

Investigating Recognition Systems in a Collaborative, Programming-Oriented Affinity Space

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Abstract: As part of a study of digital badges in online informal, interest-driven learning contexts, we investigated the relationships between discussions of credibility, trust, and the presence/absence of recognition systems in StackOverflow, a premiere programming oriented online space. Based on a content coding of 652 posts, we identified strong correlational relationships between certain badges and discussions of credibility/trust. Systems that recognize participation on the site (upvoting, downvoting, accepting answers) may provide consequential means for participants to transfer their social contributions into long-term resources for the community.

Keywords: affinity spaces; digital badges; computational thinking; informal learning

Introduction

The present rhetoric around the promise of digital badges to support learning has often skewed toward discussions of design: How do we design better digital systems that can capture evidence of learning, promote participation in online learning environments, and credentialize the skills and practices gained through these spaces? And yet, there is increasing interest in understanding the relationships between practices in informal online contexts for learning, especially learning as found within the online “affinity space” (Gee, 2005; Duncan & Hayes, 2012), or computer-mediated context within which *ad hoc* communities of interests form around practices and media artifacts. How do informal, online affinity spaces (Gee, 2005) embed relationships between recognition systems and social immersion?

Method and findings

Data was drawn from a larger study of online affinity spaces and digital badges, using content coding methods developed by Steinkuehler & Duncan (2009), further iterated to better capture information sharing practices (Gunawardena, Lowe, & Anderson, 1997; de Laat, 2002). Textual data was randomly sampled from the programming-oriented website StackOverflow during September, 2014. Data were “threads” (or unique discussions on the site), often including multiple “posts” (individual contributions) per thread, with sampling conducted at the level of “thread” in order to maintain intelligibility for qualitative coding purposes. 652 posts were sampled (by 344 unique posters), representing over 8% of the active threads from the previous two weeks. “Social interaction” codes were applied, addressing social banter, discussions of participation in online communities, offline communities, the discussion of credibility/trust, and the overt discussion of recognition systems. Four experienced programmers were trained as qualitative coders, reaching an interrater agreement of 93.29%. Raters independently rated each post in the context of each thread, assessing the presence/absence of each of the codes. Phi-coefficients were calculated between all pairwise combinations of codes to assess the co-occurrence of codes within the scheme. After initial coding was completed, data was reorganized by poster in order to isolate the relationships between codes and the presence/absence of badges. Due to space limitations, we focus our findings on the last of these analyses, addressing the ways that social interaction interrelated with the presence/absences of badges on StackOverflow.

Given the highly task-specific discussions on StackOverflow, we expected relatively low coding saturation for the social interaction codes. They were, in fact, uniformly low, with *Uncodable/Ambiguous* coded higher than any of social interaction codes other than *Social Banter* and *Online Participation*. Much of the communication within StackOverflow stayed tightly on task around computer programming, addressing solutions to posted bugs. *Credibility/Trust* was coded quite sparsely (.92% of the entire data corpus), though recoding by *poster* captured individuals’ activities with this code. In Table 1, below, we present six strong phi-coefficient results between *Credibility/Trust* and explicit badges on StackOverflow, all of which were highly significant ($p < .01$).

Table 1: Selected significant correlations between *Credibility/Trust* and StackOverflow badges (** p<.01)

Research Assistant = .707**	Synonymizer = .496**	Publicist = .707**	Beta = .496**	Booster = .345**	Marshal = .345**
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Badges strongly correlated with *Credibility/Trust* included “Research Assistant” which indicated the editing of entries on StackOverflow’s collaborative wiki resources, and “Publicist,” which indicated a high number of unique IP addresses visiting a link that was shared by the individual. Though *Credibility/Trust* was not coded highly, it seemed that there was evidence that editing the *collaborative resources* of StackOverflow (the Wiki, shared questions) had some potential relationship to this code. However, it was unclear whether these relationships indicated discussion of the credibility and trust of digital badges or other factors within the discussions on the site. We chose to isolate all posts where *Credibility/Trust* as well as presence of *Recognition Systems* were coded to identify the specific moments in which *Credibility/Trust* and *Recognition Systems* co-occurred. This yielded *four* posts drawn from three threads, with one thread featuring an exchange between two posters regarding the nature of credibility that evolves from the use of recognition systems on the site.

Post 19-9: “Glad to help. Actually, there are no requests for exceptions. An exception could only occur as a result of a request. If everything goes OK, then a response will be the result. Otherwise, the exception will be handled and logged... Anyway, *you should upvote the answer. It is very important for other users navigating to your question to be able to identify a useful answer...*”

Post 19-10: “Sure I will *upvote when i find an answer which works for me*, thanks for your help.” (Italicized emphasis added by researchers, not found in the original posts).

There is no discussion of badges here and, in fact, for all of the posts coded *Recognition Systems* that were drawn from the StackOverflow sample, *none* of them overtly discussed badges. Of course, other recognition systems may have been important, but it seems that the up-voting of responses on StackOverflow as well as the “accepting” of an upvoted response (validating a proposed solution as the one the original poster used) served a greater role in StackOverflow than originally suspected. Our assumption that recognition systems would be discussed with *Credibility/Trust* was partially confirmed, but in ways that were unexpected.

Conclusions and implications

While digital media and learning research has focused quite a bit on digital badges in recent years, our preliminary results indicate that instead of badges, more prosaic recognition systems (upvoting, the acceptance of answers) may be of greater use in supporting a collaborative learning environment on StackOverflow. There are clearly relationships between the presence/absence of some badges and discussions of *Credibility/Trust*, but upon deeper inspection, these do not appear to be consciously engaged with by site participants. Badges may be less salient to participants in the site than the post- and thread-level recognition systems, such as upvoting and the accepting of answers. It is intriguing that the recognition systems discussed with regards to *Credibility/Trust* were those that could transform a user contribution into a *resource* for others. By upvoting responses and accepting other posters’ responses, users may translate contributions on the site into “answers” for future programming problems. While badges may capture depth of participation within the site’s collaborative resources, simpler tools such as upvoting and acceptance of posts may be worth further investigation.

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