Digital Badges and Ethics: The Uses of Individual Learning Data in Social Contexts

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ABSTRACT
Empirical evidence contained in open digital badges has the capability to change educational curricula, assessments, and priorities. Because badge data in educational, social media, and workforce contexts is publicly available, questions of privacy and ethics should be scrutinized. Due to change driven by digital transparency, ethical questions at the intersection of learning analytics and the data contained in badges poses three distinct, yet related questions: within learning analytics systems, can the use of educational data in digital badges be used in a predictive manner to create a deterministic future for individual learners? Can badge data that is freely and openly accessible in social media be used against individuals if it exposes intellectual weaknesses? And, can the student data in badges be isolated to exploit particular skills for nefarious reasons, i.e. surveillance or hacking? These questions address ethical principles of human autonomy, freedom, and determinism.

Categories and Subject Descriptors
K.4.1 [Public Policy Issues]: Ethics.

General Terms
Algorithms, Design, Experimentation, Security, Human Factors, Theory, Legal Aspects

Keywords
Ethics, Open Digital Badges, Education, Learning Analytics, Social Media, Networks, Autonomy, Human Freedom, Determinism.

1. INTRODUCTION
Amongst recent developments in educational technology innovation, open digital badges are positioned to have ever-increasing influence on learners, teachers, institutions, and the workforce [1]. This influence changes several major components of education: transparency of assessments, validated evidence of learning, granularity in skills development, and demonstration of skills in digital social networks [2]. Perhaps the final point, the publicity of such learning, is the least explored component of badges research to date. Simply, what can be known about the effect of badges networked via social media on various outcomes like employment is tenuous at best [3]. The social aspect of digital badges includes a host of questions pertaining to what data is available and to whom, how it is distributed and acquired by other parties, and what occurs with individual and aggregate learners' data. In an age of web crawlers, data collection firms, and predictive algorithms, these questions warrant exploring.

The possible educational data contained in badges, including assessments, validation, and demonstration of skills, is of value as one aspect of a wider and growing body of research in learning analytics [4]. The open digital badge as an artifact of learning contains a key social aspect that conventional transcripts did not [5]. While learners may elect to distribute digital badges across social media outlets (like Facebook, LinkedIn, or Twitter), traditional collegiate transcripts are typically withheld and only distributed to another party at the learner's explicit request. This availability of student data, though freely and willfully disseminated in a learner's digital network, poses specific ethical concerns. The morality of data usage is certainly heterogeneous in today's widely-expanding ecosystem of educational technology, but the specific ethical issues with digital badges concern the broad implication of human autonomy, freedom, and determinism. The research questions pertaining to badges, then, are meant to pivot from three distinct, yet interrelated, modalities of the intersection of digital ethics and learning analytics:

- Within learning analytics systems, can the use of educational data in digital badges be used in a predictive manner to create a deterministic future for individual learners?
- Can badge data that is freely and openly accessible in social media be used against individuals if it exposes intellectual weaknesses?
- Can the student data in badges be isolated to exploit particular skills for nefarious reasons, i.e. surveillance or hacking?

2. ETHICS, EDUCATIONAL TECHNOLOGY, AND BADGES

With the expansion of educational technology, some work is being done at the intersection of ethical theory and learning analytics [6]. Some propose ethical frameworks for development [7], while others appeal specifically to known problems in the legal use of student data in analytics systems [8]. This is a growing domain of research in the broader implications of how educational technology affects student growth and development.

Though some commentators have noted the potentially-harmful aspects of having open data in social networks, to date there has been scant studies of ethical issues in open digital badges [9]. As research in the ethics of educational technology expands, a myriad of potential problems looms [10]. To bridge this gap, targeted ethical questions must be specific enough to demonstrate applicability, but also be generalizable enough to warrant attention outside of the broadly-considered technology.

Due to their connection with social networks, availability of meta-data, and transparency of learning, digital badges face important ethical questions best formulated within the larger context of learning analytics.

3. PREDICTION AND BADGE DATA: A DETERMINISTIC FUTURE?

Learning analytics systems are becoming increasingly powerful tools to help students utilize educational data to achieve academic success [11]. Such data points are ever-precise, refined by multiple cohorts, experiments, and digital developments. One of the drivers of such development is statistical regression which helps predict when students need help [12], what classes might be beneficial in customized sequences [13], and how certain interventions benefit different types of students [14]. The robustness of learning analytics systems are built with data refined over time and with evidence of successful student outcomes [15].

Open digital badges contain multiple points of valuable educational data including assessments, specific skills development, and validation amongst others. Built within learning analytics systems, the evidence presented in badges can help detail a student's educational strengths and weaknesses. Further, the data available in well-designed badge ecosystems could strengthen a learning analytics' predictive strength. For example, with the completion of several badges in both curricular and extra-curricular activities, data points could be amalgamated to further bolster a student's educational strengths and support possible weaknesses. The specificity of assessment data, where final grades in college courses could be aligned with performance data in badges, could provide extremely valuable information not only to the learner, but also the institution supporting the learner, as well as the businesses developing learning analytics systems.

As analytics systems increase their capability of predicting student outcomes, it may be difficult to distinguish between the strength of the predictive algorithm and the role of determinism as it affects students. This is not to say that the same would be true of digital badges, though. In this instance, determinism would entail the ability to either sequentially offer badges to purposely build a set of skills in a learner without his/her explicit knowledge or to suggest that a self-fulfilling prophecy of ability would be set forth with badge data. A student's interaction with content leading to a badge may be examined for motivational aspects, perhaps even for so-called gamification reasons. However, could the data contained with badges be used to constrain a determined future? Meaning, if students are directly motivated to achieve certain badges, their interests may be piqued either with the content or with simply obtaining a badge; the question, then, is what effect the badge may have on future educational choices. Today's use of digital badges is often to enhance learning and provide open and transparent evidence of learning. It is impossible to say if this will continue, and what possible effect badges may have on learners' educational choices. A determined future, one shaped by an algorithm targeting content and ability, may not be suitable to human freedom and autonomy.

Important to learning is the chance – and the eventuality – of failure. Learning and carrying on from failure is a hallmark of resilient students who become as self-actualized as possible. Badges can certainly help mitigate educational failure because they are used to supplement through micro-credentialing, build on skills to be successful in other educational contexts, and provide a lasting record of one's accomplishments. Yet, human freedom and autonomy must be examined in light of these technological developments. If learning analytics in the systemic sense and digital badges in the individual sense are able to absolutely minimize failure, could learners suffer from not having to form resilience? The possibility of minimizing failure and preventing failure is determinism for individuals, though the data available in digital badges poses numerous ethical questions related to public disclosure of student data. Learning analytics systems used at schools are controlled by regulations (like FERPA), and are thus "closed" systems, whereas open badges make educational and learning data public.

4. PUBLIC LEARNING DATA AND NEGATIVE CONSEQUENCES

One of the benefits of open digital badges is that they can publically demonstrate a set of skills; downloadable into various social media, badges can evidence real learning [16]. If a learner chooses not to disclose a badge on social media, but instead download the badge into an email format, the data can still be used in a closed system with employers as a link on a resume [17]. The social aspect, then, stems from the ability of the learner to disclose proof of learning that, heretofore, was protected or closed information. The evidence, the proof of learning, may transform education through transparency [18]. Similarly, badges may well transform workforce skills demonstration through the use of social media sites like LinkedIn [19].

The data contained in digital badges, depending on the issuer and what the learner chooses to display, can be quite detailed and specific. Combined data of multiple badges could be used by web crawlers or data companies to build individual profiles of learners, including what content they would like to purchase, what specific skills could be utilized in the workforce, or how future content might be developed to attract similar learners. To illustrate the point, the evolution of massive open online courses (MOOCs) struggled to catalyze around a business model, though recently what has emerged are verified certificates that can be quite lucrative to students and recruiting companies alike [20]. While it is yet not possible to say if MOOCs can be digital headhunters, the same may be true of digital badges in the near future. If companies seek highly specific skills that can be learned through competencies (like software programming, for example), perhaps badge data would provide not only individual identifiers but also scoring and assessment data to substantiate such skills.

Beyond marketing, though, the question must be posed as to whether such data could be used to locate and isolate individual learning weaknesses. Assessment data availability in social media means that a learning profile could be assembled to indicate what constructs a learner does not understand or habitually misses. Such data may prove dubious if used against the learner in future assessments purposely generated to exploit such weaknesses, targeted marketing, or perhaps even exploitation if threatening job security. The ethical question of such data usage becomes more complex, too, when considering what safeguards could be enacted; overreach and paternalism may also hinder a learner's autonomy, freedom, and right to fail at a task.

Questions about what data points are useful in social media contexts are open for debate, but generally arguments seem to tentatively hinge in favoring the position of the individual learner's choice to expose or withhold information. This matter becomes an issue of privacy within digital badge ecosystems, however, when students may or may not fully comprehend the possible outcomes of publishing particular data points. Further, if such algorithms can threaten learning weaknesses in individual learners, the same may be true for the entire badge ecosystems because a badge's validity, no matter the expertise involved in the content development, deployment, and verification, could be threatened. The possibilities highlighted within learning analytics systems and in individual learning may well point to more sinister uses of data.

5. LEARNING DATA USED FOR NEFARIOUS PURPOSES

The increasing specificity of learning data within digital badges may lead to nefarious uses of that data in aggregate or individual cases. The use of predictive models in learning analytics coupled with evidence of skills development in digital badges disseminated across social media could help companies, governments, and perhaps even disreputable organizations recruit for nefarious purposes like hacking or surveillance. Furthermore, if learners are completing badges "recommended" to them for the ulterior motives of developing certain skills, could such information be used against them if they later refuse to participate in questionable activities? This may sound rather extreme, but when educational data is used across social media and within predictive systems, it is impossible to state how such data might be used. Additionally, while this may not come to fruition, the logical extremity is useful to examine the possible uses of future data.

Ethically, the question of learners knowingly or unknowingly participating in skills development for nefarious purposes is a question of human freedom, and ultimately it rests with the *actions* of the learner. However, the possibility of future manipulation certainly conflicts with how popular notions of badges today include that of supplementing learning, offering opportunity for job creation and advancement, and branching learning into social spheres.

6. CONCLUSION

Open digital badges are changing the educational opportunities for learners of today and tomorrow. The intersection of learning analytics systems that may incorporate badges, as well as the possibility of learners to disseminate evidence of learning across social media platforms, creates unique ethical questions that fit within the larger discussion of machine learning. The uses of data for prediction, isolation of strengths and weaknesses, and potential manipulation have direct consequences for questions of human autonomy, freedom, and determinism.

Such scenarios described herein may appear to be exceedingly negative or dystopic to some readers. While true that some of the scenarios may or may not come to fruition, they function here not only as a thought experiment, but also as a model of what may go awry as increasing amounts of personalized data are distributed,

shared, and examined online. It is also a model for how data crawlers may use student data with present technologies. While not a warning in the formal sense, such thought experiments are useful to describe how the ethics of technology, broadly understood, ought to enter into development discussions.

Like other ethical discussions concerning digital learning and educational technology, solutions cannot be prescriptive. The speed of development may render such prescriptions neutral. Similarly, ethical discussions cannot be reactive, either. Once technology exists, especially for public use, it cannot be retracted; thus, ethical discussions belong in the foreground of development, if even for thought experiments.

As an ethics of educational technology pivots between the prescriptive and reactive, so too they must occupy this *third* space of ethical reflection. Working through the potential outcomes of development does not stymie innovation, but rather acts as a partner to innovate the autonomy of the individual, the role of the community, and the potential intersection of the two. This third space, then, is occupied with lists of potential questions, perhaps operating somewhere between utopic and dystopic, that drive purposeful and responsible innovation. Exploring the ethical implications at stake is often enough not only to aid in responsible innovation, but also to avoid potential abuses of such systems. Digital badges are no different: if they are to become ubiquitous in the digital age as key components and measures of learning and as effective credentials, then ethical innovation and use of data is ever-more important.

7. REFERENCES

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