Names and Faces: a staff dashboard to support student learning engagement

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Abstract

This paper describes the in-progress development and preliminary evaluation of a dashboard to support student-centred higher education. The dashboard, known as Names and Faces, aims to provide easy access to the data teaching staff need to proactively foster student engagement, and to improve the student's overall university experience. Names and Faces brings together data from disparate systems, and provides a highly visual interface that meets the needs of a wide range of teaching staff. Importantly, the prototype has been developed by academic staff in collaboration with other academics using an iterative prototyping approach. 48 academic staff have used the prototype over two semesters, identifying new data sources and interfaces to be incorporated in future iterations. This project contributes to the development of improved information support for student-centred education, but also to academic information systems in terms of data integration, usability, and user-centred design.

Keywords student engagement, staff dashboards, data integration, HCI, iterative prototyping.

1 Introduction

Many higher education teaching staff are interested in a more student-centred approach to learning and teaching, but often do not have the time or the tools to assemble the information needed to support this approach. If data is available, it often requires access to several systems and is presented inflexibly, in different formats. Names and Faces addresses this problem in two ways, first, by providing an integrated view of student data and their university activity, and second, by providing a highly visual interface, useable by a wide range of staff. Names and Faces also addresses a third objective, to achieve wider acceptance by involving teaching staff in an iterative, collaborative development process.

The basis of Names and Faces is to know relevant information about students and their educational experience, and to use this information to proactively foster engagement with their classes and to improve their overall educational experience. Names and Faces takes a teacher's perspective on information, literally building a picture of the students from information often stored in disparate system, including their student card photographs, demographic data, academic history, current program and timetabling, together with progressive engagement indicators, and institutional learning analytics predictions.

One of the key issues addressed in the development of Names and Faces is buy-in from teaching staff. Although staff report high levels of interest in data-based approaches to learning support, they indicate low involvement in decision making, and little discussion about this data with colleagues and other subject matter experts (West et al., 2016). Australian higher education staff seem to be relatively infrequent users of student data. For example, only 58 of 319 teaching staff, and 37 of 304 programme and course coordinators reported accessing analytics data more often than monthly (Huijser, West & Heath, 2016). Past and possibly current data-based approaches may not answer the questions that teaching staff have (Svinicki et al., 2016), and more involvement of staff in the development of such tools may lead to better tools and higher uptake.

The Names and Faces prototype has been developed to meet the broad objectives of:

i. providing an integrated, more holistic view of the student and their educational experience,
ii. supporting proactive engagement with students by providing a personal view of students that includes their photos, preferred name and pronunciation, and supports functionality, such as to remember birthdays,
iii. detecting potential difficulties, specific to individual students, which may detract from their university experience, such as timetable clashes, timetable spread, their overall load, uneven assignment workloads, planned absences,
iv. providing tools for teaching staff, such as to help them know and recognise their students, and
v. encouraging staff use by involving them closely in development.

In the remainder of the paper, section 2 provides the background in student engagement that underpins the educational focus of Names and Faces. Section 3 describes the data sources and section 4 the visual interface of the prototype. Section 5 describes the implementation, while section 6 briefly examines the prototype deployment, feedback and future development plans.

2 Improving student engagement and their learning experience

Names and Faces aims to improve student-staff interaction as an important part of student engagement (Richardson, 2011). Positive, welcoming and personal communication experiences can motivate students and increase their sense of belonging, resulting in greater participation in the learning process, further interaction, higher learning achievement, and increased overall satisfaction (Kim & Sax, 2009; Kuh et al., 2006; Masika & Jones, 2016; O'Keefe, 2017; Shepherd & Sheu, 2014; Zepke & Leach, 2010). In dealing with students that have been identified as at risk, short, informative discussions between teaching staff and students are likely to be as effective as more elaborate, less personal, and costlier, institutional interventions (Jayaprakash et al., 2014).

There is considerable capacity to improve staff-student interaction in Australian higher education. Australian students may have up to 50% less staff and student interaction compared to US students (Richardson, 2011). This may stem from the widespread use of large lecture classes with casual staffing

of tutorials in Australia, where students often have little contact with senior, full-time staff (Coates & Ransom, 2011).

Names and Faces implements what some teachers do manually, create a chart of student photographs, names and relevant information. The prototype facilitates a more personal environment through data, such as preferred names and pronunciations. Names and Faces also draws on information about student enrolments, assignments, and formal off-campus activity to allocate work more evenly and accommodate potential conflicts.

One of the substantial issues for this project (and other data driven projects) are the ethical and legal issues around use of student data. The obligation of institutions to act must be balanced against the rights of the student to privacy (Ifenthaler & Schumacher, 2015; Slade & Prinsloo, 2013). In Australia, universities and their use of student data is governed by state legislation, for example in Victoria, The Privacy and Data Protection Act of 2014 (CPDP, 2014). Compliance with the relevant legislation is typically covered by University policies and processes. Generally, student personal data can be used with appropriate safeguards if its purpose is to improve the student learning experience and outcomes. In fact, it has been identified that there is a moral obligation to use such data to do so (Slade & Prinsloo, 2013). Implied access is provided by the ability of staff to access various systems, and the approach taken in the current implementation of Names and Faces is to use data normally available to teaching staff. Ethical and privacy issues, and mechanisms to deal with these will be an ongoing consideration for the project.

3 Data Integration

Universities hold large amounts of data, but much of this is siloed in systems implemented on different platforms with weak linkages and a range of interfaces. Some of this data may be outside university systems and accessible only by staff users, for example social media, websites, mobile and cloud-based applications (West et al., 2016). Table 1 outlines the data sources used in the current prototype and some of the challenges in accessing this data.

Data	Location	Access
Student photographs (as they appear on the student card)	Student Academic Management System (SAMS)	The photos can be obtained via the browser on an individual student level, or using the query tool on a course/class level. This data can be exported using an XML, Excel or HTML format.
Student enrolments, current class registrations and previous results	Academic student enrolments (iExplore)	The data is accessible from a web browser and limited spreadsheet export at a student, course or program level is possible.
Student Timetables	MyTimetable: students register for their classes (such as Lecture, Laboratory, Workshop, Tutorial)	This data can be exported from the application as a spreadsheet, text or HTML format.
Assessment details	The Learning Management System (Canvas) provides access to assessment and other details for a course	This data can be accessed using the application API (in JSON format) for courses taught by that staff member, or provided by the LMS project team.
Final exam schedule	Prepared by student administration group	This is sent to academic staff in a spreadsheet via email.
Class/Room locations map	The campus maps (Meridian) provides maps for many of the university buildings	Stored off campus on a cloud service. Access is through and API that provides the data in JSON format.
Other administrative data.	Various sources about an individual student, course and/or program.	Predominantly transmitted via email.

Table 1. Important Student Data Sources and Access

4 Functional Visualisation

Names and Faces interface includes the following functionally orientated visualisation of the data.

i. The Student View provides basic information about a student, including their photo, and the following data related to the student is currently available for display.
   a. the student's timetable for the current semester,
   b. basic program map (visual), filled with enrolment and/or timetabled data,
   c. an assessment summary map for each course timetabled for across the semester,
   d. the assessment details for each course timetabled for the given semester, and
   e. the list of exams the student will need to attend for the given semester.

ii. The Class List provides a visual list of student in a class, using student card photos. This view can be based on enrolment course data or timetabled class attendance data. This list also includes:
   a. the assessment details of the class, and
   b. a list of students and courses where there is a timetable clash with this course.

iii. Program List provides a visual list (photos) of all currently enrolled student in a program.

iv. The Names and Faces Game helps staff to learn the names of student. The game presents the staff member with a photo of a student in their class with 6 potential student names. The staff member attempts to match the student name with that in the photo. A report can be seen that provides a count of the number of right and wrong attempts made for each student.

v. Class Location provides a grid view of the timetabled courses for a given class location at the university across a week. This view also includes a map of the floor in the given building of the location.

5 Implementation

The conceptual design is based on a simple three-level architecture (Leitner & Ebner, 2017) of data capture, processing and presentation, which allows flexibility for implementation in a range of technical environments. The data capture layer brings together data from disparate systems, unifying the different data models. Ideally, institutions will have a data integration solution in place, but in the absence of such a solution, connectors can be included in the data capture layer. Data from the disparate sources are stored in a relational database.

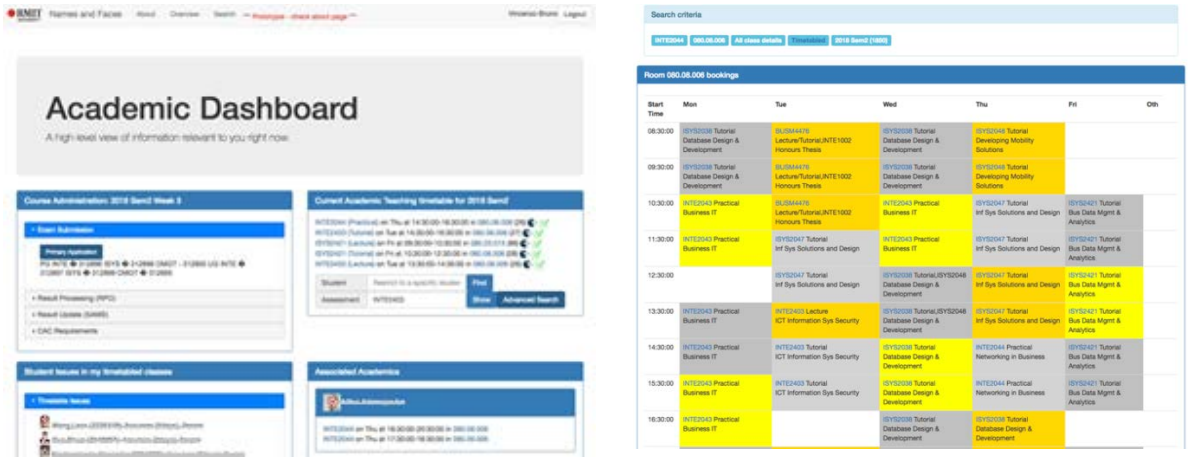

Figure 1: Main dashboard display (left) and Weekly Location View (right)

The academic dashboard prototype is currently housed in a server that is only accessible through the University intranet. Users must authenticate using the university authentication system and only academic staff can access the data for their course/class.

A web application has been developed that can be accessed through browsers on desktop and mobile devices. The visualisation is based on a "bootstrap" web graphical toolkit, which provides a common look and feel and enables the various displays to adapt to a variety of screen sizes. Figure 1 shows the

main dashboard display that includes administrative tasks sensitive to the current week in the semester, information about the courses allocated to the academic currently logged in and a list of academic involved in the same courses. Data about student with special consideration, equitable assessment plans and timetable issues/clashes are shown in relation to academic's involved courses. This figure also shows an example weekly location (room) view of courses timetabled and academic involved.

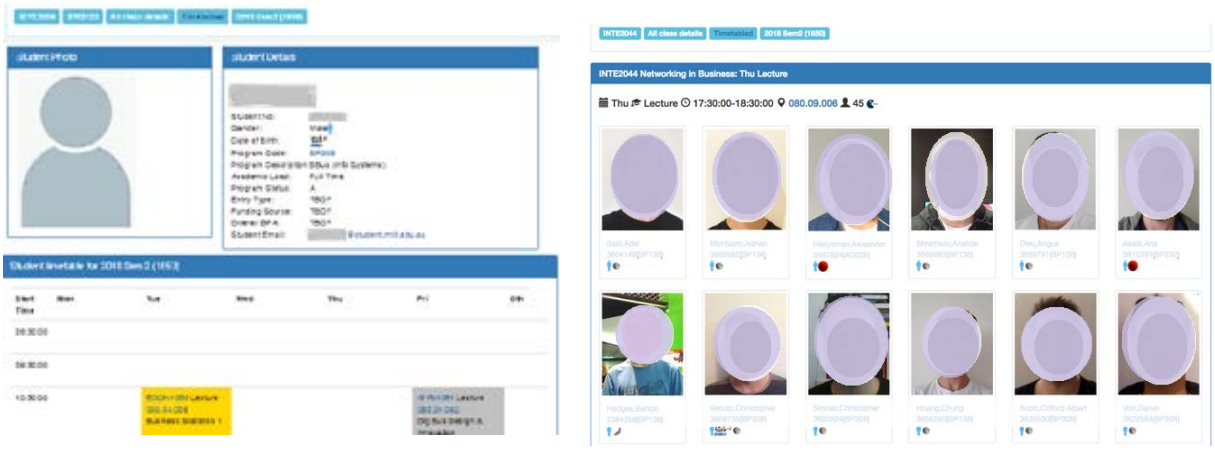

Figure 2: Snippet of the Individual Student View(Left) and Class List (Right)

The Student View (shown in Figure 2) combines data about the student (minimal), student's timetable for current semester, student's basic program plan, all assessment and exam details for enrolled courses. Figure 2 also shows a Class List View that displays the names and faces of students in each timetabled class for a course. This view can be flipped to enrolled students rather than timetabled, for courses that do not have timetabled rooms.

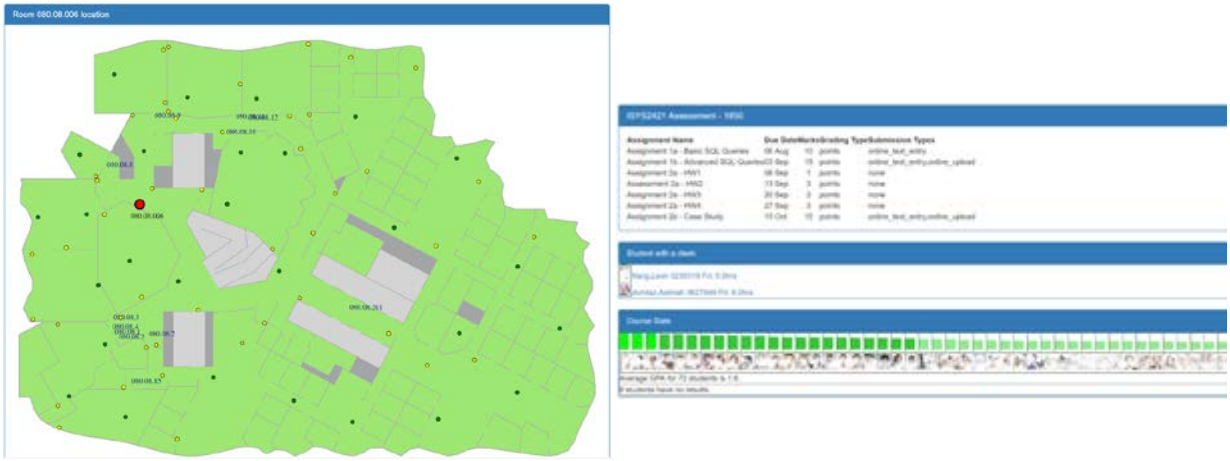

Figure 3: Room location map (Left) and Additional Class List Details (Right)

The prototype includes data from the university room location maps (Figure 3) found on the weekly location view. The additional class list details (Figure 3) includes assessment pieces, students with timetable clashes with this class and a GPA summary of enrolled students.

Preliminary evaluation and future development

The first phase of this project has focused on iterative design and development with the aim of establishing a reasonably stable dashboard. A second phase will follow to more formally evaluate the impact of the dashboard on measurable outcomes, such as satisfaction, retention and grades, for students, and usefulness and time saving for teaching staff.

The initial prototype has been developed with the involvement of academic staff from one Australian university over a 5-month period, spanning two semesters. An encouraging sign has been the increasing number of staff involved over time. Staff have accessed the web application using Windows desktop, Macintosh desktop and mobile devices, providing feedback in face to face discussions and email. Staff have identified bugs and improvements to the visual interface, as well as suggesting new functionality, such as the names and faces game.

Of the 48 academic staff members who have accessed the web application,

- all have used the (visual) class list,
- 32 have accessed individual student details,
- 23 have examined their class location, and
- 8 have used the names and faces game.

Names and Faces has been successful in motivating academic staff to collaborate in the development of a tool that helps with their work. Development iterations have led to the incorporation of more valuable data sources as they are identified, such as that from university learning analytics initiatives. Additional reports that can improve the student experience are being assessed.

6 Conclusion

Names and Faces aims to provide the type of student information systems that teaching staff need. The student is central to Names and Faces, and the primary interface is based on their image and their name. Academics can now obtain data from a single source of truth where the student lifecycle and experience is the single point around which data is presented. This data can make it easier to engage with the students in formal and less formal educational settings. It also aids staff in improving the student experience by providing the full context of the student's university activity, and by highlighting potential conflicts and difficulties before they arise. This data can be linked to other data as it becomes available, such as patterns of learning behaviour established by institutional predictive learning analytics. Together with their own knowledge of students, Names and Faces provide a powerful tool for teaching staff, one that can inform them, but most importantly allow them to influence positive student academic outcomes.

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