoming and patient with newcomers, as well as "avant garde" because she is always pushing the boundaries of the community with her style and tone of her work. She is an avid reader and her pieces often reflect her perspectives on what she is reading – whether it is literature, pop culture or world news. She is moving to Portland, Oregon in a few months with her boyfriend and is nervous about leaving her local community and "starting over" in a new place with new people. She wants to continue focusing on her art but other than the finished pieces, she has very little to show for her work and experience back east, and without the camaraderie and support of the community, she is losing confidence. She is considering trying to go back to school to complete her degree as a fall back, but her art is her passion and is the career path she knows she wants to pursue.

And, Antonio, a 32-year-old father of two young girls who has a BA in accounting and has been working as a finance professional for many years, but lately has felt uninspired and is looking to make a career change into environmental policy. He cares a great deal about the discipline and wants to make the world a better place for his girls to grow up in. He feels he has learned a lot that is relevant to the new field throughout his undergraduate education, work experience and personal projects, but he has nothing to show for it. He has started several open education courses about the topic, but has found it difficult to juggle those with raising his daughters and with his current job, which he can't afford to quit until he finds a new one. Further, he is unsure which skills to develop first or how to 'break into' the discipline and associated community of practice. To date, his resume has not been well received and he is often told that his formal education and experience do not match with the requirements for the job.

In these examples, learning is occurring outside of formal contexts and each of these learners is pursuing self-directed learning supported by online resources and communities. The opportunities, communities and material are there and sufficient to support each learner in discovering and pursuing interests, developing and refining skills, and gaining momentum and progressing in life. However, each of these learners encounters a problem in making their knowledge and skills visible and consequential in terms that are recognized by formal educational institutions and broader career ecosystems. Most existing systems of educational degrees and job-relevant accreditation require enrollment in formal programs and institutions and dictate that learning needs to follow proscribed paths. Informal, peer-based and self-directed learning is only acknowledged to the degree that it supports the formal curriculum. Further, most of these formal systems do not account for incremental learning, and a degree or report card tells a limited story about what skills and competencies people have developed along the way.

Imagine instead, a world where your skills and competencies were captured more granularly across many different contexts, were collected and associated with your online identity and

could be displayed to key stakeholders to demonstrate your capacities. In this ideal world, learning would be connected across formal and informal learning contexts, and you could craft your own learning pathways at your own pace, based on your own interests and learning styles. Whether it was through discussion with peers, structured classes or workplace experience, you could collect evidence of skill development, including new or often neglected skills such as soft skills or literacies. This evidence could be acquired automatically from your interactions with online content or peers, could be explicitly sought out through various assessments or could be based on nominations or endorsements from peers or colleagues. This would allow you to present a more complete picture of your skills and competencies to various audiences, including potential employers, mentors, peers and collaborators.

This world is not purely fictional, but instead is the direction that many entrepreneurial and innovative learners are currently moving. They are seeking learning opportunities, building relationships and developing skills by creating their own connected learning ecology that extends far beyond formal channels. But we can do much more to support learners' access to this kind of connected learning ecology. It should not be up to individuals to have to craft their own infrastructures and mechanisms to make their learning visible across formal and informal contexts. The next step is to more systematically support and acknowledge this learning so that these skills and competencies are available and become part of the conversation in hiring decisions, school acceptances, mentoring opportunities and even self-evaluations. This is where badges come in.

What Is A Badge?

> badge [baj]: a special or distinctive mark, token, or device worn as a sign of allegiance, membership, authority, achievement, etc. – Dictionary.com

A 'badge' is a symbol or indicator of an accomplishment, skill, quality or interest. From the Boy and Girl Scouts, to PADI diving instruction, to the more recently popular geo-location game, Foursquare, badges have been successfully used to set goals, motivate behaviors, represent achievements and communicate success in many contexts. Badges can support connected learning environments by motivating learning and signaling achievement both within particular communities as well as across communities and institutions. This paper outlines and addresses a working set of definitions, plans and open questions around the use of badges within connected learning contexts.

Why Do We Need Badges?

As we saw in the learner scenarios, in today's world learning can look very different than traditionally imagined. Learning is not just 'seat time' within schools, but extends across multiple contexts, experiences and interactions. It is no longer just an isolated or individual concept, but is inclusive, social, informal, participatory, creative and lifelong. And it is not sufficient to think of learning simply as consumption, but instead learners are active participants and producers in an interest-driven learning process. The concept of a 'learning environment' no longer means just a single classroom or online space, but instead encompasses many spaces in broader,

networked, distributed and extensible environments that span time and space. And across these learning environments, learners are offered multiple pathways to gain competencies and refine skills through open, remixable and transparent tools, resources and processes. In this *connected learning*[1] ecology, the boundaries are broken and the walls are down, now we just need to help it reach its full potential.

Much of this shift is due to the fact that our world is very different than the one when the current education system was developed and standardized. With the Web and its core principles of openness, universality and transparency, the ways that knowledge is made, shared and valued have been transformed and the opportunities for deeper and relevant learning have been vastly expanded. The open Web has enabled increasing access to information and each other, as well as provided the platform for many new ways to learn and new skills to achieve. We no longer must rely on the expert authority or professionally-produced artifact to provide us with the information or experience we seek, instead we can find it from peers or make it ourselves online. Courses are no longer simply confined to classrooms or expensive universities, but instead open education initiatives such as MIT OpenCourseWare, Peer-2-Peer University (P2PU) and OERCommons, which Sara and Antonio have utilized, capitalize on the openness of the Web and the peer network it supports. These projects provide paths to learning that are unbundled from the financial, social, geographical and cultural barriers of formal education. Similarly, efforts like the Chicago and New York Learning Networks, which Kareem participates in, as well as the Digital Youth Network, create informal learning environments that enable youth to connect to resources, experiences and each other. And of course, there are seemingly endless ways for us to connect, participate and learn online through social media.

In addition to alternative paths for learning similar to that which occurs within formal education, there are also opportunities to develop a new set of skills or digital literacies that have emerged with the Web. Jenkins[2] outlines a number of these new literacies - including appropriation of information, judgment of information quality, multitasking and networking - that are relevant for almost any career path and are critical to success in today's information culture. However, these skills are not typically taught in schools and certainly will not show up on a transcript. Instead, they are being developed and built upon through open, social or informal experiences across the Web, including those through P2PU, the Learning Networks or social media.

And yet, in the current formal education and accreditation systems, much of this learning is ignored or missed entirely. Institutions still decide what types of learning 'count', with little room for innovation, as well as who gets to have access to that learning. Their end products, the grade or degree, are the only way that learning is currently communicated and recognized within the system, as well as the larger society. We know that learning from someone lecturing at us, by reading a textbook on our own or by taking a multiple-choice exam represents a very small fraction of what and how we learn across our lifetimes, and yet these are the types of learning that are formally recognized and heavily required for advancement. Without a way to capture, promote and transfer all of the learning that can occur within a broader connected learning ecology, we are limiting that ecology by discouraging self-driven engaged learning, isolating or ignoring quality efforts and interactions and ultimately, holding learners back from

reaching their potential.

Thus, badges can play a critical role in the connected learning ecology by acting as a bridge between contexts and making these alternative learning channels and types of learning more viable, portable and impactful. Badges can be awarded for a potentially limitless set of individual skills regardless of where each skill is developed, and the collection of badges can serve as a virtual resume of competencies and qualities for key stakeholders such as peers, schools or potential employers. Specifically, badges support:

Capturing and translating the learning across contexts:
- *Capturing of the Learning Path* – With degrees or cumulative grades, much of the learning path is abstracted and lost. Badges could capture and explicitly represent a more specified set of skills and qualities as they occur along the learning path, and could also track a broader, and perhaps more granular, set of skills. So when you encounter that good web developer or writer, you can look at their set of badges (and issue dates!) to determine the skills an aspiring web developer or writer should learn, and even perhaps in what order s/he should learn them.
- *Achievement Signaling* – Badges can represent skills or achievements and thus signal peers or outside stakeholders, such as potential employers or institutions. For example, recruiters could look for people with badges that align with certain job requirements or needs. In this way, badges start to function somewhat like degrees or certifications, but with room for much more granular or diverse skill representation.

Encouraging and motivating participation and learning outcomes:
- *Motivation* – Badges can provide intrinsic feedback or serve as milestones or rewards throughout a course or learning experience to encourage continued engagement and retention. Badges could make learners aware of skills or topics and encourage them to go down new paths or to spend more time trying to develop those skills. Further, badges could serve as entry points to become aware of and attain new levels of privileges.

Formalizing and enhancing existing social aspects of informal and interest-driven learning:
- *Identity/Reputation Building* – Badges can serve as mechanisms to encourage and promote identity within the learning community, as well as reputation among peers. Much of this identity and reputation development may be already occurring within each community and badges can help make them more explicit and portable, as well as aggregate identities from across communities.
- *Community Building/Kinship* – Badges can signal community or sub-community membership and can help people find peers with similar interests or mentors to help teach them skills they lack. Further, badges can serve as a means of social capital, and community-oriented or -defined badges could formalize camaraderie, team synthesis or communities of practice.

In summary, we are living in an age of opportunity for learning, specialization and innovation like none ever seen before. But we are not fully capitalizing on the potential. The time has come to connect self-directed and interest-driven learning to a broader ecosystem of accreditation and recognition to enable each learner to capitalize on the learning experiences that they are

already having, or to inspire and help them to seek out new ones, as well as to communicate their achievements and skills to necessary stakeholders. To do so, we must not only recognize that people learn across many contexts in many different ways, but also find a way to capture that learning, collect it across the contexts and communicate it out. Thus, a badge system is a critical and missing piece to realize a connected learning environment for diverse learners across the Web, and to translate that learning into a powerful tool for getting jobs, finding communities of practice, demonstrating skills or seeking out further learning.

Badge System Framework

The Mozilla Foundation and Peer-to-Peer University, with collaboration and guidance from the MacArthur Foundation, are leading efforts to implement and evaluate a badge system for connected learning. We are planning a pilot round of badges within the P2PU environment, as well as working to support partners and collaborators with similar goals and interests (discussed more below).

As we start to move beyond the conceptual framework for badges, to a functioning badge system, it is critical for this system to be open and decentralized to allow for badges from any contexts where learners are learning, to support any and all types of learning occurring, to provide portable and sustainable value and to give each learner control. To meet these demands, we have identified an experimental badge system framework to guide our work and inform other initial efforts. This badge framework includes:
- the badges (skills, interests, qualities, status and achievements, with the associated badges),
- assessment (assessing the skills and determining who should get a badge), and
- infrastructure (supporting the earning and displaying of badges, moving badges around).

Badges
Every badge system needs, of course, badges. Those badges can represent various skills, competencies, qualities, achievements and interests achieved across many contexts over time. One of the benefits of the badge system over the traditional cumulative and normative grades or high-level degrees, is that it can be used to assess a much broader and deeper set of skills or competencies and capture each competency in a badge so that the learning path or more subtle, yet critical skills and experiences are not glossed over or lost. For example, a learner may earn a badge for more traditional accomplishments such as completing a course, or demonstrating a comprehensive "hard" skill such as mastery of a specific programming language or math concept, or for very granular activities or skills, such as leaving helpful comments for other learners, or logging into an online learning environment for 10 consecutive days. Badges may also be used to explicitly capture and transfer "softer" skills such as critical thinking, communication or collaboration, existing community aspects such as reputation and status, and new skills such as digital literacies. Thus, we can use badges to capture a much wider range of learning and interaction and support innovation moving forward. Further, instead of top-down determination of what skills to teach or promote, badges may be identified and defined by a number of sources, including traditional authorities, such as experts or accredited

institutions, communities of practice, such as open education projects or peer learners, or the individual learners themselves. Together, these soft and hard skill, multi-sourced badges can form a more complete picture of a person for potential employers, future or current institutions or schools, peer groups and even him or herself.

There may be different levels of badges. Basic or foundational badges could provide the core or entry-level framework for various skills, and intermediate and expert level badges could provide the pathways and milestones to guide learners through to mastery. Some lower level badges may be pre-requisites, or be required to unlock the higher level badges, much as we have seen in various gaming environments. This may be explicit, through published pathways or instructions, again giving the learning a roadmap towards mastery, or it may be more of a stealth assessment approach where certain actions or accomplishments suddenly unlock higher levels, making the learner more aware of their learning and serving to motivate continued engagement.

There may be different types of badges as well. 'Smaller' badges may be used for motivational and formative feedback purposes, like those used on the popular forum site Stack Overflow, and 'larger' badges used for certification purposes. For the former, it may be possible to have a lot of badges, perhaps defined by the community as they go and tied to smaller behaviors or achievements. The latter may have more rigorous or defined assessments and be endorsed by organizations or other authorities. Multiple motivational badges or certification badges may be aggregated into higher-level 'meta' badges that represent more complex literacies or competencies. It may be that these meta-badges are developed top-down, created and issued by organizations to target specific sets of skills, or bottom-up, as reflections and narratives around sets of badges important within a certain community or for a particular individual.

The badge itself is more than a static image or button, but instead much of the value of the badge comes from the metadata attached to it. Badges are conversation starters, and the information linked to or 'behind' each badge serves as justification and even validation of the badge. For example, a badge should include information about how it was earned, who issued it and the date of issue. Most importantly, the badge should be hyperlinked back to something demonstrating the work and/or validating the badge such as an artifact, document or testimonial. The information 'behind' the badge may differ based on the skill, assessment and issuer, but the concept of a badge as the gateway to further information remains the same. This reduces the capacity for gaming the system (i.e. copying a badge and putting it on your site) and builds in an implicit validation system. Of course, there may be a need for a more explicit validation system built into the infrastructure where badges would essentially have to be 'signed' to ensure validity, but each badge should carry sufficient information with it to provide initial, and in many cases, sufficient validation.

As more independent issuers create badges and more skills and qualities are recognized, there may be many badges in the system and the question of how to determine validity and value will be even more important. While there will be some badges that may have universal value, such as many badges for competencies such as critical thinking and teamwork, or

value-laden badges such as attitudes or ethics, most badges will carry different value within different communities. For example, certain hard skill badges, such as a badge for Javascript programming competency, may be more relevant and valuable to a web development community than a community of novelists. While value can transfer across communities in some capacity (i.e. perhaps the novelists are interested in developing a web presence for their writing), many badges will be community-specific. And in fact, in many cases, it may make sense to allow the community to define their own badges to support their needs and interests. Further, within each community, the value of each badge may be determined by who issued it or who has earned it. For example, within the web development community, Mozilla-issued badges will carry significant weight because of Mozilla's technical and ethical leadership in the discipline. Similarly, if there are certain badges that are rare or held only by a few gurus within the community, those badges will also hold considerable value.

Further, accreditation may be required for certain types of badges or for certain audiences. Within various discipline communities, the accreditation could come from community experts or authorities more formally, as in institution or authority-issued or -endorsed badges, or more informally through recognition, such as hiring people with the badges or incorporating badges into their evaluation process. There may also be many badges that carry significant value without accreditation, such as motivation or community-oriented badges.

Thus, badges can be used to capture a much wider and more granular set of skills, represent those skills and competencies important to the learners' communities and relevant stakeholders and provide evidence of the skill, competency or quality. However, badges alone do not tell us much without the associated assessments, which define what a learner must do to earn the badge and determine when someone has earned it.

Assessment

In order for any badge system to accumulate value and for badges to carry the weight of formal grades or degrees, quality and vetted assessments will be critical. However, the rigor may differ based on the use case, community or intended audience, and badges give us the flexibility to have multiple levels of assessment. Many badges will be associated with distinct pre-defined assessment exercises and success criteria, whereas others may be more loosely defined and require learner reflection or peer recommendations.

The level, or rigor, of the assessment may differ based on the skill. Most hard skills may have fairly standard or rigid rubrics to compare learner work against, whereas softer skills will be more fluid and may require more open and social assessments, such as peer reviews or endorsements. The intended audience may also determine the assessment level. If badges are simply intended to build community or reward immediate behaviors, as with motivation badges, simple assessments or in some cases, no predefined assessment, may be used. For certification badges meant for audiences such as hiring managers or admission boards, more rigorous assessments may be required to demonstrate critical competencies. Each learner may collect a wide range of badges across many different levels of assessment.

In addition to levels of assessment, badges give us the ability to support open innovation around new or relevant types of assessments, provide more personalized assessments for learners and move away from isolated or irrelevant testing practices. Instead of being forced to take an exam at a pre-determined time, in many cases learners will seek out the assessment on their own, thus encouraging reflection on their learning and competency development. In other cases, assessment and badge awarding could happen automatically and provide immediate formative feedback, and capitalize on the benefits of 'stealth assessment'[2], which is difficult to achieve in a formal classroom. The badge system also fits well with the increasingly popular portfolio assessment, since various artifacts from the portfolio could demonstrate various skills or competencies, and each earned badge could then be linked directly to the relevant artifacts in the portfolio.

Badges also allow for multiple assessors. Whereas in formal classrooms, the instructor does most, if not all, of the assessing, an open badge system supports assessments by authorities from many contexts, course organizers, peers, the system or the learner him or herself. This flexible and networked nature could mean that there are multiple paths or assessment options for earning a badge, making the system more flexible, ensuring that the needs of each learner are met and limiting the learning path constraints.

Regardless of the level, type or assessor, assessments should honor the spirit of connected learning. They should be interest-driven and flexible to individual interests and learning paths, and support recommendations and endorsements from peers. Further, they should be valuable and relevant outside of the assessment context and thus encourage development of relevant artifacts or allow learners to submit existing.

Building from here, once there are badges and associated assessments, the final piece of the badge framework is the foundational infrastructure to support the issuing, collection and display of badges across contexts.

Infrastructure

In order to give learners control and to help them capture their learning, again, we must recognize that they learn across many contexts, all over the Web. Thus, there needs to be an infrastructure that allows this learning to be captured wherever it happens (through issued badges) and lets each learner carry and display the badges wherever they go or feel is valuable. This requires that the infrastructure be open and decentralized, support badges from multiple independent sources and enable display across many sites. The open badge infrastructure should support:

- *Independent-Source Badge Issue*: Similar to assessment design and execution, badges can be issued by authorities, course organizers, peers, the system or each learner. Within the open badge infrastructure, it is important to allow for badges from many independent sources across the Web and across each learner's experience to ensure that the badge system supports all of their learning.
- *Badge Collection*: Badges should be collected in a way that ties them to the learner

identity and enables use across websites or experiences. Learners can get badges from many environments or experiences, through many different types of assessments, and store them in a single badge collection as they go. Each badge should carry comprehensive metadata to communicate information about the issuance of the badge, provide a link back to the learner's work as demonstration and justification of the badge and enable authentication back to the issuer. The learner should also have an interface to their badge collection to manage badges and set privacy controls.

● *Badge Display:* The value of badges increases further when learners have control over where to display them across audiences and contexts. The learner should be able to control which badges are available for which audience and share subsets of badges with selected audiences, ranging from target groups or networks, to the open web. Further, the infrastructure should allow learners to add badges to any external website or environment that supports badge display, including personal websites, such as blogs, and social networking environments such as LinkedIn or Facebook. Finally, these display sites should be able to authenticate the badge to ensure that the badge was issued to this particular user.

Mozilla is building an open and decentralized badge infrastructure that will support badges from any issuer across the Web and allow learners to collect their badges, associate them with a single open identity and carry the badges with them across websites and experiences. Ultimately, the goal is to support learning as it occurs all across the Web, and allow people to share that learning and evidence of skills and experiences with anyone, thus adding flexibility and value to the system and supporting personalized learning paths.

Summary

This experimental badge framework outlines the key elements of an open badge system for connected learning contexts, including the badges, associated assessments and an open infrastructure to support issuance, collection and sharing of badges. This framework will define our initial badge efforts, and can guide other badge efforts to support collaboration and interoperability.

User Stories Revisited

Revisiting our user stories with the badge system in mind:

Kareem: Because the open badge infrastructure supports badges from many issuers and environments, the Chicago and New York Learning Networks have created a set of badges for their participants. Kareem has just finished his latest movie project and submits his storyboards for the *Storyboardin'* badge, as well as his end product for the *Movie Maker* badge. His peers and facilitators review his work against a predefined rubric and decide to issue him the *Movie Maker* badge. His storyboards are missing a key narrative element and from that feedback, he refines his storyboards, resubmits and earns the *Storyboardin'* badge. In the meantime, one of Kareem's peers who he worked with on several projects decides to award him the *Good Teammate* badge based on their experience together. Kareem also looks up the badge

collection of another peer whom he really looks up to and sees which badges he should try to get to 'level up' his skill set. Kareem returns to school on Monday and shares his badge collection with his teachers who are impressed with his work and ask him to assist with an in-class narrative activity and lead his classmates through a storyboarding exercise. It is the most fun Kareem has ever had in school and many of his classmates, who he considers to be very smart, seem to have a new respect for him. Whereas Kareem's extracurricular work used to be isolated from his formal school context, the badges demonstrate his capacities to his teachers, his peers and himself, contribute to formal evaluations of him as a student and help his teachers understand his strengths and find ways to capitalize on his interests. Further, within the Learning Networks environment, badges have helped Kareem develop confidence, build relationships and become aware of ways to continue to improve his skill set.

Sara: Sara already has developed an impressive skill set, and has many artifacts - mostly websites - to demonstrate those skills. P2PU has a wide set of badges available through the School of Webcraft courses and community and she submits some of her websites and work for these badges. The Webcraft community reviews the work and rates based on established rubrics. At some threshold of rating, Sara is issued the *Javascript Expert*, *HTML5 Pioneer*, *JQuery Guru* and *CSS Expert* badges. While reviewing the pre-existing websites that she submitted for these various badges, several of her peers were impressed by her code and commenting, and decided to issue her a *Clean Code* and *Doc Rock Star* badges. In addition to submitting existing work, Sara also builds several new webpages with a web framework she is learning called Django, as part of her course on this new technology, and issues herself the *Django Basic* badge once she has completed and successfully run the initial set of exercises. Finally, she posts a blog post about her experience to date with challenged users and her overall attitudes about the importance of accessibility in web development, and is issued the *Accessibility Evangelist* badge by one of the accessibility gurus from the community. When applying for a job, she can point potential employers to her collection of badges, each linked to validating work or recommendations, providing a clear and complete picture of Sara and her skill set. She adds the badges to her personal blog so that her peer community sees them, as well as her mom!

Jin: Jin has a very specialized skill set and focus that carries significant value within certain relevant communities. She has garnered status and reputation within her local art community and through the open badge infrastructure, the community could create badges to formalize those identity and reputation aspects and make them portable across communities, like the one she hopes to find in Portland. For example, the Philadelphia community members could create a *Greeter* badge and give it to Jin, signaling her community-building and mentoring tendencies. She could also earn the *Avant Garde* or *Cutting Edge* badge, which is linked back to images of her work, to signal her style, categorize her interests and demonstrate her strengths. The Philadelphia community may also have levels of badges, representing the level of community contribution or status, and thus Jin might earn the *Gold Level* badge. Jin would then carry all of these badges with her and as she starts to meet new artists in Portland and as she tries to enter that community, her badges could bootstrap that process and help her find her place more seamlessly. Further, if she had badges from her community college experience, instead

of nothing to show for her year's work, she would also have collected evidence of a broader set of foundational skills and achievements that she could use to more accurately demonstrate her experience and skill set, as well as help her gain confidence in her career.

Antonio: Antonio also takes some P2PU courses and sees many badges that match his skill set that he has developed over the course of his education, work experience and personal research, including the *Critical Thinker*, *Public Speaker*, *Pro Presenter*, *Debater* and *Green Evangelist* badges. Each badge has an associated assessment, ranging from puzzles and challenges to reflective blogs posts and Antonio makes it a priority to complete each of these activities and submit them for the badges. His work is assessed some by peers and some by course organizers and he is awarded all but the *Green Evangelist* badge. The assessment feedback helps him realize that he needs to learn more about environmentally friendly technology and practices and he signs up for a P2PU course on the subject. Further, he finds several peers within P2PU who have the *Green Evangelist* badges and looks through their collection of badges to identify several other skills to work on. He meets another peer on a discussion forum who seems very skilled and in viewing his badges, sees that he has many relevant skills and competencies and thus Antonio reaches out to him for advice on getting into the discipline. For Antonio, badges help him to find mentors and a path to this new discipline, as well as to capture his learning path across his formal education, work experience and personal learning efforts, including a much more granular set of hard and soft skills that are important for his future career path. He adds his badges to LinkedIn to build up his profile and gets several recruiter calls within days.

Kareem, Sara, Jin and Antonio are just four examples of many learners out there learning outside of the formal channels, and participating and continuing to learn, interact and develop skills within a broader connected learning ecology. Across these learners, we can see how an open badge system could provide them with more opportunities and allow them to leverage their comprehensive skill sets, peers and learning experiences further and with more impact.

What's Next?

There are many questions and complexities involved in creating and integrating a badge system (for a running list, see Appendix A), let alone evaluating and refining it as we go to ensure we have the best system possible. But in order to test out and refine our assumptions, we need to start somewhere. Thus, P2PU and Mozilla Foundation, in collaboration with the MacArthur Foundation, are implementing a badge pilot project within the experimental badge framework with the January sessions of the School of Webcraft, a set of open courses around web development education, hosted and maintained by P2PU and the Mozilla Foundation.

Badges: This pilot will involve a small initial set of skills that we have worked with the web development community to identify, including Javascript proficiency and Accessibility values. The pilot badges include a range of hard skill, soft skill and multi-leveled badges, many of which will be Mozilla-endorsed. There are also community-oriented badges that can be awarded from peer to peer throughout the learning experience. We hope to ramp up the badges quickly in subsequent School of Webcraft sessions to include a more comprehensive set of skills,

competencies and behaviors, as well as to expand to the wider P2PU environment.

Assessment: Our pilot will explore a number of assessments including peer, self, portfolio and stealth assessments. For example, the Javascript badge assessment will involve submitting work that demonstrates competency, and peers will rate the work against the predefined rubric. Once the rating reaches a certain threshold, the badge will be issued. The Accessibility badge will involve experience with challenged users or accessibility technologies and a reflection on the experience. For this badge, there will be a set of accessibility 'gurus' within the community who could assess the work and issue badges accordingly. Other badges may be aligned directly with courses and course organizers may assess work and issue badges.

Infrastructure: In parallel, we are building the initial version of the badge infrastructure to support the issuance of badges from the School of Webcraft and the wider community, the collection of the initial badges by learners and the capacity for them to then display the badges across participating sites. A first prototype of the infrastructure was built at the Drumbeat Festival in November 2010. We plan to leverage this work and the initial feedback to expand the infrastructure and integrate it into the School of Webcraft learning environment for the January courses. For more details on the open badge system infrastructure prototype, see Appendix B.

In addition to our initial School of Webcraft pilot, we are also working with additional collaborators and partners, including [iRemix](#) and the [National Writing Project](#), to work through their specific use cases and scenarios and help them develop a plan for badges that not only captures learning and achievement within their environments, but also plugs into the overall badge infrastructure. We hope to learn quickly from a broader combination of different use cases, badges and assessments so that we can scale badges within our own environments, and support badges from across any environment where learning is occurring.

Who Should Be Involved?

You. Just as the badge system should be open, comprehensive and supporting of innovation, so should the exploration of badges. But we need help in designing and evaluating the concepts and implementations, as well as thoroughly supporting the many learning contexts that exist. We already have had immensely valuable insight, expertise and innovation from our Drumbeat colleagues, and hope to continue those conversations with an even wider audience. If you have feedback or are interested in participating or designing a set of badges of your own, please contact us at open-assessment@googlegroups.com.

FOOTNOTES & REFERENCES

[1] Our approach to badges aligns with the principles of 'connected learning' being defined by the MacArthur Foundation's Digital Media and Learning Initiative. 'Connected learning' is: 1) participatory, demanding active social engagement and contribution in knowledge communities and collectives; 2) learner-centered, empowering individuals of all ages to take ownership of their learning linked across a wide range of settings -- in school, at home, and informally with

friends and peers; 3) interest-driven, propelled by the energies of learners pursuing their unique passions and specialties; and 4) inclusive, drawing in people from diverse backgrounds and walks of life across generational, socioeconomic, and cultural boundaries.

[2] Jenkins, H. (2006). Confronting the challenges of participatory culture. *White paper for the MacArthur Foundation*. http://digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0-4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF
[3] Shute, V. J. (in press). Stealth assessment in computer-based games to support learning. To appear in S. Tobias & J. D. Fletcher (Eds.), *Computer games and instruction*. Charlotte, NC: Information Age Publishers. http://myweb.fsu.edu/vshute/pdf/shute%20pres_h.pdf

APPENDIX A: OPEN QUESTIONS

What Badges Don't Do (or, What We Should Avoid)

As we explore badges for learning contexts and design pilot systems and evaluations, we are mindful of several key things that we want to avoid. The first is replicating the existing system. If at the end of this, we have simply reinvented the existing education system with its cumulative grades, prescribed degrees and unmotivated students, then we have failed. Open, social and informal learning environments are inherently different – they are typically more approachable, accessible, flexible and fun. Our system should only encourage or foster these aspects. Further, the bottom-line goal is to promote and drive learning. Thus the badge system should not dictate what learning should occur, or constrain the types of learning that people seek out. Badges should simply help motivate learning and then reward and recognize the learning that is occurring.

Unchartered Territory (or, What We Don't Know)

Leading from the previous section, there are a number of open questions and unknowns given that assessment in these open, social and informal learning environments and more specifically, badges as a solution, are relatively unchartered territories. We intend to carefully examine these question areas and hopefully start to get some answers through our initial pilots of badges systems and continued collaboration with the community.
- *The right badges* - What skills should we assess? Are there skills that are better left unassessed? What do we want to encourage? How do we avoid encouraging the "wrong" behavior? Who gets to decide which skills to assess?
- *External influence on badges* - How much influence should outside stakeholders, such as employers, have on badges? Should they be able to design assessments and badges that are relevant to them? How can we let them have a say without creating an imbalance in the system or constraining the learning?
- *Granularity of badges* - How granular should badges be? For example, our HTML5.0 badge is at the level of the entire language mastery, but would we want HTML tag level badges? What granularity is the right level? Do badges aggregate into larger or higher level badges?

- *Badge lifetime/evolution* – Should badges expire? How do we deal with skills that need to be refreshed or renewed? How can the badge system grow with learners?
- *Motivations* - How does the introduction of badges affect learner motivations? If learners were initially intrinsically motivated, how do we avoid "crowding out" those motivations with an extrinsic badge system?
- *Gaming/Validity* - We know that once we introduce a system with value, there will be people try to game it. How will people game the system? How much will they do so? How can we discourage gaming or recognize when it happens?
- *Formal learning* - Will these badges translate to formal learning environments? And if so, how? What would be required to make schools or institutions value or accept badges? Can we meet those requirements without changing the nature of the learning environments?

APPENDIX B: PROTOTYPING AN OPEN BADGE SYSTEM INFRASTRUCTURE

A proof of concept of a federated badge system was developed over two days at the Drumbeat Festival in Barcelona in November 2010. To demonstrate the badge system functionality, the following web applications were built:

1. A web site capable of issuing badges.
2. A central hub used to store information about badges.
3. A badge "Backpack" capable of collecting badges and providing a view of all badges stored in the hub.
4. A third party web site, such as a personal blog, capable of displaying one or more badges stored in the backpack.
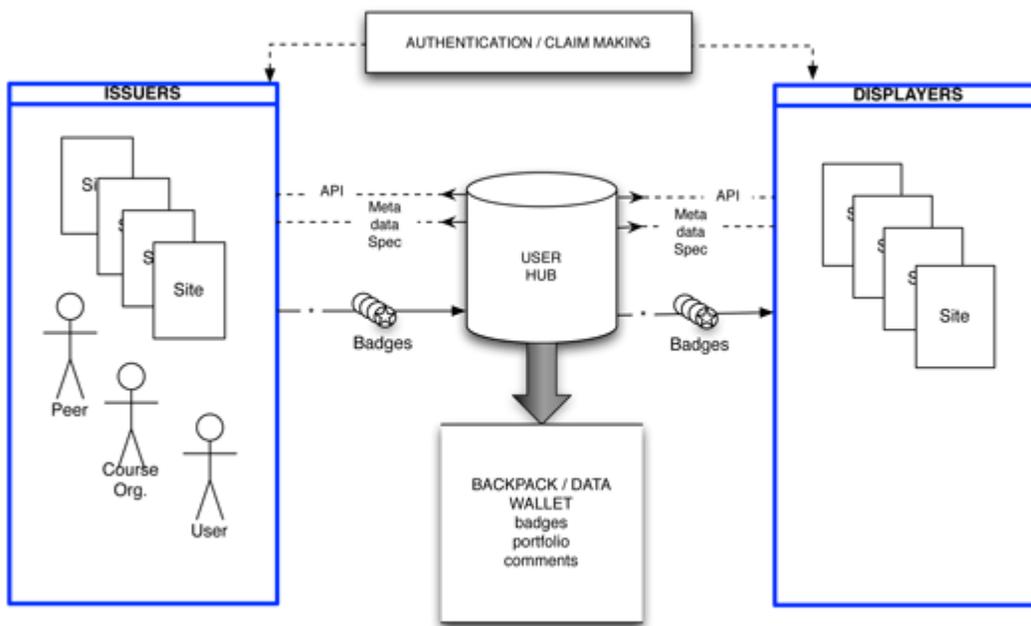
Badges are stored in the user's browser using HTML5 localStorage. In order to address a greater variety of use cases, server-side storage could easily be added if necessary. Badges are encoded using a simple JSON schema that was developed for the demo. The JSON is passed between sites using a Javascript library developed at Mozilla called JSChannel. JSChannel provides an abstraction around postMessage, enabling sites to send and receive information through a hidden iframe. In developing the hub portion of the demo, we wrote a high level API around JSChannel, so that sending and receiving information about badges is as easy as including a Javascript library and calling a function.

For the purpose of the demo, a site issuing a badge uses a simple Javascript API to push information about a badge into the hub. The Badge Backpack retrieves this information from the hub using the same API and presents the user with a visual interface displaying all of their badges. Any site wishing to display a subset of the user's badges can do so by requesting information from the hub using the Javascript API. The end result is that sites issuing badges or displaying badges do not need to know anything about each other — they are only concerned with exchanging information with the hub.

Details about verification and identity were intentionally ignored, mostly due to time restrictions. To address issues of badge authenticity, there are plans to extend the demo to include a mechanism that those sites displaying badges can use to confirm that the user is a legitimate holder of the badge.

The following diagram illustrates the Mozilla open badge infrastructure. The key takeaway from this diagram is that badge issuers and displayers are intentionally independent from the infrastructure. The infrastructure provides a metadata spec and API that anyone can use to issue badges within the system. Similarly, any site wishing to display badges can do so using the API and metadata spec.

BADGE SYSTEM INFRASTRUCTURE