



Early Performance Feedback and Course Success

Early Performance Feedback (EPF) is an early warning program to enhance first year student performance in one hundred level courses. Courses with high D, F, W grades were initially targeted for this program, however, based on learning analytics of courses at CSU that predict graduation and department willingness to participate in EPF other courses have been added to the program. EPF is a central program for improving academic feedback during the critical early weeks of the semester by providing a structure for feedback early in the semester. The purpose of this report is to explore the association between student course-level success and course participation with the Early Performance Feedback (EPF) program.

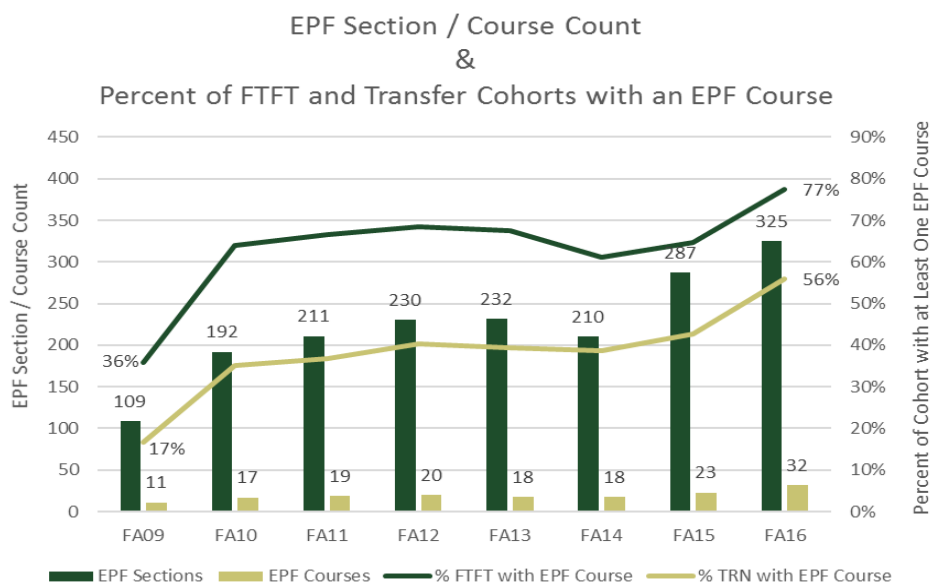
Executive Summary

Course participation in the EPF program is associated with 37% higher odds (1.37 odds ratio in Table 1) of a student earning a successful grade (A, B or C) in the course after controlling for students demographic/academic characteristics. These higher odds result in a 2.8 percentage point (PP) increase in the predicted probability of a student being successful in a course if their course section participates in the EPF program. Additionally, this association between EPF and course success is nearly identical for students that are either first generation, Pell recipient or a student of color as well as for first-time students; however, EPF participation association with course success does vary significantly by course and is actually negative for some courses.

Early Performance Feedback

Figure 1, below, displays the number of courses and sections that participate in EPF by semester on the primary Y-axis as well as the proportion of students that are in a first-time, full-time (FTFT) or transfer cohort that have at least one EPF course on the secondary Y-axis. Please note that courses have multiple sections in a semester and some or all of the sections of an EPF course might participate in the program.

Figure 1.



The number of course sections participating in EPF program has grown considerably (about 200%) over the eight fall semesters of programming included in Figure 1 (from 109 sections across 11 courses in FA09 to about 325 sections December 2017



across 32 courses in FA16). Nearly 80% of the FA16 FTFT cohort had at least one EPF course during their first fall semester and 56% of the transfer cohort had at least one EPF course (up from 36% and 17% in FA09). Please note that the proceeding analysis excludes FA17 because end of term grades are not completed, but that the program has continued to grow (this FA17 there are about 400 EPF sections across 40 courses).

Methodology

The association between course-level EPF participation and student success in the course is calculated with a logistic regression model that controls for student type (new first-time or transfer students as well as continuing students) and student demographics (gender, first generation status, minority status, and Pell recipient status) for each course. This analysis is limited to degree-seeking undergraduates in courses with face-to-face delivery.

In order to assess the association between EPF participation and student course success the students' final grade in a course is compared across course sections that participate in the EPF program to those that do not participate. In most cases (about 67%), all course sections in a semester participate in EPF; therefore, the non-EPF course section grades are taken from semesters prior to the EPF implementation in that course. However, for some courses participation in EPF varies by section within a term so the course's non-EPF students are obtained from the same semester (specific comparison semesters per course are listed in the Appendix).

Results

The EPF courses' observed headcounts and rates of success are displayed in Table 1. Additionally, Table 1 shows the logistic regression odds ratios and changes in predicted probability of success by course. Please note that the differences between the observed and predicted values are based on the predicted associations controlling for other factors that are associated with course level success. The observed values do not control for other factors. The overall course average results are taken across the 32 course specific analyses (course level model statistics are available by request). The following are some highlights from Table 1:

- Overall, about 80% of students in the EPF courses earned an A, B or C compared to about 77% of students in non-EPF courses. After controlling for student demographics and student type, EPF sections are associated with 37% higher odds of course success compared to students in the same course but not in an EPF section. On average, EPF participation increases a student's predicted probability of success in a course by 2.8 PP.
- Although not shown in Table 1, the results for EPF's association with student course-level success are nearly identical when the data is limited to students that are either a Pell grant recipient, first generation, or a student of color. Additionally, it appears that EPF's association with student course-level success is also similar for first-time students.
- About 44% (14 of the 32) of the EPF courses had a statistically significant positive association with student success in the course. These courses are highlighted green in Table 1. CHEM 111 and LIFE 102 are all courses where EPF has the strongest associations (predicted probabilities of success that are 7 to 11 PP higher for EPF compared to non-EPF sections) with success.
- About 41% (13 of the 32) of the EPF courses were statistically similar in student success rates regardless of EPF participation. However, 9 of the 13 were trending towards a positive association.
- About 16% (5 of the 32) of the EPF courses had a statistically significant negative association with student success in the course. These courses are highlighted gold in Table 1. EPF participation in four math courses (101, 130, 141 and 180) all had strong negative associations (predicted probabilities of success that are 4 to 12 PP lower for EPF compared to non-EPF) with course success.
- The wide variation in EPF results by course indicates that section instructors might be utilizing the program differently.



Table 1.

Course Success Rates ¹ by EPF Status							
Course	Comparison Type ³	EPF Student Count	Non-EPF Student Count	Observed Values		Predicted Values ²	
				EPF Successful Rate	Non-EPF Successful	EPF Odds Ratio ⁴	EPF's Predicted PP Difference
BZ 111	Across Terms	369	186	69.6%	72.0%	0.87	-2.76
BZ 120	Across Terms	231	233	79.7%	84.5%	0.75	-4.01
CHEM104	Across Terms	1,227	929	93.0%	91.1%	1.39	2.35
CHEM107	Within Terms	1,467	633	76.8%	67.6%	1.54*	8.56
CHEM108	Across Terms	1,487	488	92.1%	89.8%	1.66*	4.07
CHEM111	Across Terms	7,975	3,696	70.3%	64.3%	1.44*	7.88
CHEM112	Across Terms	7,612	2,303	88.1%	83.4%	1.56*	5.07
CHEM113	Within Terms	1,298	1,111	66.6%	71.6%	0.80	-4.86
CHEM114	Across Terms	2,793	953	91.7%	89.6%	1.31	2.23
CO 130	Within Terms	159	182	95.6%	88.5%	2.84	6.24
CO 150	Within Terms	2,177	8,630	92.9%	92.0%	1.14	0.83
CS 160	Across Terms	1,274	635	74.1%	62.7%	1.87*	13.30
FSHN150	Across Terms	453	441	83.7%	79.1%	1.34	4.40
GEOL120	Across Terms	580	529	94.8%	89.8%	2.16*	4.83
HIST100	Within Terms	701	352	87.2%	82.7%	1.43	4.32
HIST101	Within Terms	1,050	1,084	89.5%	84.8%	1.58*	4.91
HIST150	Within Terms	481	1,526	81.5%	83.2%	0.90	-1.57
HIST151	Within Terms	888	3,246	79.7%	85.5%	0.66*	-5.73
HIST170	Within Terms	846	456	84.9%	78.9%	1.55*	6.33
HIST171	Within Terms	1,300	1,568	87.9%	82.0%	1.58*	5.59
LIFE102	Across Terms	10,978	2,842	78.2%	72.2%	1.44*	6.76
LIFE103	Across Terms	680	671	70.6%	66.6%	1.23	4.27
MATH101	Across Terms	425	442	82.4%	91.9%	0.42*	-9.22
MATH130	Across Terms	1,757	1,328	71.9%	79.7%	0.65*	-7.81
MATH141	Across Terms	2,732	2,126	73.6%	77.8%	0.80*	-3.99
MATH155	Across Terms	1,824	1,628	64.9%	63.4%	1.07	1.61
MATH160	Within Terms	2,656	828	63.1%	61.8%	1.12	2.64
MATH161	Across Terms	2,713	1,035	71.0%	53.7%	2.09*	16.77
MATH180	Across Terms	133	53	45.9%	60.4%	0.60*	-12.50
PH 141	Across Terms	351	333	75.8%	64.9%	1.74*	11.24
POLS101	Within Terms	261	84	88.5%	76.2%	2.60*	13.08
PSY 100	Across Terms	11,304	6,028	89.6%	85.4%	1.57*	4.54
Course Average				79.8%	77.4%	1.37	2.81

¹ Course Success rate is the percent of students at end of term that earned an A, B, or C grade among all students that received a letter grade or W drop/Incomplete.

² Predicted values are based on a course's logistic regression model that has EPF status as the primary independent variable and course success as the dependent variable controlling for student type, gender, first-generation status, Pell grant recipient status, and minority status. The predicted probabilities assume the average level of all the control variables.

³ Comparison type indicates how the EPF control group is collected: Within terms (not all course sections are in EPF) and Across Terms (EPF control group is collected in non-EPF terms). The terms for analysis can be found in the Appendix.

⁴ The asterisk indicates statistical significance (the odds ratio's p-value is less than .01) and positive significant results are highlighted light green and negative significant relationships are highlighted gold.



Conclusions

Considering CSU's ambitious goals for increasing completion rates and eliminating gaps it is important to continually assess our efforts towards these goals. The EPF program has grown considerably over the last nine fall semesters because of CSU's institutional efforts to increase student success, resulting in nearly 80% of the FA16 FTFT cohort having at least one course that participated in EPF during the critical early weeks of the semester.

Overall, EPF participation is associated with higher levels of course success and prior research from IRP&E shows a strong negative association with failing a course during a student's first fall semester and their likelihood for graduation. Therefore, EPF's association with course level success could be associated with higher graduation rates if students' unsuccessful course attempts during their first fall semester decreases. It is also important to note that the association between EPF and course success for students that have a gap attribute (FG, Pell or SOC) is nearly identical to the overall results. Additionally, the association between EPF participation and students' course-level success is also similar for first-time students. These results indicate that EPF courses are good for all students, regardless of their demographics or class-level, and can serve as an institutional initiative to reduce gaps and increase first-time students' course-level success.

Further discussion about possible expansion of the program and the variation of some of the EPF course outcomes is recommended. Even though the majority of first year students are enrolled in at least one course that participates in EPF, there are still a large number of new students that have no EPF courses in their first semester. Additionally, the variation of math is noteworthy since four math courses have some of the strongest negative associations between EPF and student course success; however, MATH 161 has one of the strongest positive associations between EPF participation and success. Acknowledging that there are various factors involved in class instruction and student performance, these results suggest that the EPF program has the potential to have substantial impacts on persistence and graduation rates.

Appendix

Table A.1

Terms included in EPF vs Non-EPF Course Comparisons

Course	FA07	FA08	FA09	FA10	FA11	FA12	FA13	FA14	FA15	FA16
BZ 111								Non-EPF Control Term	EPF All Sections	EPF All Sections
BZ 120									Non-EPF Control Term	EPF All Sections
CHEM104	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
CHEM107					Within Term	Within Term	Within Term	Within Term	Within Term	Within Term
CHEM108	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections			EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
CHEM111	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
CHEM112	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
CHEM113							Within Term	Within Term	Within Term	Within Term
CHEM114	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
CO 130									Within Term	Within Term
CO 150						Within Term	Within Term	Within Term	Within Term	Within Term
CS 160	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	
FSHN150									Non-EPF Control Term	EPF All Sections
GEOL120									Non-EPF Control Term	EPF All Sections
HIST100			Within Term	Within Term	Within Term				Within Term	Within Term
HIST101			Within Term	Within Term	Within Term	Within Term				Within Term
HIST150			Within Term		Within Term	Within Term		Within Term		Within Term
HIST151			Within Term	Within Term	Within Term				Within Term	Within Term
HIST170				Within Term	Within Term			Within Term	Within Term	Within Term
HIST171			Within Term	Within Term	Within Term	Within Term		Within Term	Within Term	Within Term
LIFE102	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
LIFE103					Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections
MATH101									Non-EPF Control Term	EPF All Sections
MATH130	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections			
MATH141			Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
MATH155	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
MATH160			Within Term	Within Term	Within Term	Within Term	Within Term	Within Term	Within Term	Within Term
MATH161	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections
MATH180			Non-EPF Control Term	EPF All Sections		EPF All Sections	EPF All Sections	Non-EPF Control Term		
PH 141								Non-EPF Control Term	EPF All Sections	
POLS101										Within Term
PSY 100	Non-EPF Control Term	Non-EPF Control Term	Non-EPF Control Term	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections	EPF All Sections

Non-EPF Control Term (Orange): Indicates that all sections of the course participated in EPF so these are the non-EPF control terms

EPF All Sections (Gold): Indicates that all sections of the course participated in EPF and these terms are the terms included in the analysis

Within Term (Pale Green): Some sections of courses participated in EPF and some did not so comparison group is pulled from the EPF terms