

Open Badges: Encouraging Participation in Software Development Modules

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Abstract. This paper will discuss the initial steps taken to ascertain the suitability of Open Badges as a motivational and pedagogical tool for students undertaking Software Development modules. The literature reviewed suggests that the Open Badges are a positive motivational tool but that careful design is required to maximize their introduction. Students were surveyed to gauge their knowledge of Open Badges and to ascertain their desire for inclusion.

Keywords: Open badges · Student engagement · Software development motivation

1 Introduction

The Open Badge system, as developed by Mozilla, is open to organisations and educational institutions for the purpose of issuing digital badges. A web based technology; badges are “digital images that have built in data about the issuer, criteria, and evidence” [1].

Open Badges are a topic that is growing in stature and relevance within education and as such warrants investigation into its suitability for inclusion and use in Software Development modules. The aim is to use Open Badges as a tool for motivating, engaging and engendering self-worth within the student. Through a portable achievement mechanism that can be used as a skills differentiator for employers and as a form of social achievement.

To ascertain an understanding of the students’ perception of Open Badges a survey of undergraduate students, studying on software development degrees, was initiated.

2 Literature Review

Jovanovic and Devedzic note the need for recognition of “soft skills” and “generic competences” as a prime mover in the rise of Open Badges [2]. Goligoski suggests that badges are a good means of capturing skills not just knowledge [3]. Gibson et al. also suggest that badges can provide a detailed breakdown or map of the student’s skills achievement [4].

The concept of collecting badges would be fostered amongst the student cohort as a means of encouragement, hopefully, evoking a sense of self-worth and giving a platform for differentiation of ability outside of academia [3].

Engagement is a perennial issue faced by educators and as such every effort must be made to engage the student in a meaningful and productive way. Open Badges can be proffered as a possible tool to help motivate and engage the student [2].

The motivational quality of Open Badges for the student relies on the following four aspects as identified by Jovanovic and Devedzic [2]: desirability, attainability, challenging nature and awarded for. Glover also acknowledges that desirability, attainability, and challenge will help to motivate the student, but also notes that employers may find badges desirable as a means of depicting the student's skills [5].

There is a view that rewarding or issuing badges based on effort and or improvement provides more encouragement to the student to progress and improve on their learning [2].

The ability of Open Badges to be collected can invoke within the student an inherent motivation or desire to collect all available badges in the same way that people are naturally drawn to collectable based hobbies; anecdotal evidence in [1] adds credence to this postulation.

Findings from Santos et al. study suggest that integrating Open Badges into collaborative learning environments can help to promote motivation and engagement amongst the student cohort [6].

Põldoja and Laanpere have identified four Open Badge design patterns: Composite, Activity-based, Grade-based and Hierarchical [1]. This classification shows the potential for varying the mode of badge achievement within a module or programme of study. Using the definitions provided in [1] composite style badges can be earned through completion of a number of assignments, activity-based badges can be earned by the student meeting the criteria on "measurable learning activities", grade-based badges are, unsurprisingly, based on the students grades and hierarchical based badges use a building block approach to award badges on the basis of previous work at a lower level.

Rughini and Matei have adopted a tiered approach to their implementation of Open Badges based on a medal system i.e. 'Bronze', 'Silver' and 'Gold' [7]. These medals are awarded based on the student's grade point average in the respective range 75 %, 85 % and 95 %. This is an interesting approach and could act as a motivator for students wishing to attain high marks and by implication a 'Gold' standard.

An interesting observation from Santos et al. suggests that regular awarding of badges helps to maintain levels of engagement [8].

The general concept of badges is one of positive activity; however, Santos et al. also created 'negative' badges for awarding to students based on their lack of participation [8]. This is an interesting departure from the normal idea and may well have a positive outcome in itself as evidenced by their findings when students ranked such badges amongst the most important [8].

If badges are to hold any currency outside of academia then they have to somehow have attached to them a record of the student's competency and learning achievements [9]. Badging systems must therefore allow badges to store metadata that will indicate who the badge issuer is, what the student has done to achieve the badge and the level of attainment [9].

Giannetto et al. observes that badges act as a means of "positive feedback" for the student which in turn can engender a "feeling of accomplishment" for the student which in turn will lead to a desire within the student to strive for further attainment [10].

Jovanovic and Devedzic highlight the possibility of intrinsic motivation, engaging with the task through personal interest, being diluted by extrinsic motivation, engaging with the task to gain a reward i.e. the badge, suggesting the occurrence of “motivation displacement” [11].

Ahn et al. observe that badges are a viable pedagogical tool citing the concept of visible badges acting as a “roadmap” indicating to the student the activities and achievements available [12]. Designing badges to encourage “positive learning behaviours” and convey valued knowledge and skills [12].

3 Survey

After consideration of the literature in the previous section, in particularly Jovanovic and Devedzic suggestion that the popularity of Open Badges tends to be in academia and driven by educational technologist [2], it was decided to survey the current student cohort to ascertain their knowledge of and views on Open Badges.

The survey was designed in two parts: firstly to gain an understanding of the student cohort’s knowledge of Open Badges and secondly to determine the student cohort’s thoughts on the introduction of Open Badges to programming modules.

Each survey was created using Google Forms, a highly flexible tool that makes the creation of surveys quick, easy and free. Surveys created using Google Forms are accessible on all formats: web, mobile and tablet. The survey was disseminated to the student cohort via an emailed link.

The first survey was split into three sections although not all sections would be accessed by the student. Using a technique available in Google Forms the order with which the student interacts with the survey could be dictated.

The first question of the survey, Fig. 1, is a simple binary question. If the respondent answers yes, they have heard of Open Badges then they are directed to the second section of the questionnaire. If the respondent, however, responds no, then the survey is complete and no more sections are shown. If the student cohort were unaware of Open Badges then there was no need to proceed to the next section of the survey (Fig. 2).

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Open Badges

Form Description

Have you heard of Open Badges?*

Yes

No

Fig. 1. First question of initial survey.

For those students that had heard about Open badges it was important to gauge where they had heard of them and to determine if they already had any badges. Students who answered yes to having badges were subsequently directed to the third and final part of the survey. Students who answered no were thanked for their participation and did not continue to the third part of the survey.

The questions in Fig. 3 are used to determine the number of badges a student may have and the skill area the badges are in.

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Open Badges - Student Knows about.

Yes

Where did you hear about Open Badges?*

School

College

University

Employer

Do you have any Open Badges?*

Yes

No

Fig. 2. Second part of first survey.

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Open Badges - Attainment

Attained Badges

How many badges do you have?*

1-5

6-10

11-15

16-20

> 20

Which areas do you have Open Badges?*

Languages

IT Skills

Programming Skills

Volunteering

Social

Educational Studies

Fig. 3. Final section of first survey.

Like the first survey the second survey was split into two sections and completion of both sections was dependent on the answer to the first question.

For the second survey, Fig. 4, the students were given a definition of Open Badges and asked, based on the definition, if they would like to see Open Badges introduced into their modules.

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Open Badges - Part 2

Form Description

What Are Open Badges?

Open Badges are

- a digital accreditation infrastructure from Mozilla.
- Images with metadata hard-coded into them.
- Visual representations of achievements, learning, skills, competencies etc.
- They can accommodate formal and informal learning pathways.

19th Annual SEEA Conference: Open Badges Workshop
Phil Vincent and Daniel Mackley, Technology Enhanced Learning Advisor at York St John University

Based on the definition above, would you like to see Open Badges introduced to your modules?

Yes

No

Fig. 4. Survey 2 first question.

The final section of the questionnaire, Fig. 5, was used to determine the aspects of the module that the students would like to receive credit for and if they would like to see a tiered approach to its implementation.

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Yes, I'd like them introduced to my modules.

What aspects of your module would you like to receive badges for?*

- Problem Solving
- Critical Thinking
- Time Management
- Written & Oral Communication
- Design Issues
- Using Social Media for Documenting (Blogs & Wiki's)
- Option 7
- Other:

Would you like badges to be given in a tiered approach?*
i.e. Gold, Silver, Bronze to reflect your achievement and understanding of the module material

Yes

No

Other:

Fig. 5. Survey 2 final section.

4 Results

This section will discuss the results obtained from the two surveys, trying to put them into context for the author’s educational establishment. All the students surveyed were undertaking Software Development modules related to Games programming.

This was by far the stand out result of the survey; the expectation was that a high percentage of the student cohort would have had some level of knowledge of Open Badges (Fig 6).

Have you heard of Open Badges?

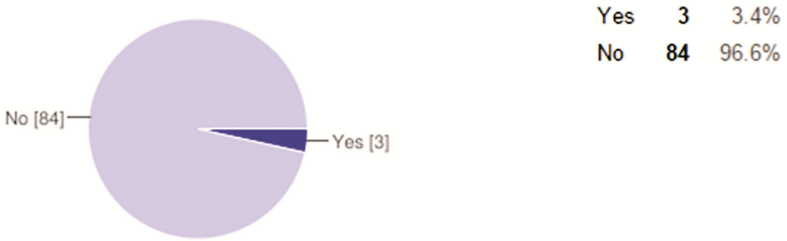


Fig. 6. Number of students aware of Open Badges.

The results in Fig. 7 were interesting but due to the low number not significant that all three students had heard of Open Badges through the University. Not unsurprisingly none of the students that had heard of Open badges actually had any.

Where did you hear about Open Badges?

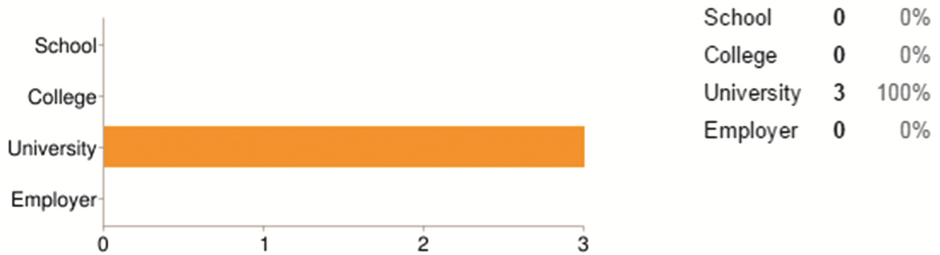


Fig. 7. Where did you hear about Open Badges?

The second survey undertaken by the student cohort had less participants than the first but it still provided some interesting data.

Interestingly, Fig. 8, shows that 14 % of students surveyed would not like to see the introduction of Open Badges to their modules. This was a higher than expected figure.

Based on the definition above; would you like to see Open Badges introduced to your modules?

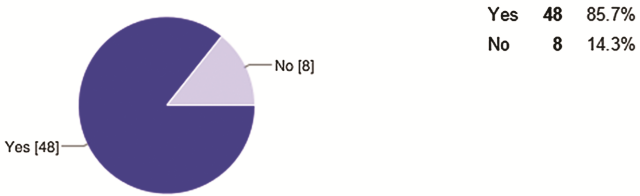


Fig. 8. Would you like to see Open Badges introduced?

The results in Fig. 9 highlight a number of interesting issues. Firstly, the number of students selecting problem solving, making this the top aspect. Currently students undertaking modules in programming do not exhibit strong problem solving skills as there is a reluctance to engage in proper systems analysis prior to coding with students prone to head straight to development. Again, like problem solving, it was surprising to see critical thinking and design issues occupy the second and third place for the same reason mentioned for problem solving.

What aspects of your module would you like to receive badges for?

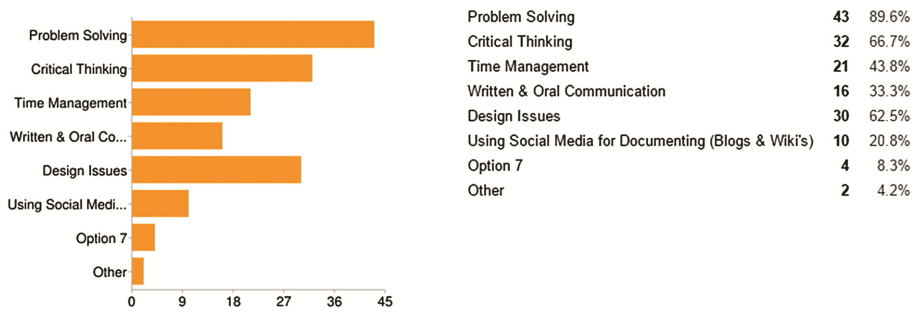


Fig. 9. Aspects of module to receive badges.

It was expected that documenting using Blogs and Wikis would feature higher than it did. The ubiquitous nature of Blogs and Wikis and its media rich format suggested that it would be a good candidate to feature higher in the list.

5 Conclusion

Although 96 % of the students initially surveyed had no knowledge of Open badges the results of the second survey indicated that around 85 % would welcome the inclusion of Open Badges into their modules. Armed with this data it has been decided to introduce Open Badges into Software Development modules as a test in the new academic year. Cognizance will need to be taken of the design issues required for integrating an Open Badge system into the modules to meet not just the expectations of the students outlined in the second survey but also to allow a sound pedagogical foundation that will encourage and engender motivation within the students.

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