Retention Analytics Dashboard Case Study, Spring 2020

Executive Summary

This report describes a case study of a new tool that leverages learning management system (Canvas) and other data to discover struggling students. Retention Analytics Dashboard, or RAD, provides three dimensions of data from Canvas: *activity* (student LMS interaction), *assignments* (missing and late assignments), and *grades* (grades recorded in Canvas). In this report, we describe how a team of student support specialists from Undergraduate Academic Affairs (UAA) and Student Life combined and analyzed RAD data with additional academic information, triaged students, and conducted outreach to focused populations of pre-major and international undergraduate students. Key findings from the study were:

- Students were more likely to engage when an expectation had been established that staff will communicate with them and/or there was a personal connection between staff and student.
- Communication with students revealed that they were experiencing Zoom fatigue, had difficulty learning remotely, struggled finding motivation for asynchronous work, and were challenged to seek support services.
- 23% of the students identified in the caseload were already on academic probation/warning or showed academic difficulty.
- An increased number of flagged RAD features (activity, assignments, and grades) was associated with negative student outcomes; specifically, lower end-of-quarter grades and fewer credits completed.
- As the quarter progressed, RAD features more accurately pinpointed struggling students.

Background

Following the termination of UW's contract with a major student success analytics company in autumn of 2019, UW-IT — in collaboration with the Office of Minority Affairs & Diversity (OMA&D) — has been developing models and prototypes for discovering struggling students. With the emergence of COVID-19 and the move to remote learning, the need to discover struggling students increased considerably. In response, UW-IT worked closely with OMA&D, the Office of Undergraduate Academic Affairs (UAA), Student Life, and CIRCLE to quickly develop and utilize RAD with the goal of identifying and reaching out to struggling students during spring quarter. Here, we describe how a team of student support specialists from UAA and Student Life combined and analyzed RAD data with additional academic information, triaged students, and conducted outreach to a focused populations of pre-major and international undergraduate students.

The role of student academic support staff is to guide students and provide support prior to, during, and following an academic quarter. Staff largely rely on post-quarter indicators of student performance. However, their ability to identify students who experience academic difficulty during the quarter is limited to student self-disclosure and faculty referrals. In the absence of these reports, support staff rarely know whether students are engaged and/or struggling in their courses. Lacking more timely and reliable indicators, support staff have been put in a reactive position, providing guidance only *after* students reach out to discuss their struggles or faculty make a referral, or at the end of the quarter when grades are submitted. RAD aims to change this situation by allowing support staff to be proactive in their work with students. Using RAD, support staff can identify students who are struggling to succeed or have disengaged early in the quarter and reach out *before* matters go beyond repair.

How does RAD work?

RAD is an online dashboard that, in addition to providing predictive analytics (only for the Educational Opportunity Program students), displays three dimensions of data from Canvas LMS: *activity* (focuses on student LMS interaction), *assignments* (focuses on missing and late assignments), and *grades*. Scores for each of these dimensions are independent to the student, generated in comparison to their classmates, and aggregated across their courses. Each of the three dimensions are scored on an 11-point scale from -5 to +5, with positive scores indicating that a student is doing better than their classmates (Figure 1).

The dashboard allows users to winnow down a list of students based on their status for each dimension (e.g. low, medium, high) as well as the prediction score. The dashboard provides student email addresses so that users can contact them if necessary. Users can also download filtered data to combine and analyze with additional data not included in RAD.

Figure 1. Screenshot of RAD containing mock data.
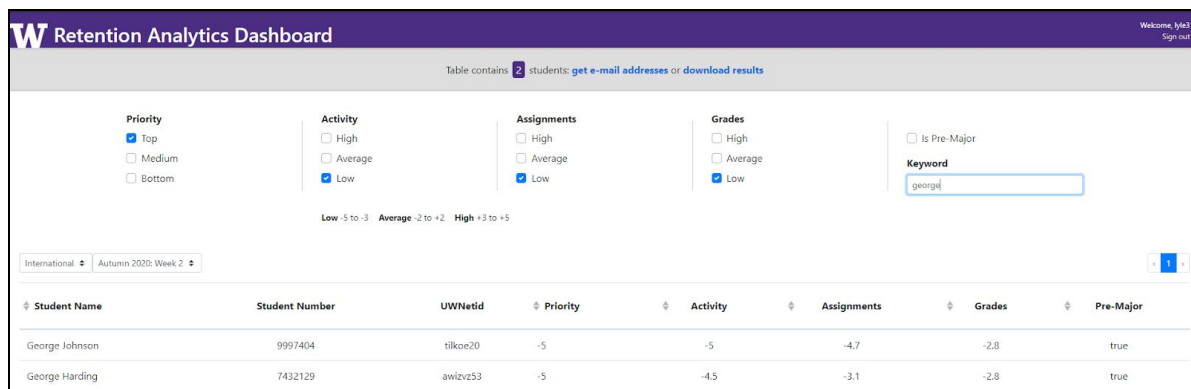
Spring 2020 Case Study

Two distinct use cases emerged following the release of RAD at the beginning of spring quarter. First, OMA&D provided their advisers direct access to RAD, allowing advisers to find students in

their caseload who were struggling. This report focuses on the second use case, in which a team of student support specialists from UAA and Student Life — specifically Academic Support Programs, CIRCLE, HFS Residential Life, and the Office of the VP for Student Life — combined and analyzed RAD data with additional academic information, triaged students, and conducted outreach to a focused populations of pre-major undergraduate international students.

Process

Initially, Grades and Activity scores from RAD were used to identify students who were not engaging in their coursework. Students with those scores were identified and downloaded from the system each week after the second week of the quarter. A database was developed to track whether students were showing up week over week, were new, or worked their way off the list by increasing their Assignment and/or their Activity scores. Starting mid-quarter the team began to identify students with the lowest Grade scores, regardless of their Activity and Assignment scores, and added them to the database. The student success manager conducted a manual review of student transcripts through EARS to identify students who were on probation, warning, or had a history of academic difficulty. This database of students served as a caseload for the team and became the target audience of outreach and support.

Through this process, the team identified 391 students (212 international and 179 non-international pre-major) who at some point in the quarter had the lowest level of Activity and Assignment scores, or Grade scores. Of the 391 students identified, 36% were identified for three or more weeks, and 23% were on academic probation, had received a warning or had a history of academic difficulty.

Outreach

Various outreach approaches were utilized to reach students. Most were contacted via email due to the remote learning setting. The email messages included tips for learning in the remote setting that also aligned with RAD measures — "it's important to log in to Canvas, submit assignments on time, etc." Other approaches included inviting students to meet with academic support staff and academic coaches. Residential advisers in HFS conducted personal outreach to students identified in RAD as part of their normal rounds with students living in HFS facilities.

The use of RAD generated a number of insights that point to the potential of RAD and areas for improvement, especially as it relates to outreach.

- The two means of identifying students — low Activity & Assignment scores, and low Grade scores — generated a significant caseload of students (n=391) who at some point showed potential academic distress or disengagement.
- Twenty-three percent of the students identified in the caseload were already on academic probation/warning or showed academic difficulty. A specific review of those on academic probation/warning (n=29), showed that only 17% improved their academic standing, while 50% had a decline in their academic standing (dropped, withdrew,

moved from warning to probation). The remaining 31% maintained and persisted with their probation status, which can be considered a success.
- Attempts at outreach indicate that having a personal connection with the student and/or an expectation established that staff will communicate with them increases the likelihood the students will engage. Efforts to encourage students via email to utilize services or meet with success coaches did not seem to be effective.
- Communication between students and HFS Resident Advisers revealed that students identified by RAD were experiencing Zoom fatigue, had difficulty learning remotely, struggled finding motivation for asynchronous work, and were challenged to seek support services.

Student outcomes

The relationship between RAD data and student outcomes was also examined, specifically the percent of credits taken vs. earned and end-of-quarter GPA. Our evaluations included 14,764 students, 5,778 of which are in EOP, and 4,422 are International students (Table 1). While these groups were examined as a whole in this report, evaluating individual groups separately yields similar results.

Table 1: Descriptive statistics for the three student populations included in RAD

	Pre-Major	N	Mean Spring 2020 GPA	Mean % Credit Earned
International	*Yes*	1293	3.56	90.7%
	No	3129	3.62	94.7%
EOP	*Yes*	1768	3.30	89.0%
	No	4010	3.49	93.8%
Pre-Major (Non-EOP, Intl. pre-major students)	*Yes*	4564	3.51	93.6%

Considering Activity, Assignments, and Grades scores for each student, an increased number of flagged RAD features was associated with poorer student outcomes (Figure 2).
- Mood's median test and Games-Howell test both confirm there are significant differences between medians and means between groups with different numbers of RAD features.
- Viewed through a student support lens this indicates that students with 1 or fewer flagged RAD indicators are likely to succeed and may not need the same attention from support staff as a group as those with two or more indicators.
    - For a vast majority of students, those with a low number of flagged features who still underperformed, the Activity score was their lowest metric.
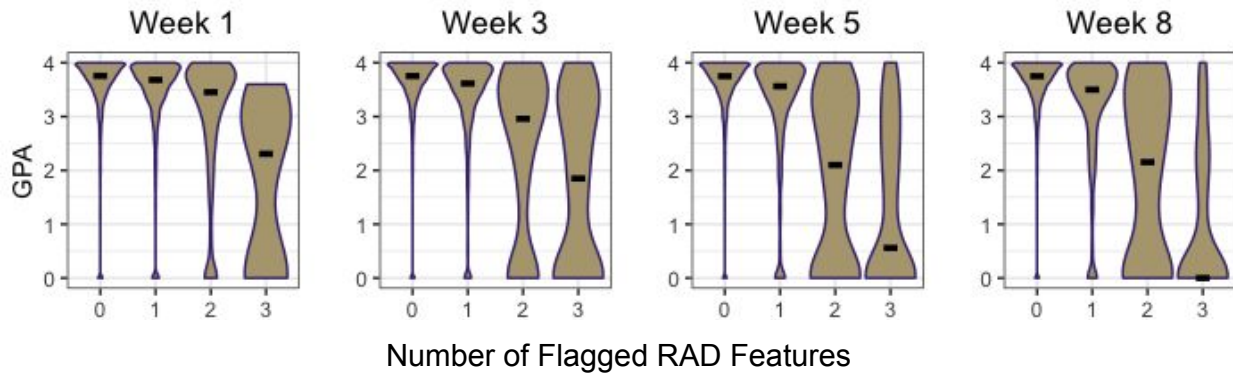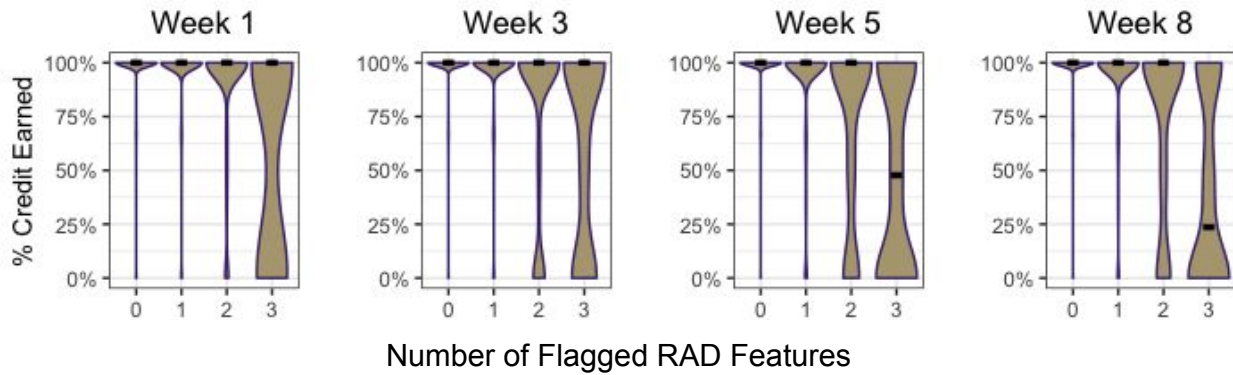
Figure 2. Considering RAD features below -3 (a "flagged" feature) for each student at different points in the quarter, we can compare relationships with final GPAs (upper frame) and percentages of credit earned out of total enrolled credit (lower frame).

Table 2: Student counts for Figure 2

	0 Flags	*1 Flag*	*2 Flags*	*3 Flags*
Week 1	11045	3154	547	27
Week 3	12464	1980	208	121
Week 5	13484	993	154	142
Week 8	13735	756	134	148

Regression analyses indicate that each RAD feature is valuable in determining predictions of student outcomes.
- In each week of the quarter we see that Activity, Assignments, and Grades are valuable in informing estimates with $p < 0.0001$ for every model. The most impactful predictor was Grades and Activity.
  - A one-point increase in Activity was associated with roughly a 0.2 final GPA increase throughout the entire quarter.
  - By the end of the quarter, a one-point increase in Assignments was only associated with roughly a 0.1 increase in final GPA.
  - Looking at all students in RAD, Grades have an increasingly significant impact on determining final GPA as the quarter progresses. As early as week 3, a one-point increase in a student's grades score is associated with an estimated 0.4 GPA point increase, so a student with a grades score between -5 and -3 will likely receive a final GPA -2 to -1.2 points lower than an identical student with a grades score of 0.
    - By the eighth week, a one point increase in grades is associated with an expected increase in GPA by 0.7.
- While variance in final student outcomes is largely accounted for by RAD features at the start of quarter, models utilizing RAD features increase in accuracy as the quarter progresses,
  - The primary change in the model is the influence of the Grades metric on student outcomes.
    - For advisors, this might mean considering all metrics similarly at the start of the quarter while looking for students with multiple flags, then considering grades with increased attention as the quarter progresses.

Next steps

Autumn 2020 Pilot, OMA&D

The vision and requirements for RAD have been driven by a years-long collaboration between UW-IT and OMA&D. The goal was to add RAD as a feature to Compass, OMA&D's advising

dashboard. Due to technical hurdles with implementing RAD as a feature of Compass, UW-IT decided the quickest path forward was to develop a separate application on a familiar technology stack. The approach had a few drawbacks, limiting the use of RAD during spring quarter by OMA&D advisers: (i) RAD was not easily accessible by EOP advisers from/in Compass, (ii) advisers could not easily navigate their caseloads in RAD, and (iii) the absence of predictive analytics, which were anticipated by EOP advisers. UW-IT has since improved access to RAD via Compass, included a dropdown menu where advisers can view their caseloads, and provided risk scores based on a predictive model. As planned, a pilot of RAD with OMA&D will commence autumn 2020.

Our goal is to enrich RAD with additional data sources, especially those that can identify struggling students early on in the quarter, and expand the service to serve additional student populations. RAD launched in autumn 2020 with a few new features. First, given the concern from our administrators for incoming freshmen, we will include a filter for this population. Second, we will include a filter for STEM students. Finally, if feasible, we will surface additional interaction data, which can provide insight into how often a student is engaging with any system that requires a UW NetID login.

Beyond the data and system features the future of RAD and the effectiveness and impact of outreach efforts will be areas of focus in the year to come. Developing a guiding body to explore expansion and ensure the ethical use of data will be pursued over the next 1-2 quarters. Additional efforts will also be made to improve the efficacy of outreach by student support services and advising staff.

Contributors

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