WRIGHT STATE UNIVERSITY

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To: Susan Edwards, President

From: Douglas W. Leaman, Interim Provost

Date: February 09, 2021

Re: Executive Summary of Report and Recommendation Concerning Faculty Retrenchment

Our collective bargaining agreement (CBA) with the full-time faculty includes a process for the elimination of full-time faculty positions: "Retrenchment." The faculty (through their union) and the University agreed that retrenchment is appropriate when there has been a significant reduction in enrollment that has continued for at least four semesters and is expected to persist. The University's enrollment has declined steeply over the past several years—from approximately 17,000 to 12,000. Our data suggest that enrolment is likely to continue falling through at least 2023, when it will be in the vicinity of 9,000 (excluding medical students). During that same period of time, the number of bargaining unit faculty has not declined as significantly. Thus, the size of our academic workforce today is in excess of that which is warranted by our current and expected enrollment. Natural attrition, selectively hiring replacements for retired or resigned faculty, retirement incentives, and other University initiatives have not alleviated the need for retrenchment. As a result, I recommended in November 2020 that the University consider initiating the retrenchment process.

I have carefully studied the available data so that I could make informed recommendations concerning the number of positions that must be eliminated through retrenchment to (a) bring the size of our faculty in line with the size of our student body, and (b) ensure that the University can continue to meet student and community demand in the most critical academic disciplines.

A detailed report of my investigation, including underlying data and explanations of methodology, accompanies this executive summary.

Introduction

Over the past ten semesters, our enrollment has declined substantially, from a high of approximately 17,000 in 2017, to approximately 12,000 as of this past term. First-year student enrollment has declined even more significantly, by over 50% since 2015. Because gains and losses in first-year enrollment ripple through our enrollment figures for years, the recent declines in first-year enrollment make it virtually certain that our overall enrollment will continue to decline through at least 2023. At that point, multiple forecast models indicate that enrollment will be approximately 8,000 to 10,000. Peer institutions with enrollment in that range employ circa 375 faculty; Wright State currently employs 489. Simply put: the size of our academic workforce is greater than what is necessary (or even customary, among our peers) based on our current and expected enrollment. The University must adapt.

Retrenchment is not our first or preferred tool for addressing this significant and continuing reduction in enrollment. But other tools have not been sufficient. For years, the University has attempted to rely on natural attrition, and selective re-hiring when faculty resigned or retired. We attempted to accelerate and amplify the effectiveness of attrition by offering retirement incentives, but

those voluntary efforts fell short. As a result, the University must now act through the retrenchment provisions of the CBA.

Data

My analyses relied on the data in the accompanying report. The data indicate that enrollment at the University has declined from near 17,000 in 2017 to near 12,000 at present. First-year enrollment has declined by more than 50% since 2015, which assures with a very high level of confidence that our significant reductions in enrollment will continue until at least 2023. This is true even if the University experiences success in improving recruitment and retention.

My assessment of the data follows the expected 2023 enrollment of 8,975 (without BSOM, or 9,500 including it).

Analysis

Various methodologies were used to determine the instructional needs of each college through Fall Term 2023, based on an enrollment of approximately 9,000. Those figures were compared to current workforce sizes to determine where the University has excess faculty. The exact methodologies are detailed in the accompanying report.

In conducting these analyses, I accounted for the need for enrollment growth in the College of Nursing and Health, and in the College of Engineering and Computer Science (particularly in the Computer Science Department), based on the probability of high employer demand and student interest in those fields. Because faculty reductions in those programs would likely impact recruitment and retention, I made allowance for fewer reductions to the faculty in those departments.

The analyses under each method produced similar, but not identical, recommendations. I adopted an aggregate of those recommendations.

Recommendations

Based upon our significant and continuing reductions in enrollment, and accounting for the instructional needs of the University at those levels of enrollment, I recommend that the University move forward with retrenchment. After accounting for our current faculty workforce size, I recommend the retrenchment of 113 faculty positions, as follows:

College of Education and Human Services:	12
College of Engineering and Computer Sciences:	12
College of Liberal Arts:	49
College of Nursing and Health:	0
College of Science and Mathematics:	26
Raj Soin College of Business:	14
Total	113

Additional Considerations

I am hopeful that the University's recruitment and retention initiatives will be wildly successful. If that is the case, or other currently unforeseeable events transpire that significantly alter the trajectory of our enrollment or alter the current faculty numbers, the University may find that it is necessary to remove faculty from the retrenchment list who are still in their notice periods, or "call back" faculty members whose positions have been eliminated. Because the collective bargaining agreement guarantees retrenched faculty as much as eighteen months of paid notice before the elimination of their positions, we will have a significant opportunity to continue studying the need for, and effects of, retrenchment into 2023.

Provost Recommendation to the President
February 9, 2021

Wright State University invoked Articles T17 and N17 of the current collective bargaining agreement as a result of significant reductions in enrollment that have continued over an extended period of time and are expected to persist. This action is otherwise known as retrenchment.

This report provides information and analyses identifying and supporting the recommended number of faculty reductions necessary to align teaching capacity with these enrollment declines, while maintaining critical programmatic offerings. Enrollment data demonstrate significant declines going forward, with the enclosed analyses predicting a student body of approximately 9,400 (8,700 exclusive of the Boonshoft School of Medicine [BSOM] and School of Professional Psychology [SOPP]) by Fall semester, 2023.

Multiple analyses incorporating a variety of assumptions converge upon similar enrollment figures and similar estimates of the number of faculty needed to meet the operational needs of the University. The already-existing significant reduction in enrollment clearly will persist not only over the next few academic years, but also likely beyond that period. As such, we must reset the institutional base and focus on growth strategies within a tighter educational framework in order to reposition and stabilize Wright State University's role as a uniquely critical resource within the Greater Miami Valley region.

Background and Approaches

On November 12, 2020, the University announced the anticipated need for faculty retrenchment under the CBA. While retrenchment can be invoked following "just" four semesters (two years) of significant reduction in enrollment, our notice followed a sustained reduction experienced over the past *10* semesters (5 years). Enrollments, projected through Fall 2023, demonstrate a persistent decline.

The supporting data attached to our November 12 notice is attached again here as Appendix A. It utilizes four distinct projection methods that *all* indicated a continued decline in enrollment and predicted an overall student population of between 7,700 and 10,000 students by Fall 2023. By comparison, there were roughly 17,000 students as recently as Fall 2017, and just over 12,000 students in Fall 2020 (BSOM and SOPP included).

The University has attempted to alleviate the need for retrenchment in a variety of ways over the last several years. This included restricting replacement hiring to allow normal attrition to take effect, and by offering two voluntary retirement incentive plans. These efforts provided limited relief, but they have not kept pace with our significant reductions in enrollments.

While overall student enrollment decline is of significant concern, an even more critical concern is the *rapid decline in first year undergraduate student populations*. As shown in Figure 1 of Appendix B, first-year student enrollment (defined as having earned 0-30 credit hours) has declined by 53% since Fall 2015, as compared to 33% for undergraduates at all levels. This clear disruption in the "supply pipeline" cannot reasonably be assumed to be temporary, as it will have profound impact on the University's ability to reverse this downward trend in overall enrollment as students in their final years progress toward graduation and fewer incoming students replace them. Indeed, without a dramatic recovery in the first-year student enrollment numbers, continued declines beyond Fall 2023 will present a challenge

to stabilizing the institution's student population. Thus, the recommendations contained within this report must be enacted while *also* finding ways to increase recruitment and boost retention efforts to stem the declines. Failing to do so might require additional faculty retrenchment. That projections have been made only through Fall 2023 should not be misinterpreted as a signal that enrollment is expected to increase beyond that.

We are following the processes outlined in Articles T17 and N17 of the CBA in order to reposition Wright State University to serve a significantly smaller overall student population. Peer institutions in the projected 8,000 to 10,000 student population range generally have, on average, a smaller full-time faculty population of approximately 375, as compared to Wright State's current bargaining unit faculty member (BUFM) population of 489 and overall full-time faculty population of 626 (Fig. 2, Appendix B).

This report carefully contemplated a variety of approaches to determining an appropriate number of full-time BUFM that would effectively accommodate our smaller overall enrollment. For some time, it has been discussed publicly that Wright State University was likely headed toward becoming an institution with a student body of approximately 10,000 students. However, based upon the attached data and analyses, that number may be aspirational, with projections placing the future size of Wright State slightly below this value. The analyses contained herein consider the slightly smaller projected university population, effective Fall 2023, as outlined below.

College Level Declines

The original retrenchment letter utilized University-level enrollment projections (Appendix A), highlighting a student body that would average approximately 8,976 by Fall 2023, excluding MD students enrolled in BSOM (roughly 9,500 if they are included). To extend these estimates to the individual college level, several distinct strategies were undertaken, each described in more detail in the attached appendices. When those new studies were combined with the data in Table 4 from Appendix A – in this case adjusted to remove SOPP and other BSOM students beyond MD students – the analyses conducted previously clearly align well with the newer, college-level projections (Table 1, Appendix C). Indeed, these three additional studies all reached a conclusion similar to the work presented in the November 12 notice Appendix, projecting a slightly revised overall Fall 2023 enrollment of 9,376, including BSOM and SOPP students, or 8,676 students exclusive of BSOM and SOPP (Table 1, Appendix C). These values have been rounded to 9,400 and 8,700, respectively, for simplicity and ease of discussion, and represent the basis for estimates of instructional need as we approach Fall 2023.

Scope of the Retrenchment Process

As described above and in the original retrenchment notice, my projected student population for 2023 is significantly lower than the current student body (which in turn is significantly lower than past years). Although some faculty attrition has occurred naturally, and the University has endeavored to incentivize further voluntary faculty departures, the data presented below demonstrate that the University is not only overstaffed currently, but is on track to experience even greater faculty surplus in the future. The analyses focused on determining the instructional need for current and future student populations in order to align our workforce with this projected instructional demand. Note that most of the analyses conducted herein (with the exception of Method I) did not presuppose any particular numbers, but

simply provided projection assessments that aligned well with the estimates for Fall 2023 that were discussed in the previous section.

The types of analyses and calculations conducted are described briefly below, and in more detail in the executive summaries included in the attached documentation. Because of the critical role that Wright State plays in supplying the workforce needs of Dayton and the Greater Miami Valley regions in key critical areas, my recommendations emphasize the need to retain capacity in those areas that are high priorities, particularly in the College of Nursing and Health (CoNH), to ensure that we preserve sufficient capacity to support these potential growth areas. By example, a strategic decision was made to step around faculty reductions in CoNH at this time so the program can meet the increased regional demands for nurses imposed by the COVID pandemic. Similarly, while the College of Engineering and Computer Sciences (CECS) is subject to the retrenchment process, some adjustments to the recommended numbers were incorporated in order to preserve capacity for growth – particularly in Computer Science. As discussed in the original November 12 letter, Lake Campus will not participate in the retrenchment process, logically, because its enrollment has not declined significantly. Finally, note that predictive analyses document the need in some areas for retrenchment numbers that are larger than deemed feasible for some colleges, and so in those cases I have made the strategic recommendation to adjust those estimates downward to ensure continued functionality.

Analyses Performed

Four distinct methods were used to address the projected size of Wright State University enrollment in Fall semester, 2023, and to estimate how many faculty would be required to provide instruction to that student population. Each of the methods focuses on overlapping issues, including teaching capacity, student headcount and student credit hour needs. All used college-level analyses to ensure that the results were focused to the unit under consideration and not extrapolated from university-wide projections. A variety of strategies, foci and assumptions apply to any projection method, and my judgement was that inclusion of all four was better than using any one strategy to the exclusion of the others. Indeed, for many colleges, individual strategies had the potential to over- or under-estimate the needs relative to alternate approaches, but use of multiple strategies tempered the effects of any one approach, and thus all were involved in formulating a recommendation.

I. Instructional need calculated on a student FTE basis – Appendix D

The first strategy calculated the instructional capacity needed to meet the demands of each college to instruct the number of full-time equivalent (FTE) students in each program. These analyses were performed on Fall 2020 data using student FTE numbers in each department/program, the number of full-time faculty, the number of adjunct and other non-full-time instructors, and the relative ratios of students taught by each category. The teaching capacity of BUFM faculty was determined based on the current workload MOU, and is pro-rated for the relative numbers of TET and NTE in each program. It is critical to note that this method then assigned instructional need to BUFM first, and utilized “adjuncts” only if BUFM capacity was projected to be exceeded. Only at that time were remaining teaching capacity needs allocated to non-full-time faculty (globally called “adjuncts” for simplicity in this analysis).

Assessment of the Fall 2020 data revealed that excess teaching capacity already existed given the numbers of student FTEs – with a projected excess of 87 BUFM (including Lake campus and CoNH). When the number of students was proportionately decreased from existing levels (12,440) to the projected 9,400 student population (a ~25% decline relative to Fall 2020), the number of faculty needed declined concomitantly, reaching a predicted excess of 137 BUFM relative to Fall 2020 staffing levels. It is critical to note again that this methodology eliminated adjuncts before reducing full time BUFMs and that the raw, 137 value includes Lake and CoNH faculty.

This analytical strategy distributed the projected cuts by program, however we are limiting the recommendation to college-level reductions only thus allowing those values to serve as a guide for the relevant academic unit heads (deans, chairs) to make appropriate reductions as operationally needed. As mentioned, Nursing and Lake Campus are excluded from the retrenchment process, and so those values were zeroed out in the summary data (Appendix H) and do not contribute to the 121 value.

II. Student Headcount and Credit Hours aligned with enrollment trends – Appendix E

An assessment of the number of faculty needed, by college, for the projected student population in Fall 2023 was performed using the average 2014-2020 college-specific student headcount to BUFM (SHC:BUFM) and faculty-delivered student full-time equivalents to BUFM (SFTE:BUFM) ratios. The predictions in this study indicated a student enrollment (exclusive of BSOM and SOPP) of approximately 8,500 by Fall 2023. The projected college-specific declines in SHC and SFTE were aligned, equally, with each college's 2014-2020 average SHC:BUFM and SFTE:BUFM ratio to estimate the number of BUFM required to meet needs of a smaller student body. A recommendation based on an equal impact of SHC and SFTE projections was used since both values are critical for most colleges. Further, such a combination does not preferentially identify colleges that perform significant service teaching. The study utilized an assumption that the percentage drop in SHC and SFTE over the next three years will mirror the annual percentage SHC and SFTE drop experienced by each college, averaged over the three-year decline from Fall 2017 - Fall 2020 (to dampen the effects of any single year).

This approach identified a projected estimate of 123 excess faculty for Fall 2023 relative to Fall 2020 numbers, including CoNH (120 exclusive of CoNH). Note that in this and the subsequent analyses, the College of Science and Mathematics faculty numbers have not been adjusted for Matrix department faculty that teach fractionally in BSOM. That adjustment will occur at the end.

III. Instructional demand and faculty coverage – Appendix F

Using historical ratios of credit hours to fall enrollment, and fall-spring-summer enrollment regressions performed on each of the six Dayton Campus colleges, the number of students, then credit hours, then implied faculty were calculated. Three additional variables were assumed to remain constant: (1) the ratio of NTEs to TETs, which has remained steady at 3:7; (2) the number of adjuncts, which for this modeling was simply implied in the productivity (credit hours/BUFM) numbers used, making no assumptions about future adjunct usage nor specifying the ratio of adjuncts to BUFM; and (3) the ratio of full to part-time students, which is presumed to remain the same throughout. Each college's numbers for these ratios are assumed invariant and historical. The productivity in 2017 was the highest between 2014 and 2020, and is assumed to be achievable moving forward. Students classified as not being in one of the six colleges were dispersed across those colleges proportionately to the existing college numbers.

This strategy was slightly more conservative in terms of numbers of students predicted in Fall 2023 (~9,700 excluding BSOM and SOPP students) as compared to the other college-level estimates, but yielded faculty number estimates that were similar as other methodologies, highlighting, in this case, an excess of 127 faculty (Appendix F).

IV. Student HC declines correlated to faculty needs – Appendix G

Several of the above models correlated headcount and/or student credit hour declines with the required need to reduce faculty headcount. Here, we performed college-level enrollment projections utilizing the Markov analysis described in the Gandy *et al.* 2019 paper highlighted in the original University-level predictions associated with the retrenchment notification of November 12, 2020 (Appendix A). Because this approach can lead to some students being undercounted (as highlighted in the associated executive summary, Appendix G hereto), the predicted versus actual enrollment data for Fall 2020 were used to develop a correction factor to modify the 2021-2023 predictions, in some cases correcting the numbers upward from those reported in Tables 1-14 of the executive summary (included as Table 15 and Table 16, Appendix G). By looking at enrollment predictions for each college for Fall 2023 and overlaying those declines on a percentile basis with current faculty numbers, an estimate for a relative number of faculty needed for Fall 2023, when this strategy suggests we will hit 7,640 students (excluding BSOM and SOPP). By using a simple ratio transformation to account for the decline in students, it is estimated the number of faculty reductions needed by Fall 2023 is 155 (143 excluding CoNH; Table 17).

Recommendation

The dramatic reduction in first-year student enrollment discussed in the background section of this report guarantees overall enrollments will decline beyond current levels for the foreseeable future and, without significant intervention, will likely reach the 9,400 (8,700) student headcount projections by Fall 2023. In order to meet the instructional requirements for this smaller student population, each of the various methods described above was aggregated to formulate a recommendation. These analyses, collectively, indicate that Wright State University could reduce its number of BUFMs by between 115-139 faculty members relative to current staffing levels, as summarized in Table 1 of Appendix H. Although the different projection strategies produced slightly different final tallies, they were substantially consistent across each college and led to the specific recommended reductions in headcount as follows:

Fall 2023 - 8,700 students (9,400 including BSOM and SOPP)

College of Education and Human Services	12
College of Engineering and Computer Sciences	12
College of Liberal Arts	49
College of Nursing and Health	0
College of Science and Mathematics	26
Raj Soin College of Business	14
Total	**113**

These numbers are NOT a straight mathematical average of the values obtained from the different analytical methods in all cases, but take into consideration the strategic assessment of college needs to ensure sustainability, particularly in CECS and CoNH as discussed earlier. For CoSM, the adjustment specifically targets the percentile of effort that Matrix faculty contribute to BSOM instruction, which was not captured in the enclosed analyses. Note that whereas changes in anticipated reduction numbers were implemented in many units, no strategic increases in faculty reductions were employed for any college beyond the predictions reached through the employed methodologies.

The number of faculty positions impacted by the retrenchment process is significant. Fortunately, several tools remain available to the University in the event enrollment trends are positively impacted over the next several years. The first is the salary and benefits continuation period contained within the retrenchment process itself (*see, e.g.*, Articles T17.6.10, T17.7, and T17.8). Simply put, specific faculty positions identified as a result of the retrenchment can be recalled over the next 18 months should college level enrollments dictate.

While these analyses were in progress, moreover, a separate "Joint Committee on Retrenchment," mandated by the CBA, has been meeting regularly, with one of its responsibilities being to identify potential ways in which to offset the need for retrenching this full cohort of faculty. That committee, with equal representatives from both the AAUP-WSU and the University, was tasked with fulfilling that responsibility by identifying other ways to reduce the faculty workforce to meet instructional demands. It is my fervent hope that the contribution from the retrenchment committee will provide avenues to mitigate the need to retrench the full numbers of faculty presented in this recommendation.

Beyond that, the University has a variety of critical efforts that already are or will soon be underway to work to reverse the dramatic enrollment reductions that this institution has faced, focusing with renewed vigor on student recruitment and retention. If these efforts succeed in the short term, it is possible that a number of retrenched faculty might be recalled prior to the end of the up-to-18-month notice period. Recruiting and retention efforts have been ongoing for many years, however, and we must operate realistically now based on the information currently before us – not on the basis of hopes for stable or growing enrollment. To date, there is no evidence that enrollment declines have subsided, and even once they do, the imbalance in the first- versus fourth-year student populations demonstrates that stabilization and potential growth will continue to lag. Finding more collaborative approaches to right-sizing the faculty populations is imperative, and nothing is more important to an institution that serves an at-need student body like Wright State's than improved retention leading to enhanced student success.

Appendix A - Wright State University
Headcount Enrollment Forecasts for Fiscal Years 2022, 2023, and 2024
Executive Summary

A series of analyses were conducted by representatives from the Office of Institutional Research and Effectiveness and the Statistical Consulting Center in the Fall of 2020 to forecast student headcount enrollments for Wright State University for fiscal years 2022 (Fall 2021), 2023 (Fall 2022), and 2024 (Fall 2023). A total of three analyses were conducted using different methodologies (models). For each analyses, the sample of students included tuition-generating, census date student headcount enrollments. Professional medical (MD) student headcount enrollments were excluded from all three analyses.

Model 1

Trend analyses of fall semester student headcount enrollments from 2013 to 2020 were conducted with a focus on entering student cohort fall-to-fall headcount enrollment patterns to forecast headcount enrollments for Fall 2021, Fall 2022, and Fall 2023. Entering student cohorts were defined in accordance with The Wright Guarantee Tuition Program. Total fall headcounts were derived by estimating entering cohort headcounts (i.e., a Wright Guarantee cohort) and continuing cohort headcounts (i.e., returning students by prior year Wright Guarantee cohort) for three categories of students: College Credit Plus students, undergraduate students, and graduate/professional students.

Two analyses were conducted: Models 1A and 1B. For both models, continuing cohort headcounts were calculated based upon average trends in year-to-year cohort headcount enrollment changes (e.g. from year one to year two, year two to year three, etc.) over a seven-year period. Forecasted entering cohort headcounts for Models 1A and 1B were derived differently. For Model 1A, entering cohort headcounts were derived based upon the highest gain in fall-to-fall enrollments of entering cohort headcounts over the past seven years; whereas, for Model 1B, entering cohort headcounts were derived based upon the lowest gain in fall-to-fall enrollments of entering cohort headcounts over the past seven years. Table 1 displays a summary of actual and forecasted headcount enrollments by student category.

Table 1

Model 1 Actual and Forecasted Fall Student Headcount Enrollments by Student Category

Student category	Model	Fall 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
CCP	Actual	407	354	504	804	934	876	895	798			
	1A									808	892	995
	1B									644	529	436
UG	Actual	13,127	13,049	13,067	12,717	12,267	11,153	9,768	8,768			
	1A									7,876	7,155	6.553
	1B									7,696	6,697	5,781
GR	Actual	3,433	3,666	3,874	3,700	3,351	2,961	2,501	2,145			
	1A									1,938	1,795	1,680
	1B									1,875	1,632	1,413

(continued)

Table 1 (continued)

Student category	Model	Fall 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	Actual	16,967	17,069	17,445	17,221	16,552	14,990	13,164	11,711			
	1A									10.622	9,842	9.228
	1B									10,215	8,858	7,630

Note. CCP = College Credit Plus students. UG = undergraduate students. GR = graduate/professional students. Actual = actual enrollments. 1A = Model 1A. 1B = Model 1B.

Figure 1 displays the total actual and forecasted headcount enrollments from Model 1 trend analyses.

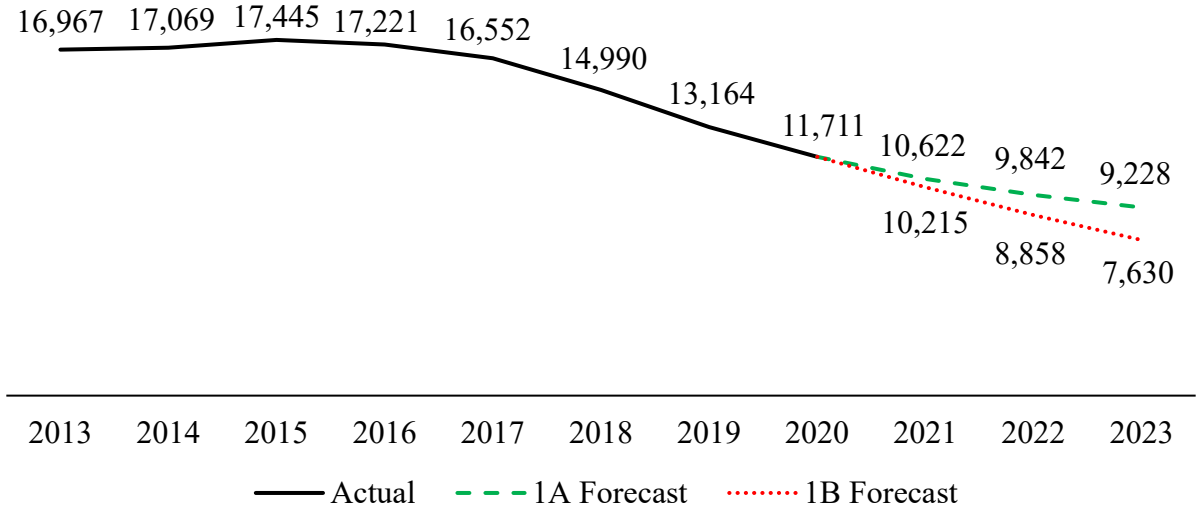

Figure 1. Model 1 actual and forecasted total fall student headcount enrollments.

Model 2

The second set of analyses examined enrollment trends of student headcount enrollments for summer, fall, and spring semesters from calendar years 2016 to 2020. Enrollment patterns of four groups of students (new, transfer, readmitted, and continuing) were evaluated by campus (i.e., students enrolled exclusively at the Dayton campus, students enrolled exclusively at the Lake campus, and students enrolled at both the Dayton and Lake campuses) and by six student categories: College Credit Plus students, domestic undergraduate students, international undergraduate students, domestic graduate students, international graduate students, and School of Professional Psychology students. The most recent trend in headcount enrollment patterns from spring to summer, fall to fall, and fall to spring, were used to forecast headcount enrollments for summer, fall, and spring semesters, respectively, for fiscal years 2022, 2023, and 2024. Table 2 displays the actual and forecasted headcounts for fall semesters by student category.

Table 2

Model 2 Actual and Forecasted Fall Student Headcount Enrollments by Student Category

Student category	Fall							
	Actual enrollments					Forecasted enrollments		
	2016	2017	2018	2019	2020	2021	2022	2023
CCP	804	934	876	895	798	763	780	843
UG Dom	12,233	11,892	10,854	9,548	8,605	7,864	7,408	7,458
UG Intl	484	375	299	220	163	118	88	66
GR Dom	2,601	2,534	2,364	2,003	1,749	1,533	1,351	1,195
GR Intl	968	682	469	384	286	223	180	148
SOPP	131	135	128	114	110	106	102	99
Total	17,221	16,552	14,990	13,164	11,711	10,607	9,909	9,809

Note. CCP = College Credit Plus students. UG Dom = domestic undergraduate students. UG Intl = international undergraduate students. GR Dom = domestic graduate students. GR Intl = graduate international students. SOPP = School of Professional Psychology students.

Figure 2 displays the total actual and forecasted headcount enrollments from Model 2 trend analyses.

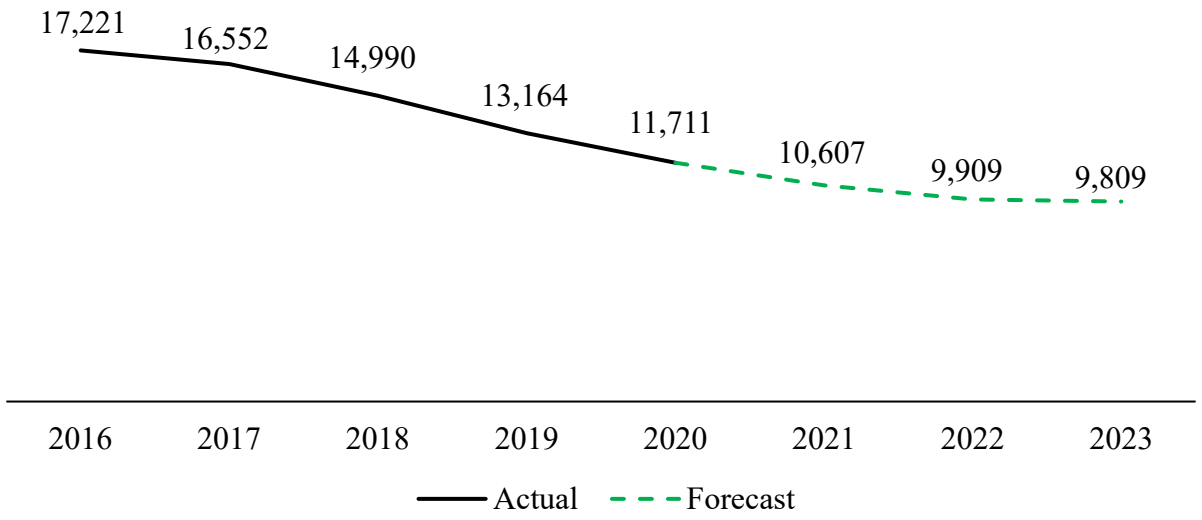

Figure 2. Model 2 actual and forecasted total fall student headcount enrollments.

Model 3

For the third set of analyses, a series of Markov chain models were run to forecast total student headcount enrollments for fall semesters. Markov chains are used to predict probabilities of transitioning from a given state to any number of other states, and have recently been used in higher education to forecast headcount enrollments (Gandy et al., 2019). For the current analyses, the transition states from one fall semester to a subsequent fall semester included nine student credit hour (SCH) bins and an exit state (i.e., failing to enroll the subsequent fall semester either due to attrition or graduation). The fall-to-fall headcount enrollment patterns of

four groups of students were analyzed: College Credit Plus students, undergraduate students, graduate students, and School of Professional Psychology students.

An underlying assumption of the Markov chain process is that it is memoryless, meaning the probabilities of transitioning to any future states are based solely on the baseline transition period. For example, probabilities from a baseline transition period or year (e.g., from Fall 2013 to Fall 2014) are used to forecast future enrollments for three subsequent fall terms (e.g., Fall 2015, Fall 2016, and Fall 2017) without taking into account any past trends. The only factors used to forecast headcount enrollments are (a) the probabilities of transitioning to a future state as derived from the baseline year (e.g., from Fall 2013 to Fall 2014), (b) the number of students in each SCH bin for a given fall semester (e.g., Fall 2013), and (c) the number of incoming students in each transition state in the subsequent fall semester (e.g., Fall 2014).

A total of six models were conducted, each using a different fall-to-fall transition from the past eight years (2013 to 2020). Because each model forecasted headcount enrollments for three subsequent fall semesters, it was possible to compare forecasted headcount enrollments to actual headcount enrolments. Table 3 provides a comparison of the actual total student headcount enrollments and the three-year total forecasted headcounts for each of the six Markov chain models.

Table 3

Model 3 Actual and Forecasted Fall Total Student Headcount Enrollments

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	17,445	17,221	16,552	14,990	13,164	11,711			
13-14	15,984	15,417	15,119						
% Difference	-8.37	-10.48	-8.66						
14-15		16,481	16,052	15,801					
% Difference		-4.30	-3.02	5.41					
15-16			16,291	15,490	15,045				
% Difference			-1.58	3.34	14.29				
16-17				15,724	14,798	14,258			
% Difference				4.90	12.41	21.75			
17-18					14,401	13,067	12,320		
% Difference					9.40	11.58			
18-19						12,486	11,054	10,209	
% Difference						6.62			
19-20							11,086	9,891	9,235

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix A - Wright State University
Headcount Enrollment Forecasts for Fiscal Years 2022, 2023, and 2024
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Figure 3 displays the total actual and forecasted headcount enrollments from the Model 3 Markov chain analyses.

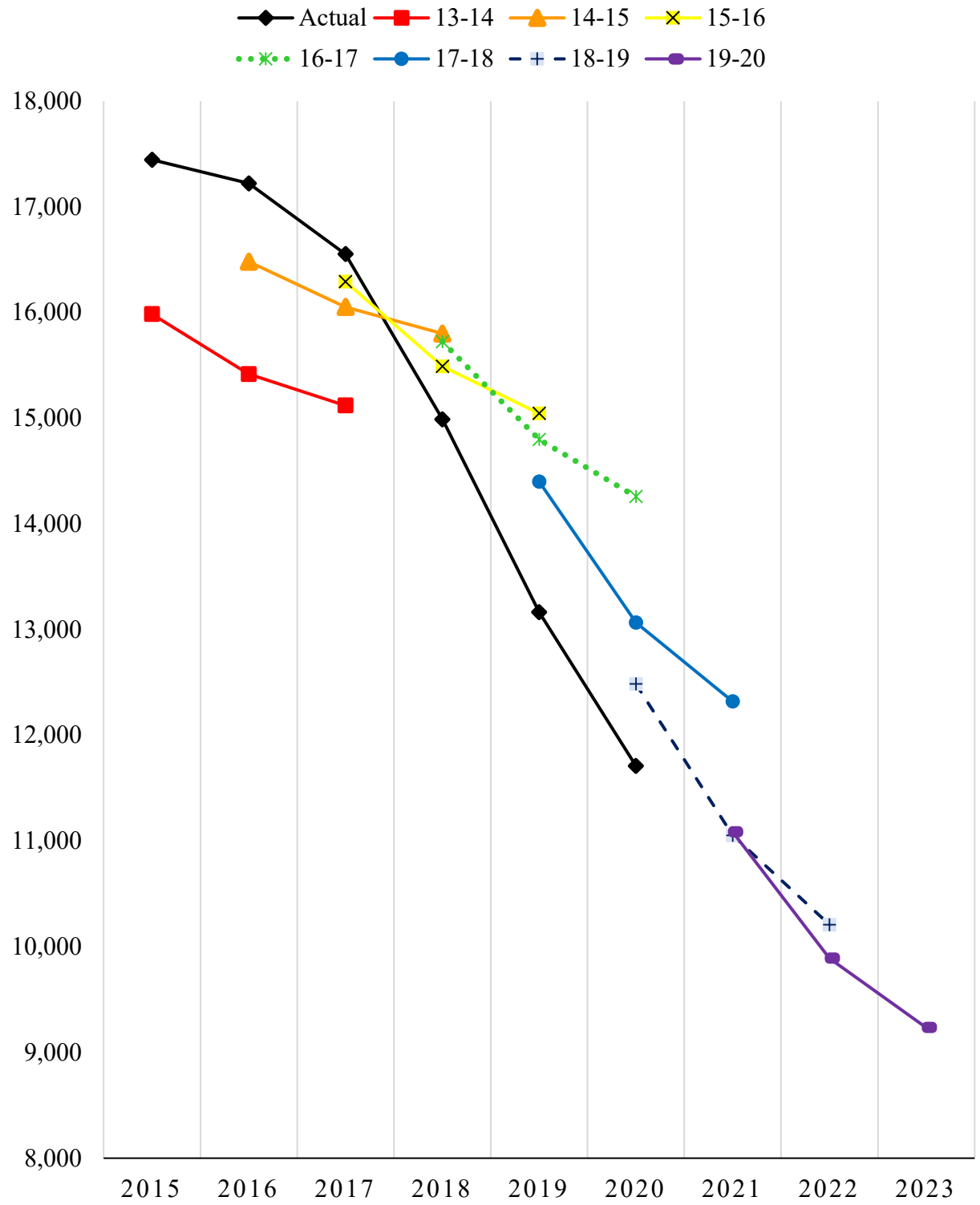

Figure 3. Model 3 actual and forecasted total fall student headcount enrollments.

Appendix A - Wright State University
Headcount Enrollment Forecasts for Fiscal Years 2022, 2023, and 2024
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Summary

Table 4 contains the forecasted total student headcount enrollments for Fall 2021, Fall 2022, and Fall 2023 from each of the three analyses (models).

Table 4

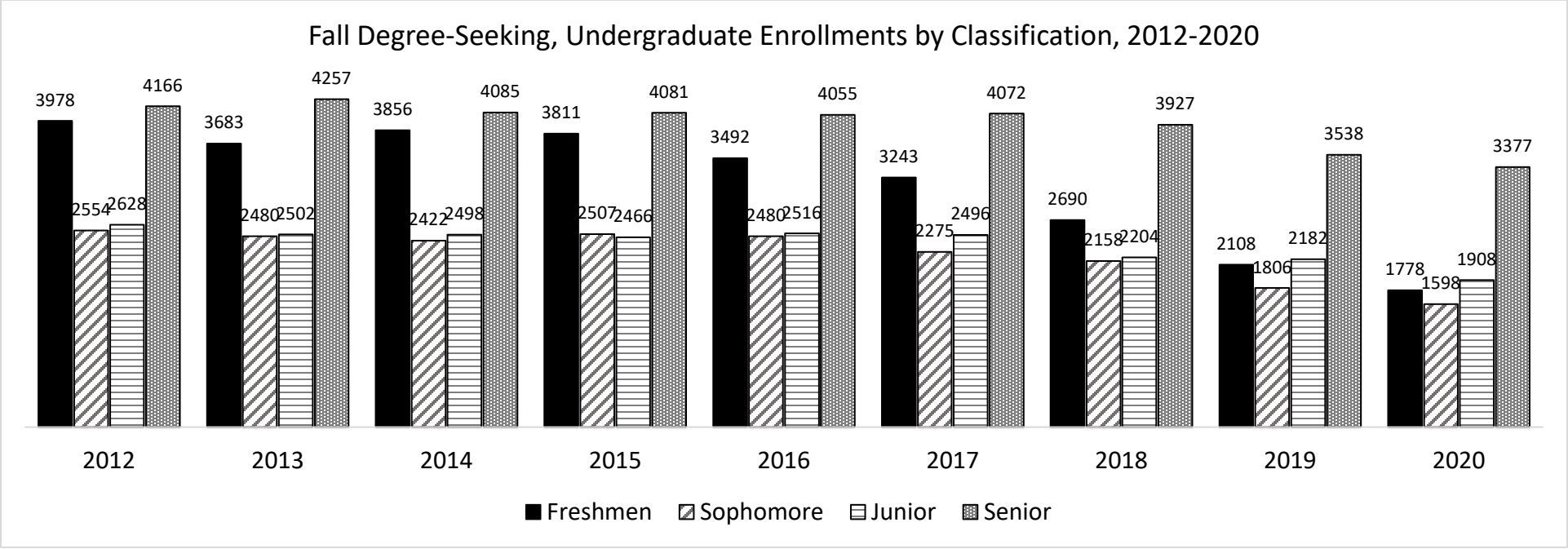
Forecasted Fall Student Headcount Enrollments by Model

	Fall		
Model	2021	2022	2023
Model 1A	10,622	9,842	9,228
Model 1B	10,215	8,858	7,630
Model 2	10,607	9,909	9,809
Model 3 17-18	12,320	-	-
Model 3 18-19	11,054	10,209	-
Model 3 19-20	11,086	9,891	9,235

References

Gandy, R., Crosby, L., Luna, A., Kasper, D., & Kendrick, S. (2019). Enrollment projection using Markov chains: Detecting leaky pipes and the bulge in the boa. *The AIR Professional File,* Fall 2019, 21-38. https://doi.org/10.34315/apf1472019

Appendix B, Figure 1



Fall census date (Day 14) headcounts of degree-seeking undergraduate students by student classification. Freshmen = less than 30 overall credit hours earned; Sophomore = 30 – 59.9 overall credit hours earned; Junior = 60 – 89.9 overall credit hours earned; Senior = 90 or more overall credit hours earned.

Appendix B, Table 1 – Full time faculty numbers at 8,000-10,000 student headcount universities.

School	ST	Enrollment	Faculty
University of Alabama in Huntsville	AL	9988	363
Jacksonville State University	AL	9021	341
University of Arkansas at Little Rock	AR	9581	394
California State University-Stanislaus	CA	10974	355
Colorado Mesa University	CO	9373	304
Southern Connecticut State University	CT	9817	423
The University of Tampa	FL	9628	368
Columbus State University	GA	7877	300
Valdosta State University	GA	11270	416
University of Northern Iowa	IA	10497	419
Western Illinois	IL	7624	447
Purdue Ft Wayne	IN	8000	318
Indiana State University	IN	10830	381
University of Southern Indiana	IN	10705	360
Purdue University Fort Wayne	IN	10208	310
Purdue University Northwest	IN	10006	324
Murray State	KY	9500	444
Morehead State University	KY	9654	311
Murray State University	KY	9556	453
University of New Orleans	LA	8231	284
Northwestern State University	LA	10900	325
Northwestern State University of Louisiana	LA	10900	322
Bridgewater State University	MA	10881	361
Saginaw Valley State University	MI	8265	286
University of Minnesota Duluth	MN	10858	349
Southeast Missouri State University	MO	10637	385
The University of Montana	MT	10487	469
William Paterson University of New Jersey	NJ	10105	391
Stockton University	NJ	9934	352
The New School	NY	10432	427
Farmingdale State College	NY	9996	265
North Eastern State University	OK	7879	289
Bloomsburg University	PA	8700	521
Kutztown	PA	8200	467
Coastal Carolina University	SC	10484	488
University of South Dakota	SD	9920	448
Austin Peay State University	TN	11048	385
Tennessee State University	TN	8081	409
Tennessee Technological University	TN	10140	425
University of Houston Clear Lake	TX	9082	246
Angelo State University	TX	10568	309
West Texas A & M University	TX	9970	337
Texas Southern University	TX	9034	433
Radford University	VA	9798	444
University of Wisconsin-LaCrosse	WI	10580	377
Average		**9760**	**374**

Appendix C – Summary Headcount Projection Data

Table 1 represents an aggregation of the headcount predictions employed throughout the analyses that went into this process. Models 1-3, which were conducted on university-wide data, excluded only MD students in BSOM from the numbers reported in Appendix A. In contrast, the college level studies focused on BUFM colleges only, and thus excluded MD students, as well as graduate students enrolled in BSOM, and professional students enrolled in SOPP. Thus, the latter two groups of students were subtracted from the data provided for Models 1-3 so that they could be compared directly to the outcomes of the college level studies reported herein.

Table 1 – Headcount predictions minus SOPP and BSOM students

	Fall		
Model	2021	2022	2023
University Models			
Model 1A	10,422*	9,642*	9,028*
Model 1B	10,015*	8,658*	7,430*
Model 2	10,407*	9,709*	9,609*
Model 3 (Average)	11,286*	9,691*	9,035*
College-Level Models			
Model II (Appendix E)	10,140	9,161	8,290
Model III (Appendix F)	10,432	10,202	9,700
Model IV (Appendix G)	9,560	8,432	7,644
Overall Average	10,323	9,356	8,676

*Appendix 1, Table 4 values were adjusted to remove SOPP and non-MD BSOM students

Table 2 is for "semantic" clarification purposes only. The top line includes the overall average from Table 1, exclusive of all BSOM and SOPP students, whereas the second line adds those estimated values back in. This allows for conversation around a predicted "all-in" student body at the university.

Table 2 – Projected Overall Headcount Including SOPP and BSOM students.

	Fall		
Population	2021	2022	2023
No SOPP or BSOM	10,323	9,356	8,676
With SOPP and BSOM*	11,023	10,056	9,376

*Factoring in a potential 2% increase in Professional students

Appendix D - Wright State University
Fall 2020, 2023 Faculty Workload Analyses
Executive Summary

In January 2021, the Office of the Provost oversaw a department-level analysis to determine the optimum number of full-time equivalent (FTE) instructional staff based upon (a) student credit hours generated and (b) staffing levels for Fall 2020 semester.

Definition of Terms

Generated SCH – the number of student credit hours (SCH) generated as of the fall census date. Course sections and department relationships were identical to those used in the University's 2019-20 academic program review.

*FTE faculty** – all full-time equivalent TET/NTE faculty.

*FTE adjuncts** – all full-time equivalent adjuncts.

*FTE faculty and adjuncts were divided evenly among employee job records and funding departments as of November 1, 2020.

Assumptions

- Part-time faculty and adjuncts are equivalent to 0.33 FTE.
- All faculty/adjunct positions are solely responsible for teaching/instruction. Full-time workloads for one semester were derived by department based upon the Campus Bargaining Agreement. Table 1 displays the estimated SCH generated per year by one FTE instructional staff with a full-time workload. This value was divided by 15 cr hr to generate the per-semester value per FTE student per faculty member used in the final calculations (Tables 2 and 3).
- Graduate teaching assistants and student employees are not teaching for-credit courses.

Optimum FTE Instructional Staff

Optimum FTE instructional staff were derived based upon (a) the total generated SCH by department and (b) the derived one-semester, full-time faculty workload by department converted to generated SCH per one FTE instructional staff.

Adjustment for Fall 2023 Needs

Table 2 utilized the above analyses for Fall 2020 to assess current staffing need versus current numbers of FTE instructors. To project Fall 2023 needs, student FTE numbers were adjusted down by 25% based on aggregated enrollment projections (Appendix C – Fall 2020 versus Fall 2023), and the analyses from Table 2 repeated on the new numbers. The projected reduction in FTE faculty and adjunct numbers, on a college basis, are reported. Note that unlike the other three methods employed, adjustment for workload distribution to other, non-BUFM duties (ie BSOM instruction) by Matrix faculty in CoSM was factored into this analysis already. This is why the CoSM numbers are lower for this, versus the other methods used throughout this recommendation, and will be considered as such in the final analysis.

Results

The results of the analysis for Fall 2020 are displayed in Table 2. For each department, the optimum FTE instructional staff needed to generate the department's total SCH for one semester were filled first by FTE faculty, and only if need exceeded capacity were "adjuncts" (broadly defined) added to the numbers. As mentioned in the recommendation, department and/or program-level data are aggregated by college to allow the content experts (Deans and Chairs) to appropriately allocate staffing changes. Results suggested that current staffing exceeded need by approximately 87 BUFM (inclusive of all colleges, including Lake campus and without strategic adjustments). In Table 3, the analyses were repeated for the projected declines in students FTE for Fall semester 2023. These analyses identified 137 faculty (again including Lake and CoNH) and additional adjuncts that were in excess of required instructional demand for that smaller student body. Again, department and program level values were rolled into an overall college-level estimate.

Conclusions

These calculations are based on raw projections using current workload assignment numbers and NTE:TET ratios in each college, along with an expected average instructional load for each instructor. The value of these calculations is that they specifically highlight the reductions in adjunct instructors as a first line of reductions, and only then include BUFM. It must be noted that, as with the other methods, the final numbers will be adjusted as necessary. Examples include strategic adjustments for workforce needs (CoNH, CECS), removal due to prior decisions not to retrench (Lake Campus), as well as adjustments for functional needs within the unit. These adjustments will be made as a final step in the recommendation process, but the calculated values are all included here.

Table 1

Estimated Generated SCH for One Semester per One FTE Instructional Staff by College

College	Department	Courses/FTE Instructional Staff	Average Class Size	Avg. SCH/ Course	Generated SCH/FTE Instr. Staff
CEHS	Human Services (EHS55)	2.8	32	3.00	268.80
CEHS	Kinesiology & Health (KNH55)	2.9	32	3.00	278.40
CEHS	Leadership Studies in Educ (LDR55)	2.7	32	3.00	259.20
CEHS	Teacher Education (TED55)	2.9	32	3.00	278.40
CECS	Biomed Indust & Human Factor Engr (BME55)	2.2	32	3.00	211.20
CECS	Computer Science (CSC55)	2.4	32	3.00	230.40
CECS	Electrical Engineering (EEG55)	2.1	32	3.00	201.60
CECS	Mechanical & Materials Engineering (MEG55)	2.2	32	3.00	211.20
COLA	Art & Art History (ART55)	2.5	32	3.00	240.00
COLA	Communication (COM55)	2.8	32	3.00	268.80
COLA	English Language & Literatures (ENG55)	3.0	32	3.00	288.00
COLA	History (HST55)	2.6	32	3.00	249.60
COLA	Modern Languages (MOL55)	3.0	32	3.00	288.00
COLA	Music (MUS55)	3.0	32	3.00	288.00
COLA	Religion Philosophy & Classics (CLS55)	2.6	32	3.00	249.60
COLA	School Public and Intern'l Affairs (SPIA5)	2.6	32	3.00	249.60
COLA	Social Work (SOW55)	2.9	32	3.00	278.60
COLA	Sociology & Anthropology (SOC55)	2.7	32	3.00	259.20
COLA	Theatre Arts (THA55)	2.8	32	3.00	268.80
CONH	College of Nursing& Health Teaching (CONHT)	3.1	32	3.00	297.60
COSM	Biochemistry/Molecular Biology-COSM (BMB55)	2.2	32	3.00	211.20
COSM	Biological Sciences (BIO55)	2.3	32	3.00	220.80
COSM	Chemistry (CHM55)	2.5	32	3.00	240.00
COSM	Earth and Environmental Sciences (GLY55)	2.1	32	3.00	201.60
COSM	Mathematics & Statistics (MTH55)	2.6	32	3.00	249.60
COSM	NeuroScience Cell Bio Physio-COSM (ANT55)	2.9	32	3.00	278.40
COSM	Physics (PHY55)	2.7	32	3.00	259.20
COSM	Psychology (PSY55)	2.8	32	3.00	268.80
LAKE	Lake Campus Business & Admin (LCD55)	3.3	32	3.00	316.80
LAKE	Lake Campus Business Technologies (LCT55)	3.5	32	3.00	336.00
LAKE	Lake Campus Education & Human Svcs (LCE55)	3.2	32	3.00	307.20
LAKE	Lake Campus Engineering Technology (LCH55)	3.1	32	3.00	297.60
LAKE	Lake Campus Liberal Arts (LCL55)	3.2	32	3.00	307.20
LAKE	Lake Campus Science & Mathematics (LCM55)	3.3	32	3.00	316.80
RSCB	Accountancy (ACC55)	2.7	32	3.00	259.20
RSCB	Economics (ECN55)	2.9	32	3.00	278.40
RSCB	Finance & Financial Services (FIN55)	2.8	32	3.00	268.80
RSCB	Info Syst & Supply Chain Mgt (ISO55)	2.5	32	3.00	240.00
RSCB	Management (MGT55)	2.8	32	3.00	268.80
RSCB	Marketing (MKT55)	2.5	32	3.00	240.00

Table 2

Comparison of Actual and Optimum FTE Instructional Staff by Department, Fall 2020

College	Department	Generated SCH	Actual FTE Instr. Staff A. Faculty	Actual FTE Instr. Staff B. Adjuncts	Optimum FTE Instructional Staff C. Total	Optimum FTE Instructional Staff D. Faculty	Optimum FTE Instructional Staff E. Adjuncts	Optimum vs. Actual Faculty [D - A]	Optimum vs. Actual Adjuncts [E - B]	Optimum vs. Actual Unmet [C - (A + B)]
CEHS	Human Services (EHS55)	2,986.0	11.00	7.67	10.94	10.94	0.00			
CEHS	Kinesiology & Health (KNH55)	2,307.0	9.00	1.67	8.16	8.16	0.00	(7.42)	(17.02)	0.00
CEHS	Leadership Studies in Educ (LDR55)	1,969.0	14.00	5.67	7.48	7.48	0.00			
CEHS	Teacher Education (TED55)	4,990.0	13.67	6.00	17.65	13.67	3.98			
CECS	Biomed Indust & Human Factor Engr (BME55)	2,197.0	7.50	2.83	10.24	7.50	2.74			
CECS	Computer Science (CSC55)	7,142.0	21.00	4.33	30.52	21.00	9.52	(7.02)	(5.26)	5.19
CECS	Electrical Engineering (EEG55)	1,861.0	14.50	2.50	9.09	9.09	0.00			
CECS	Mechanical & Materials Engineering (MEG55)	3,481.0	17.83	2.67	16.23	16.23	0.00			
COLA	Art & Art History (ART55)	1,906.0	10.00	0.67	7.82	7.82	0.00			
COLA	Communication (COM55)	1,984.0	8.50	1.00	7.27	7.27	0.00			
COLA	English Language & Literatures (ENG55)	5,525.0	32.50	2.33	18.89	18.89	0.00			
COLA	History (HST55)	2,949.0	12.50	1.33	11.63	11.63	0.00			
COLA	Modern Languages (MOL55)	2,298.0	13.00	0.67	7.86	7.86	0.00			
COLA	Music (MUS55)	2,482.0	16.00	5.00	8.49	8.49	0.00	(43.91)	(21.33)	5.19
COLA	Religion Philosophy & Classics (CLS55)	3,354.0	11.50	0.67	13.23	11.50	1.73			
COLA	School Public and Intern'l Affairs (SPIA5)	3,343.0	15.00	2.33	13.19	13.19	0.00			
COLA	Social Work (SOW55)	1,683.0	10.00	0.33	5.95	5.95	0.00			
COLA	Sociology & Anthropology (SOC55)	4,902.0	12.50	2.00	18.62	12.50	6.12			
COLA	Theatre Arts (THA55)	3,139.0	19.00	7.67	11.50	11.50	0.00			
CONH	College of Nursing& Health Teaching (CONHT)	5,647.0	26.00	10.33	18.68	18.68	0.00	(7.32)	(10.33)	0.00
COSM	Biochemistry/Molecular Biology-COSM (BMB55)	518.5	7.00	0.00	2.42	2.42	0.00			
COSM	Biological Sciences (BIO55)	5,916.0	19.00	0.83	26.38	19.00	7.38			
COSM	Chemistry (CHM55)	3,373.0	11.50	0.00	13.84	11.50	2.34			
COSM	Earth and Environmental Sciences (GLY55)	2,006.5	10.00	0.00	9.80	9.80	0.00	(16.56)	(1.08)	10.43
COSM	Mathematics & Statistics (MTH55)	6,261.0	26.33	2.00	27.92	26.33	1.59			
COSM	NeuroScience Cell Bio Physio-COSM (ANT55)	1,871.0	14.50	0.00	5.95	5.95	0.00			
COSM	Physics (PHY55)	1,651.0	10.00	0.67	6.77	6.77	0.00			
COSM	Psychology (PSY55)	7,421.0	20.83	3.33	34.60	20.83	13.76			
LAKE	Lake Campus Business & Admin (LCD55)	2,498.0	1.00	1.00	7.76	1.00	6.76			
LAKE	Lake Campus Business Technologies (LCT55)	186.0	2.67	2.00	0.55	0.55	0.00			
LAKE	Lake Campus Education & Human Svcs (LCE55)	2,392.0	5.33	8.17	7.67	5.33	2.33	(2.47)	(10.88)	8.44
LAKE	Lake Campus Engineering Technology (LCH55)	1,256.0	4.50	0.67	4.16	4.16	0.00			
LAKE	Lake Campus Liberal Arts (LCL55)	4,407.0	8.67	7.83	14.13	8.67	5.46			
LAKE	Lake Campus Science & Mathematics (LCM55)	5,311.5	13.17	0.67	16.51	13.17	3.34			
RSCB	Accountancy (ACC55)	2,119.0	10.00	0.00	8.05	8.05	0.00			
RSCB	Economics (ECN55)	3,342.0	12.00	0.67	11.82	11.82	0.00			
RSCB	Finance & Financial Services (FIN55)	2,307.0	7.00	1.67	8.45	7.00	1.45	(2.86)	(1.55)	0.77
RSCB	Info Syst & Supply Chain Mgt (ISO55)	3,074.0	9.00	3.33	12.61	9.00	3.61			
RSCB	Management (MGT55)	3,409.5	9.00	3.00	12.49	9.00	3.49			
RSCB	Marketing (MKT55)	1,773.0	8.00	0.67	7.27	7.27	0.00			

Table 3

Comparison of Actual and Optimum FTE Instructional Staff by Department with Reduced Generated SCH, Fall 2020

		Generated SCH			Actual FTE Instr. Staff		Optimum FTE Instructional Staff			Optimum vs. Actual		
College	Department	Actual	Adj.	Reduced	A. Faculty	B. Adjuncts	C. Total	D. Faculty	E. Adjuncts	Faculty [D - A]	Adjuncts [E - B]	Unmet [C - (A + B)]
CEHS	Human Services (EHS55)	2,986.0	0.75	2239.5	11.00	7.67	8.33	8.33	0.00			
CEHS	Kinesiology & Health (KNH55)	2,307.0	0.75	1730.3	9.00	1.67	6.21	6.21	0.00	(13.98)	(21.00)	0.00
CEHS	Leadership Studies in Educ (LDR55)	1,969.0	0.75	1476.8	14.00	5.67	5.70	5.70	0.00			
CEHS	Teacher Education (TED55)	4,990.0	0.75	3742.5	13.67	6.00	13.44	13.44	0.00			
CECS	Biomed Indust & Human Factor Engr (BME55)	2,197.0	0.75	1647.8	7.50	2.83	7.80	7.50	0.30			
CECS	Computer Science (CSC55)	7,142.0	0.75	5356.5	21.00	4.33	23.25	21.00	2.25	(13.05)	(9.78)	0.00
CECS	Electrical Engineering (EEG55)	1,861.0	0.75	1395.8	14.50	2.50	6.92	6.92	0.00			
CECS	Mechanical & Materials Engineering (MEG55)	3,481.0	0.75	2610.8	17.83	2.67	12.36	12.36	0.00			
COLA	Art & Art History (ART55)	1,906.0	0.75	1429.5	10.00	0.67	5.96	5.96	0.00			
COLA	Communication (COM55)	1,984.0	0.75	1488.0	8.50	1.00	5.54	5.54	0.00			
COLA	English Language & Literatures (ENG55)	5,525.0	0.75	4143.8	32.50	2.33	14.39	14.39	0.00			
COLA	History (HST55)	2,949.0	0.75	2211.8	12.50	1.33	8.86	8.86	0.00			
COLA	Modern Languages (MOL55)	2,298.0	0.75	1723.5	13.00	0.67	5.98	5.98	0.00			
COLA	Music (MUS55)	2,482.0	0.75	1861.5	16.00	5.00	6.46	6.46	0.00	(67.40)	(22.32)	0.00
COLA	Religion Philosophy & Classics (CLS55)	3,354.0	0.75	2515.5	11.50	0.67	10.08	10.08	2.83			
COLA	School Public and Intern'l Affairs (SPIA5)	3,343.0	0.75	2507.3	15.00	2.33	10.05	10.05	0.00			
COLA	Social Work (SOW55)	1,683.0	0.75	1262.3	10.00	0.33	4.53	4.53	0.00			
COLA	Sociology & Anthropology (SOC55)	4,902.0	0.75	3676.5	12.50	2.00	14.18	12.50	1.68			
COLA	Theatre Arts (THA55)	3,139.0	0.75	2354.3	19.00	7.67	8.76	8.76	0.00			
CONH	College of Nursing& Health Teaching (CONHT)	5,647.0	0.75	4235.3	26.00	10.33	14.23	14.23	0.00	(11.77)	(10.33)	0.00
COSM	Biochemistry/Molecular Biology-COSM (BMB55)	518.5	0.75	388.9	7.00	0.00	1.84	1.84	0.00			
COSM	Biological Sciences (BIO55)	5,916.0	0.75	4437.0	19.00	0.83	20.10	19.00	1.10			
COSM	Chemistry (CHM55)	3,373.0	0.75	2529.8	11.50	0.00	10.54	10.54	0.00			
COSM	Earth and Environmental Sciences (GLY55)	2,006.5	0.75	1504.9	10.00	0.00	7.46	7.46	0.00	(17.42)	(2.67)	2.45
COSM	Mathematics & Statistics (MTH55)	6,261.0	0.75	4695.8	26.33	2.00	21.27	21.27	0.00			
COSM	NeuroScience Cell Bio Physio-COSM (ANT55)	1,871.0	0.75	1403.3	14.50	0.00	6.64	6.64	0.00			
COSM	Physics (PHY55)	1,651.0	0.75	1238.3	10.00	0.67	5.16	5.16	0.00			
COSM	Psychology (PSY55)	7,421.0	0.75	5565.8	20.83	3.33	26.35	20.83	5.52			
LAKE	Lake Campus Business & Admin (LCD55)	2,498.0	0.75	1873.5	1.00	1.00	5.91	1.00	4.91			
LAKE	Lake Campus Business Technologies (LCT55)	186.0	0.75	139.5	2.67	2.00	0.42	0.42	0.00			
LAKE	Lake Campus Education & Human Svcs (LCE55)	2,392.0	0.75	1794.0	5.33	8.17	5.84	5.33	0.51	(4.18)	(16.73)	3.91
LAKE	Lake Campus Engineering Technology (LCH55)	1,256.0	0.75	942.0	4.50	0.67	3.17	3.17	0.00			
LAKE	Lake Campus Liberal Arts (LCL55)	4,407.0	0.75	3305.3	8.67	7.83	10.76	8.67	2.09			
LAKE	Lake Campus Science & Mathematics (LCM55)	5,311.5	0.75	3983.6	13.17	0.67	12.57	12.57	0.00			
RSCB	Accountancy (ACC55)	2,119.0	0.75	1589.3	10.00	0.00	6.13	6.13	0.00			
RSCB	Economics (ECN55)	3,342.0	0.75	2506.5	12.00	0.67	9.00	9.00	0.00			
RSCB	Finance & Financial Services (FIN55)	2,307.0	0.75	1730.3	7.00	1.67	6.44	6.44	0.00	(9.89)	(8.21)	0.00
RSCB	Info Syst & Supply Chain Mgt (ISO55)	3,074.0	0.75	2305.5	9.00	3.33	9.61	9.00	0.61			
RSCB	Management (MGT55)	3,409.5	0.75	2557.1	9.00	3.00	9.51	9.00	0.51			
RSCB	Marketing (MKT55)	1,773.0	0.75	1329.8	8.00	0.67	5.54	5.54	0.00			

Note. Genereted student credit hours were adjusted based upon a -25% percent change in overall headcount from 12,440 for Fall 2020 to 9,400 total students.

Appendix E – Estimation of Faculty Instructional Needs – Fall 2023

Method II - Executive Summary

In order to predict the numbers of students (head count), full time equivalent student credit hours and the faculty instructional workforce needed to cover this workload over the next three years, a series of studies were conducted that utilized recent enrollment trends to project Fall 2023 instructional needs. As outlined below, these projections were performed on a college basis, excluding Lake Campus, the School of Professional Psychology and the Boonshoft School of Medicine.

For these studies, a seven-year average (2014-2020) was used to establish the college-specific number of students per bargaining unit faculty member (BUFM) as well as the full-time equivalent student credits hours generated per BUFM. This broad range was used to spread out the effects of any particular event that might impact enrollment and/or instruction in the short-term. The summary data are included below and utilized enrollment and instructional data provided to the AAUP-WSU and the Committee on Retrenchment.

1. Table 1 lists the 2014-2020 average college student head count (SHC) to BUFM ratios (SHC:BUFM) and the 2014-2020 average student full-time equivalent credit hours delivered by full-time faculty during the academic year (SFTE) to BUFM ratios (SFTE:BUFM), by college.

Table 1 College	14-20 Average SHC:BUFM	14-20 Average SFTE:BUFM
Educ./Human Svc. - CEHS	39.2	11.6
Eng./Comp. Sci. - CECS	37.4	16.2
Liberal Arts - COLA	15.1	13.6
Nursing/Health - CONH	36.3	11.8
Science/Math - COSM	14.7	16.2
Business - RSCOB	40.1	19.5

2. Table 2 - SHC/SFTE projections for approximate 8500 SHC by Fall 2023
   a. Assumptions
      1) % enrollment decline for each of the next three years will be similar to the average % decline over the past three years. This approximates the impact of the year-over-year smaller number of first-time students entering the University progressing toward degree completion and replacing the former larger entering classes.
      2) There will be no significant change in first-time student enrollment or increase in retention rate (from Fall, 2020 numbers).

   b. The average % of the previous year's SHC and SFTE that were realized in the subsequent year, from 2017-2020, was determined. To calculate this average %, the % SHC and % SFTE in 2018 compared to 2017, in 2019 compared to 2018, and in 2020 compared to 2019, were determined and then averaged (Table 2, columns 2 and 4). The average % of the previous

year's SHC and SFTE was then used to project the Fall 23 SHC and AY22-23 SFTE, respectively, by applying the average % of the previous year's SHC and SFTE to the previous year's SHC and SFTE, respectively (columns 3 and 5). For example, the Fall 20 SHC was multiplied by the average % of the previous year's SHC to project the Fall 21 SHC, and the projected Fall 21 SHC was then multiplied by this % to project the Fall 22 SHC.

Table 2 College	Average % of previous year's SHC	Projected Fall 23 SHC	Average % of previous year's SFTE	Projected AY22-23 SFTE
CEHS	91.3%	1236	101.0%	602
CECS	85.3%	1169	89.2%	644
COLA	87.9%	1357	89.3%	1375
CONH	86.8%	612	101.1%	431
COSM	93.4%	1422	90.3%	1320
RSCOB	89.4%	1259	95.0%	871

3. Table 3 – Projected Fall 23 workforce requirements and reductions. Estimates of workforce needs (Table 3, columns 2 and 3) were made using the 2014-2020 average SHC:BUFM and SFTE:BUFM ratios listed in Table 1 to divide into the Fall 23 SHC and AY22-23 SFTE projections listed in Table 2, respectively. For example, Fall 23 SHC was divided by the average SHC:BUFM ratio. The average BUFM needs from SHC and SFTE projections are listed in column 4. The BUFM as of Oct. 1, 2020 is listed in column 5. The final column lists the difference between the current and Fall 23 projected BUFM workforce needs.

Table 3 College	BUFM estimate Fall 23 SHC	BUFM estimate AY22-23 SFTE	BUFM est. ave. F23 SHC, AY22-23 SFTE	BUFM, Oct. 1, 2020	Est. BUFM difference Fall 20 to Fall 23
CEHS	32	52	42	46	4
CECS	31	40	36	57	21
COLA	90	101	96	151	55
CONH	17	37	27	30	3
COSM	97	81	89	118	29*
RSCOB	31	45	38	49	11

*Final number should be adjusted downward by 3 BUFM (total 26), to account for the BSOM effort of jointly appointed Matrix department faculty with BSOM duties (currently 10% of COSM BUFM FTE).

Conclusion: The faculty reductions per college represent an estimate based on projections derived from relevant trend data and college-level metrics (seven-year average SHC:BUFM and SFTE:BUFM). The use of both values was deemed helpful since it minimized the impact that either score alone had on colleges with diverse missions.

Appendix F - Faculty Sizing Estimate

Method III

As of October 2020, the BUFM faculty across the six colleges in Dayton, and Lake Campus numbered 489. This number continued the downtrend in BUFMs, since peaking in 2015 at 654, representing an average compound decline of 5.65%. During this period, the TET/NTE ratio remained almost constant at 7:3.

During this same period, both enrolled students and credit hours have also declined albeit at a steeper pace. Strategic Information and Business Intelligence (SIBI) data show that the enrollment across the same colleges fell by a compound annual decline of roughly 8.85% between 2015-2020. The credit hours fell during this same period by 33% for an annual compound decline of 7.68%.

The primary determinant of faculty size moving forward is student projections. To that end, projections can be made based upon qualitative factors (e.g. SARS-CoV-2 {Covid-19}, macroeconomies, and competition) or based upon quantitative analysis of trends. Past trend line extrapolation assumes that the drivers for the past trend lines will not meaningfully change, but in the absence of clarity on the collective of strategic drivers, one is left with the existing trend lines.

Qualitative factors:

a. Competition: During this period, Sinclair has become more aggressive in recruitment, partnered with the University of Dayton for tuition normalization, expanded their physical presence, and enhanced their vocational offerings. Arizona State University has increased its marketing presence with a well-known brand. Southern New Hampshire University has bucked the national trends in enrollment by continuing to offer convenience in higher education targeting busy students. This value proposition is particularly appealing to working students which comprise the vast majority of WSU students. UD itself has sought to secure its own enrollment with tuition equalization. The University of Cincinnati has also seen its enrollment increase recently. There is no reason to think that these aggressive competitive moves will ebb within the projected period.

b. Brand: This period, beginning with the visa allegations, continuing with the debate failure, and punctuated more recently by the strike has seen a significant amount of negative press. Although the communications department states that we remain net positive in mentions, the valence of the negative press and its positioning, particularly in the Dayton Daily News, has cast a shadow over the university. The specter of a potentially combative retrenchment would lead one to conclude that, at least in the short-term, the negative aura will not abate.

c. Student market pool: One can look at four groups of students separately: Direct from HS, post-traditional working students, international students, and revenue-generating graduate students. PhD students are not revenue producing and are comparatively marginal in these terms. Regardless, as WSUs budget issues continue, we will likely be less competitive in attracting them. The Raider Country direct-from-HS student pool is nominally flat to slightly declining. As noted above, they are increasingly 'fought over', and until Covid-19, the improving economy likely attracted many into the workforce. However, more recently as

we anticipate the end of Covid-19 pressures by the end of 2021, the local economy is increasingly advertising for $15+ per hour jobs. These jobs are increasingly competitive with the lower end of likely salary outcomes, and come with immediate results and no debt. The national $15/hr minimum wage pressure will allow HS graduates to earn in excess of $30k to start. As a contrast, we hire MS level academic advisers for only 20% more. Post-traditional students (1/3 of our students at the beginning of 2015), are those being relentlessly targeted by the increasing range of quality online offerings offering the ultimate convenience for managing work-life-school balance. International students fell sharply during the Trump administration and the curtailing of government support particularly from the Middle East. There is some reason to believe that a Biden administration could improve this outlook somewhat, but only after Covid-19 is fully resolved. Finally, for-profit masters programs (such as the MBA) are lucrative for any school offering them. There are a plethora of online alternatives here, and many students will have discovered that they can successfully navigate online courses. The 'brand' of WSU graduate programs broadly speaking does not present a differentially advantageous credential in most cases.

d. College Credit Plus: Although the Dayton Daily News has reported that CCP enrollments have broadly increased over the period of Covid-19, Wright State's has not. This represents a credit-hour per matriculated student siphon for students who earn significant CCP credits via non-WSU institutions like Sinclair which has historically been more aggressive and more successful at this than has Wright State. Sinclair enjoys about a 7:1 advantage in this area. It is entirely possible that this particular factor is temporary, but their 'brand presence' in area high schools for this purpose (along with Edison and Clark State) is stronger, and the CCP overall trend is increasing.

The qualitative factors presented above suggest that there is insufficient evidence to support the conclusion that the recent trend lines will not continue for at least 2-3 more years, even though it is certainly possible that they will. There simply isn't a compelling set of qualitative factors that support an alteration of the current trends. Moreover, it is a much safer path to assume they will continue and act accordingly than to assume they won't and postpone or reduce retrenchment.

For those reasons, this analysis was based upon the extrapolation of recent trend data until Fall 2023. The above analysis also shows that the trends in student numbers and credit hours are not uniform by college. Lake Campus, for example, has increased both while the Dayton campus has declined. Within the Dayton Campus, headcounts across the various colleges have fallen at dramatically different rates in that same period. For that reason, the statistical analyses will be performed on the colleges individually, rather than collectively. Moreover, the number of student credit hours delivered per BUFM is also not a constant across colleges for any number of reasons; teaching loads, sections, and class sizes chief among them.

The future size of the BUFM faculty required for a future point in time depends upon two semi-independent variables considered in this projection. First and foremost was the size (in Fall of 2023) of the student body. Second is the workload borne by the faculty to instruct them. Four additional variables were not specifically addressed:

1) The ratio of NTEs to TETs, which has remained steady at 3:7 and presumed here to remain so

2) The ratio of BUFMs to adjuncts, which for this modeling was simply implied in the productivity (credit hours/BUFM) numbers used

3) The ratio of full to part-time students, which is presumed to remain the same throughout.

4) Changes to the workload agreements

All of these could have a material impact to the projected number of faculty needed, but are beyond the scope of this specific analysis.

Each college's numbers for these ratios are assumed invariant and historical. The productivity in 2017 was the highest between 2014 and 2020, and is assumed here to be achievable moving forward. The data source for enrollments was SIBI. Students classified as not being in one of the 6 colleges were 'spread' across the 6, proportionate to those college's numbers. The units with students so classified are University College, SoGS, and Continuing Education, all of which had historical enrollments. It is presumed with their clearly declining numbers that these are historical classifications that simply were not changed in student profiles. They are declining as no new students are being classified as such.

The projections were done according to the following steps:

1) Initial Exploration: The data were obtained from SIBI/COGNOS. Enrollment data for each college (14 Day) for each term were tabulated. Because spring terms are always lower, the initial look was fall to subsequent fall, using data from 2014 through 2020. Each college and the subtotal without LAKE was examined graphically to determine whether simple linear regressions would be appropriate, or whether the trend lines appeared to be more complex. With only 7 data points (5 df), the threshold of significance for a linear relationship needed to exceed .755 (alpha = .05). Although some of the colleges met this standard, all did not. Furthermore, linear decay would simply result in further losses of about 1400 total student per year, predicting zero students within 7-8 years, which is a nonsensical outcome.

   The SIBI enrollment data include enrollment in the legacy categories of University College, School of Graduate Studies and Continuing Education. These data were not included in the following modeling until the last step.

2) Predictive Modeling: Each college's fall term student count was paired with its subsequent spring and the following fall (excluding Lake). This resulted in 36 ordered sets (6 colleges by 6 F/S/F groups). These sets were regressed using Datafit9.1 (Oakdale Engineering), with each Fall and Spring used to predict the following fall. Each of 298 possible data models were tested. Although solutions for over 200 were obtained, the following model was chosen: $Y = a+b/x1+c*\ln(x2)$ owing to its relative parsimony and that its coefficients were all statistically significant.

3) Using this technique, Fall 2021 was predicted for each college.

4) A separate single predictor regression between Fall and the corresponding spring was done to predict Spring 2022 from Fall 2021. This regression followed Spring = 0.9197 * Fall + 23.5.

5) Successive terms were likewise predicted culminating in Fall 2023.

6) A manual estimate for the legacy units mentioned above was made and for faculty estimation 'folded back' into the active colleges on a proportionate basis prior to moving to faculty estimates.

7) This process resulted in a headcount estimate for Fall of 2023 of 8435, exclusive of LAKE (roughly 9700 inclusive).

	Spread non-academic unit pops		
	Fall 2021	Fall 2022	Fall 2023
College of Educ & Human Svcs Admin (CEHS)	1420	1342	1275
College of Engineerg & Computer Sci (CECS)	1808	1695	1588
College of Liberal Arts (COLA)	1859	1744	1635
College of Nursing & Health (CONH)	854	1135	1137
College of Science & Mathematics (COSM)	1513	1419	1337
Raj Soin College of Business (RSCB)	1667	1561	1463
	9121	8896	8435

8) In order to 'sanity check' this result, a further analysis was undertaken using only the Fall totals, also exclusive of Lake. This analysis was interpolative rather than regressive and used a cubic spline to interpolate from Fall 2020 against an assumption that WSU's enrollment fully recovers to current levels after which it remains slightly improving. Three different recovery time lines were tested, 2026, 2028 and 2030 to the non-lake enrollment of 10295. For 2025 recovery the enrollment minimum year was 2022 and for the 2028 and 2030 recoveries, the enrollment minimum year was 2023 and 2024 respectively. The minimum enrollment values were as follows:

Recovery year	Minimum enrollment year	Minimum enrollment
2026	2022	9012
2028	2023	8514
2030	2024	8014

9) As well as any math model can 'predict', this spline exercise indicates that the regression-extrapolation model is within the realm of reasonable outcomes with yr/yr changes that are within historical ranges.

10) Using SIBI data, each college's student credit-hour data for each fiscal year was compared to the historical Fall enrollment values. This approach is reasonable given the stability of Spring and Summer enrollments as ratios of Fall. This ratio varied among the colleges, and varied by year. These data were tabulated. Note that Fall 21 corresponds to FY22.

	Cred Hours Per fall headcount	Credit hours FY22	Credit hours FY23	Credit hours FY24
CEHS	18.00	25562	24158	22952
CECS	15.99	28918	27110	25399
CoLA	35.47	65937	61858	57992
CoNH	11.40	9735	12938	12961
CoSM	42.42	64176	60189	56710
RSCoB	20.01	33362	31241	29279

11) Credit hour productivity values were calculated by simply dividing the credit hours (historical) by the faculty numbers for that year, individually for each college.

12) The resulting tabulate productivity values were examined for trends. FY 2017 was the most productive when measured in this manner. Given the circumstances of this analysis, this assertion is reasonable as it is assumed here that this outcome would be managed to.

	Annual Credit Hours per Fall Headcount
CEHS	753.2
CECS	580.1
CoLA	572.1
CoNH	445.4
CoSM	664.3
RSCoB	850.1

13) Required faculty were estimated by taking the estimated student credit hours from step 10 and dividing by the productivity values from step 12.

14) This method produced the following required BUFMs for Fall 2023, corresponding to an enrollment at that time of 8438 students, exclusive of BSoM and SoPP, which were excluded from this analysis, and Lake, which was analyzed independently:

College	2023 Need	2020 FTE	Difference
CEHS	30	46	16
CECS	44	57	13
CoLA	101	151	50
CoNH	29	30	0
CoSM*	85	118*	33
RSCoB	34	49	15
Total	325		**127**

*CoSM total BUFM will be adjusted for Matrix appointments in subsequent steps

15) As mentioned above, Lake campus data were analyzed separately and, although not shown, it was found that Lake Campus enrolled student time series is very regular and comparatively invariant. Their credit hours per fall enrollment have also been comparatively steady. This leads to the conclusion that any variability in projected enrollment would be within natural variations in enrollment, and could be managed in due course as would be typical of any faculty management system.

Overall Conclusions: By considering college level enrollment trends, faculty credit hour productivity and student credit hour data, these studies suggest a reduction of 128 faculty is needed to meet the instructional needs in Fall 2023 (127 when CoNH is removed). As described in the recommendation letter and in a few notes herein, adjustments to these values to account for strategic needs within the individual colleges will occur at the last step in the process.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

A series of Markov chain analyses were conducted by representatives from the Office of Institutional Research and Effectiveness and the Statistical Consulting Center in the Fall of 2020 to forecast student headcount enrollments for Wright State University for fiscal years 2022 (Fall 2021), 2023 (Fall 2022), and 2024 (Fall 2023) for the following colleges:

- College of Education and Human Services
- College of Engineering and Computer Science
- College of Liberal Arts
- College of Nursing and Health
- College of Science and Mathematics
- Lake Campus
- Raj Soin College of Business

For a given college, the sample included tuition-generating students who were enrolled on the fall census date in one or more programs offered within the college. Because enrollment patterns, particularly exit patterns, varied greatly between undergraduate and graduate students, undergraduate and graduate student enrollment patters were examined separately for each college. For the Lake Campus, the enrollment patterns of College Credit Plus (CCP) students and traditional undergraduate students were examined separately.

Markov chains are used to predict probabilities of transitioning from a given state to any number of other states. For the current analyses, the transition states from one fall semester to a subsequent fall semester included nine student credit hour (SCH) bins and an exit state (i.e., failing to enroll the subsequent fall semester either due to attrition or graduation). An underlying assumption of the Markov chain process is that it is memoryless, meaning the probabilities of transitioning to any future states are based solely on the baseline transition period. For example, probabilities from a baseline transition period or year (e.g., from Fall 2013 to Fall 2014) are used to forecast future enrollments for three subsequent fall terms (e.g., Fall 2015, Fall 2016, and Fall 2017) without taking into account any past trends. The only factors used to forecast headcount enrollments are (a) the probabilities of transitioning to a future state as derived from the baseline year (e.g., from Fall 2013 to Fall 2014), (b) the number of students in each SCH bin for a given fall semester (e.g., Fall 2013), and (c) the number of incoming students in each transition state in the subsequent fall semester (e.g., Fall 2014).

It is important to note one limitation to this study, in particular, that may have impacted the results. For the college-level analyses, a new or incoming student was defined as any student enrolled for the first time within a given college by student category (i.e., undergraduate, graduate, and CCP). Thus, for example, a graduate student who entered the College of Nursing and Health in Fall 2013, exited the college, and re-enrolled again as a graduate student in the College of Nursing and Health in the Fall 2018 (perhaps to start a new program), would have only been counted as a new or incoming graduate student in the college for the Fall 2013 (and not Fall 2018). As a result of this limitation, the derived forecasts are underestimating new student enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

College of Education and Human Services

Tables 1 and 2 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Education and Human Services, respectively.

Table 1

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Education and Human Services

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	1,656	1,558	1,474	1,341	1,284	1,202			
13-14	1,464	1,340	1,285						
% Difference	-11.59	-13.99	-12.82						
14-15		1,467	1,355	1,294					
% Difference		-5.84	-8.07	-3.50					
15-16			1,392	1,255	1,190				
% Difference			-5.56	-6.41	-7.32%				
16-17				1,300	1,157	1,072			
% Difference				-3.06	-9.89	-10.82			
17-18					1,120	918	812		
% Difference					-12.77	-23.63			
18-19						1,101	986	930	
% Difference						-8.40			
19-20							1,010	844	759

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 2

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Education and Human Services

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	718	726	654	578	444	420			
13-14	612	574	561						
% Difference	-14.76	-20.94	-14.22						
14-15		602	541	517					
% Difference		-17.08	-17.28	-10.55					
15-16			591	530	502				
% Difference			-9.63	-8.30	13.06				
16-17				558	480	448			
% Difference				-3.46	8.11	6.67			
17-18					392	271	221		
% Difference					-11.71	-35.48			
18-19						315	209	172	
% Difference						-25.00			
19-20							283	214	187

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 1 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Education and Human Services.

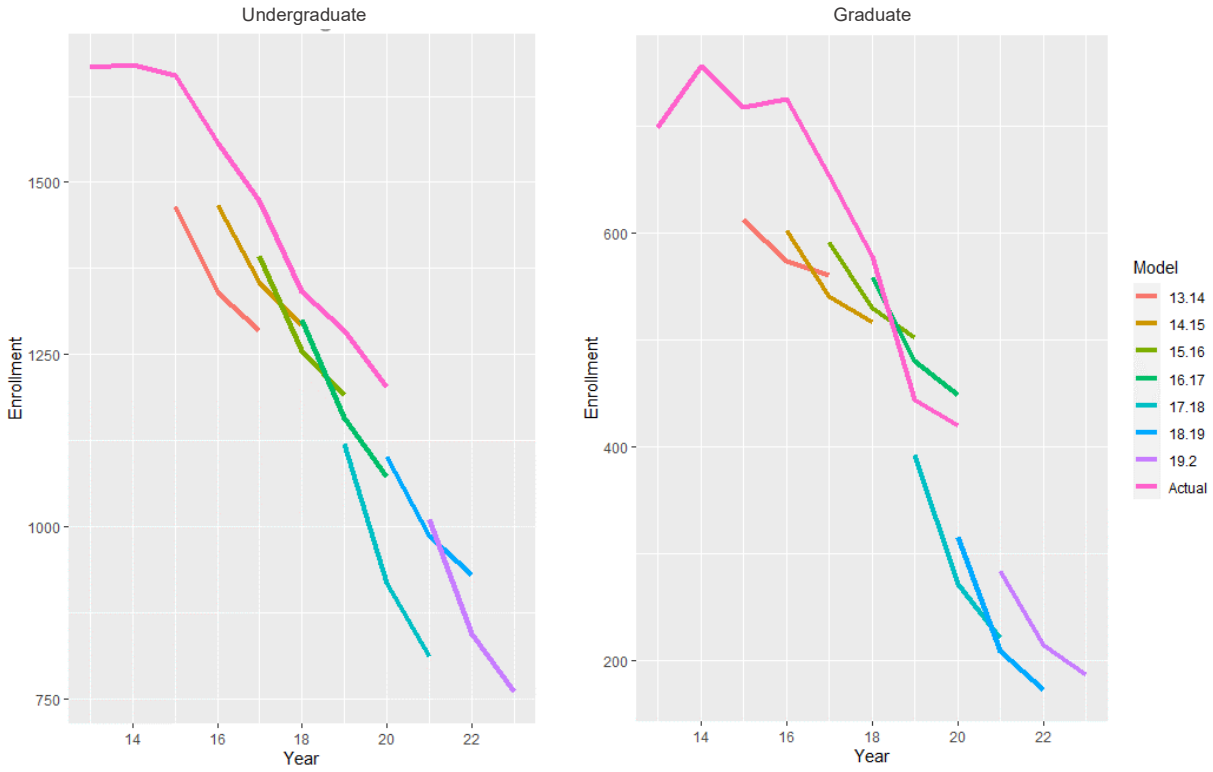


Figure 1. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Education and Human Services.

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Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
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College of Engineering and Computer Science

Tables 3 and 4 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Engineering and Computer Science, respectively.

Table 3

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Engineering and Computer Science

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	2,392	2,394	2,273	1,970	1,674	1,470			
13-14	2,091	2,039	1,992						
% Difference	-12.58	-14.83	-12.36						
14-15		2,231	2,161	2,100					
% Difference		-6.81	-4.93	6.60					
15-16			2,240	2,124	2,044				
% Difference			-1.45	7.82	22.10				
16-17				2,132	1,966	1,865			
% Difference				8.22	17.44	26.87			
17-18					1,809	1,522	1,338		
% Difference					8.06	3.54			
18-19						1,531	1,270	1,108	
% Difference						4.15			
19-20							1,347	1,144	1,022

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 4

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Engineering and Computer Science

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	1,207	1,037	757	584	482	406			
13-14	862	852	851						
% Difference	-28.58	-17.84	12.42						
14-15		985	954	944					
% Difference		-5.01	26.02	61.64					
15-16			847	613	542				
% Difference			11.89	4.97	12.45				
16-17				652	472	406			
% Difference				11.64	-2.07	0.00			
17-18					488	354	304		
% Difference					1.24	-12.81			
18-19						391	290	250	
% Difference						-3.69			
19-20							316	232	197

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 2 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Engineering and Computer Science.

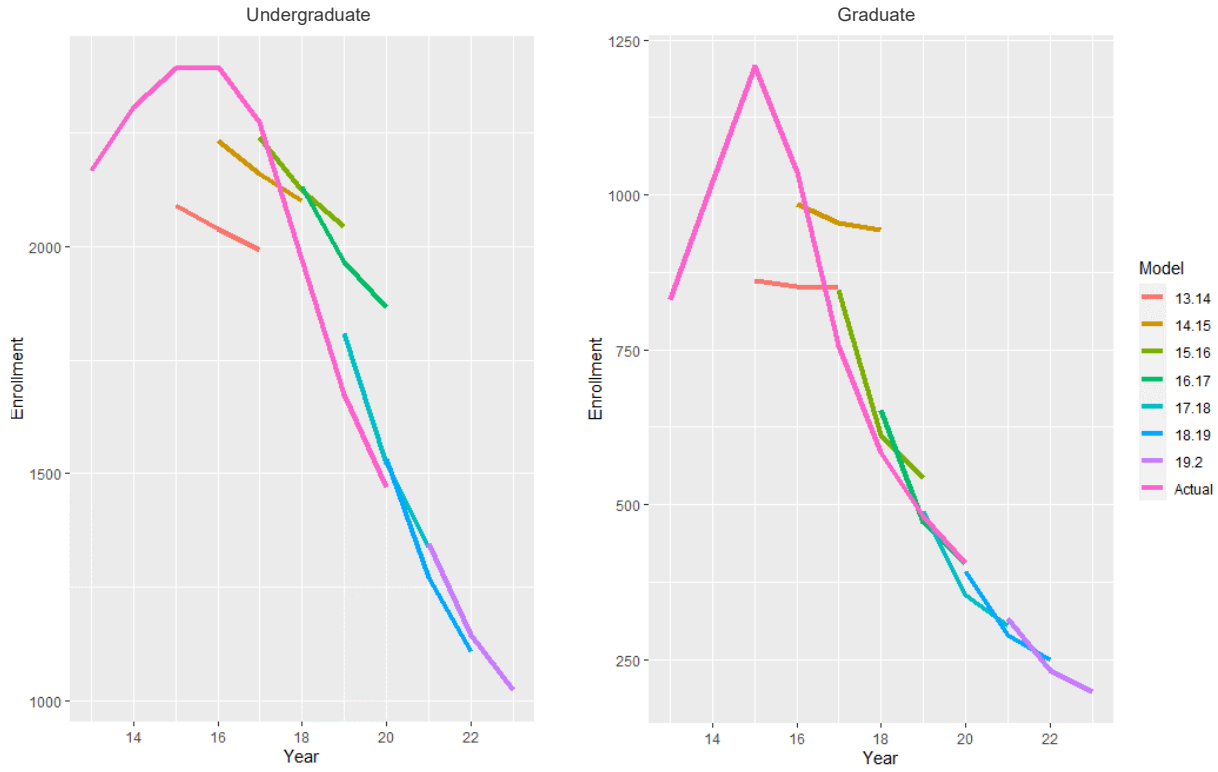

Figure 2. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Engineering and Computer Science.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

College of Liberal Arts

Tables 5 and 6 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Liberal Arts, respectively.

Table 5

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Liberal Arts

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	2,760	2,628	2,490	2,211	1,878	1,741			
13-14	2,556	2,274	2,120						
% Difference	-7.39	-13.47	-14.86						
14-15		2,460	2,227	2,109					
% Difference		-6.39	-10.56	-4.61					
15-16			2,362	2,146	2,021				
% Difference			-5.14	-2.94	7.61				
16-17				2,275	2,039	1,888			
% Difference				2.89	8.57	8.44			
17-18					1,972	1,678	1,537		
% Difference					5.01	-3.62			
18-19						1,668	1,397	1,243	
% Difference						-4.19			
19-20							1,548	1,331	1,206

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 6

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Liberal Arts

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	394	422	366	356	308	238			
13-14	362	378	385						
% Difference	-8.12	-10.43	5.19						
14-15		374	365	362					
% Difference		-11.37	-0.27	1.69					
15-16			400	403	405				
% Difference			9.29	13.20	31.49				
16-17				354	318	304			
% Difference				-0.56	3.25	27.73			
17-18					302	266	251		
% Difference					-1.95	11.76			
18-19						253	189	165	
% Difference						6.30			
19-20							209	160	143

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 3 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Liberal Arts.

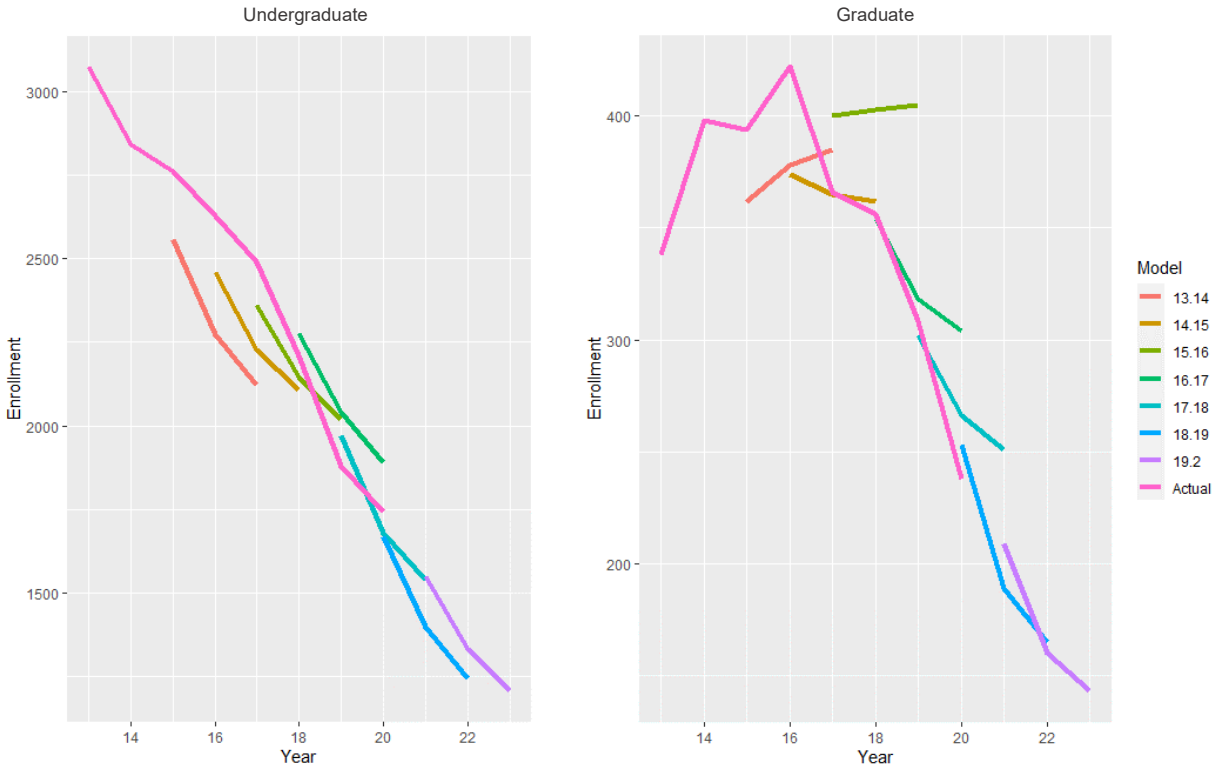

Figure 3. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Liberal Arts.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

College of Nursing and Health

Tables 7 and 8 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Nursing and Health, respectively.

Table 7

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Nursing and Health

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	1,208	1,199	1,176	1,063	953	836			
13-14	1,000	954	941						
% Difference	-17.22	-20.43	-19.98						
14-15		1,100	1,115	1,133					
% Difference		-8.26	-5.19	6.59					
15-16			1,082	1,021	987				
% Difference			-7.99	-3.95	3.57				
16-17				1,070	997	950			
% Difference				0.66	4.62	13.64			
17-18					966	857	794		
% Difference					1.36	2.51			
18-19						887	788	724	
% Difference						6.10			
19-20							763	665	607

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 8

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Nursing and Health

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	286	247	256	235	171	99			
13-14	277	258	245						
% Difference	-3.15	4.45	-4.30						
14-15		268	259	259					
% Difference		8.50	1.17	10.21					
15-16			236	213	203				
% Difference			-7.81	-9.36	18.71				
16-17				238	233	229			
% Difference				1.28	36.26	131.31			
17-18					172	116	86		
% Difference					0.58	17.17			
18-19						138	74	43	
% Difference						39.39			
19-20							69	35	23

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 4 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Nursing and Health.

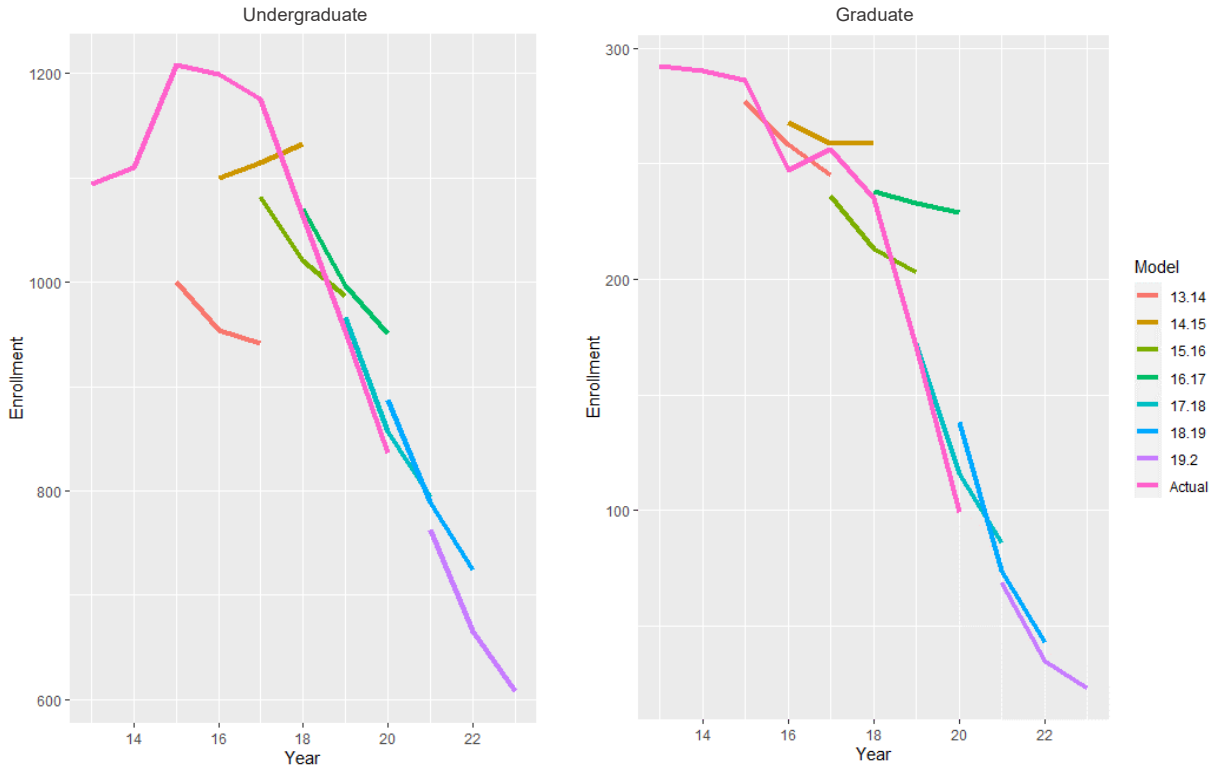

Figure 4. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Nursing and Health.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

College of Science and Mathematics

Tables 9 and 10 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Science and Mathematics, respectively.

Table 9

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Science and Mathematics

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	1,960	1,854	1,788	1,737	1,550	1,456			
13-14	1,733	1,558	1,466						
% Difference	-11.58	-15.97	-18.01						
14-15		1,765	1,688	1,660					
% Difference		-4.80	-5.59	-4.43					
15-16			1,686	1,540	1,460				
% Difference			-5.70	-11.34	-5.81				
16-17				1,620	1,498	1,427			
% Difference				-6.74	-3.35	-1.99			
17-18					1,515	1,360	1,286		
% Difference					-2.26	-6.59			
18-19						1,380	1,189	1,085	
% Difference						-5.22			
19-20							1,233	1,043	945

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 10

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the College of Science and Mathematics

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	420	393	329	293	287	265			
13-14	389	378	372						
% Difference	-7.38	-3.82	13.07						
14-15		386	366	357					
% Difference		-1.78	11.25	21.84					
15-16			363	329	312				
% Difference			10.33	12.29	8.71				
16-17				309	250	224			
% Difference				5.46	-12.89	-15.47			
17-18					256	220	206		
% Difference					-10.80	-16.98			
18-19						269	249	239	
% Difference						1.51			
19-20							239	217	206

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 5 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Science and Mathematics.

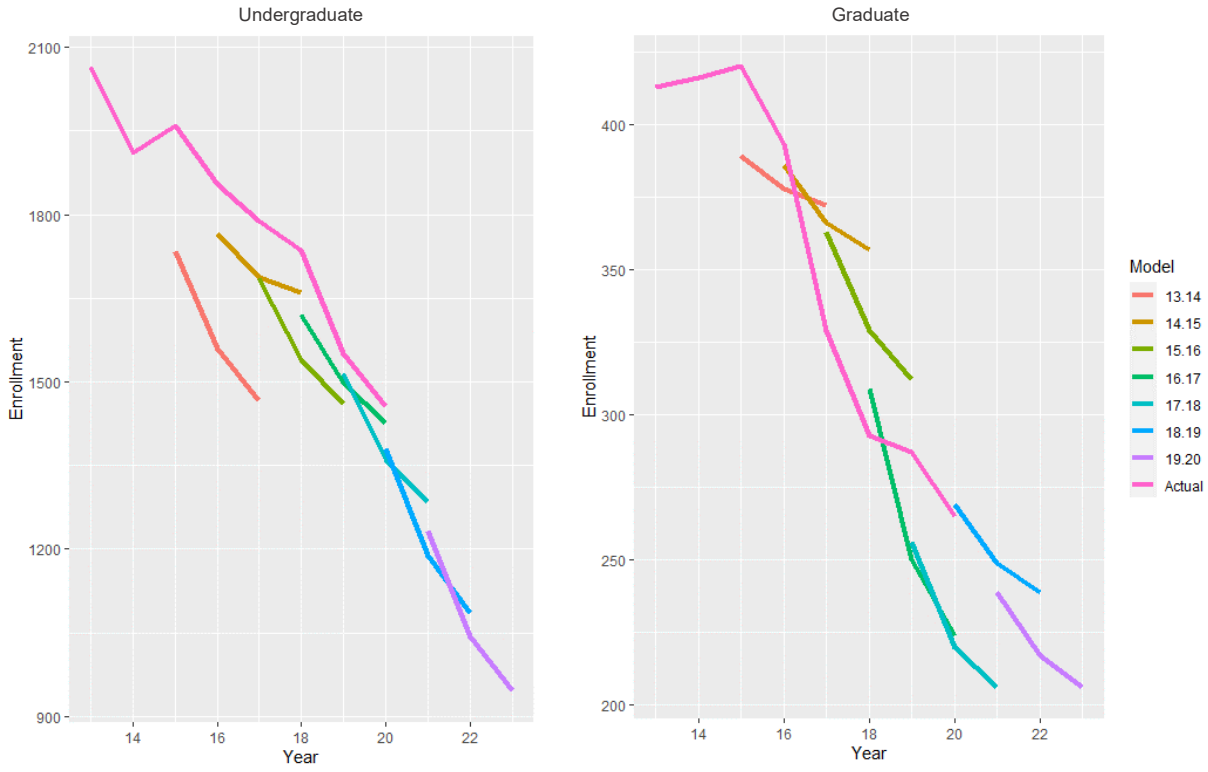

Figure 5. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the College of Science and Mathematics.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Lake Campus

Tables 11 and 12 display summaries of the College Credit Plus and traditional undergraduate student actual and forecasted fall headcount enrollments for the Lake Campus, respectively.

Table 11

College Credit Plus Student Actual and Forecasted Fall Headcount Enrollments for the Lake Campus

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	160	226	205	225	280	330			
13-14	140	138	138						
% Difference	-12.50	-38.94	-32.68						
14-15		181	190	191					
% Difference		-19.91	-7.32	-15.11					
15-16			225	243	248				
% Difference			9.76	8.00	-11.43				
16-17				204	196	195			
% Difference				-9.33	-30.00	-40.91			
17-18					222	227	228		
% Difference					-20.71	-31.21			
18-19						279	295	298	
% Difference						-15.45			
19-20							325	342	347

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 12

Traditional Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the Lake Campus

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	657	759	868	871	800	748			
13-14	581	557	548						
% Difference	-11.57	-26.61	-36.87						
14-15		586	563	553					
% Difference		-22.79	-35.14	-36.51					
15-16			654	655	656				
% Difference			-24.65	-24.80	-18.00				
16-17				787	803	816			
% Difference				-9.64	0.37	9.09			
17-18					784	738	705		
% Difference					-2.00	-1.34			
18-19						708	610	556	
% Difference						-5.35			
19-20							687	611	573

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 6 displays the College Credit Plus and traditional undergraduate student actual and forecasted fall headcount enrollments for the Lake Campus.

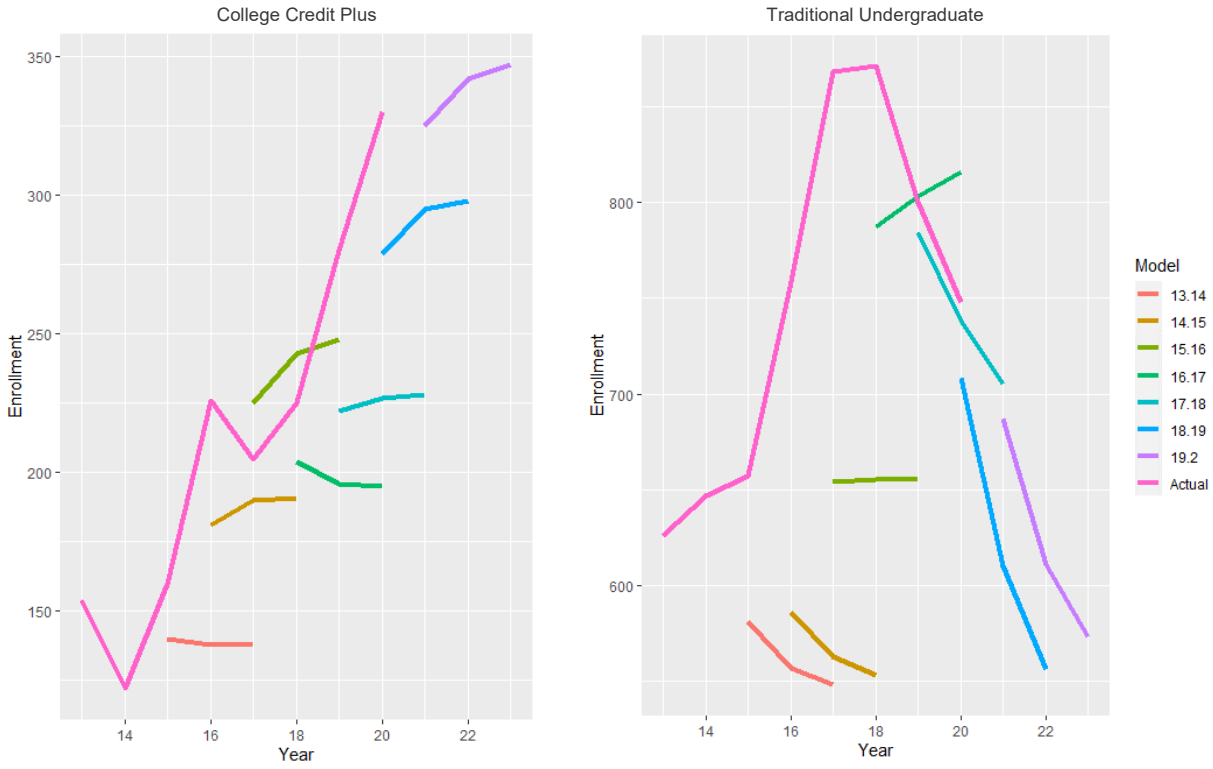

Figure 6. College Credit Plus and traditional undergraduate student actual and forecasted fall headcount enrollments for the Lake Campus.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Raj Soin College of Business

Tables 13 and 14 display summaries of the undergraduate and graduate student actual and forecasted fall headcount enrollments for the Raj Soin College of Business, respectively.

Table 13

Undergraduate Student Actual and Forecasted Fall Headcount Enrollments for the Raj Soin College of Business

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	1,983	1,902	1,794	1,660	1,453	1,236			
13-14	1,789	1,718	1,671						
% Difference	-9.78	-9.67	-6.86						
14-15		1,784	1,650	1,578					
% Difference		-6.20	-8.03	-4.94					
15-16			1,712	1,544	1,448				
% Difference			-4.57	-6.99	-0.34				
16-17				1,610	1,446	1,354			
% Difference				-3.01	-0.48	9.55			
17-18					1,441	1,235	1,129		
% Difference					-0.83	-0.08			
18-19						1,268	1,052	925	
% Difference						2.59			
19-20							1,085	869	754

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Table 14

Graduate Student Actual and Forecasted Fall Headcount Enrollments for the Raj Soin College of Business

	Fall								
Model	2015	2016	2017	2018	2019	2020	2021	2022	2023
Actual	456	559	663	650	567	517			
13-14	369	321	310						
% Difference	-19.08	-42.58	-53.24						
14-15		399	372	364					
% Difference		-28.62	-43.89	-44.00					
15-16			460	468	472				
% Difference			-30.62	-28.00	-16.75				
16-17				561	558	556			
% Difference				-13.69	-1.59	7.54			
17-18					495	393	345		
% Difference					-12.70	-23.98			
18-19						441	321	267	
% Difference						-14.70			
19-20							393	297	265

Note. Each Markov chain model is named after the baseline year used to forecast headcount enrollments (e.g., 13-14 = Fall 2013 to Fall 2014 transition period). Actual = actual enrollments.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Figure 7 displays the undergraduate and graduate student actual and forecasted fall headcount enrollments for the Raj Soin College of Business.

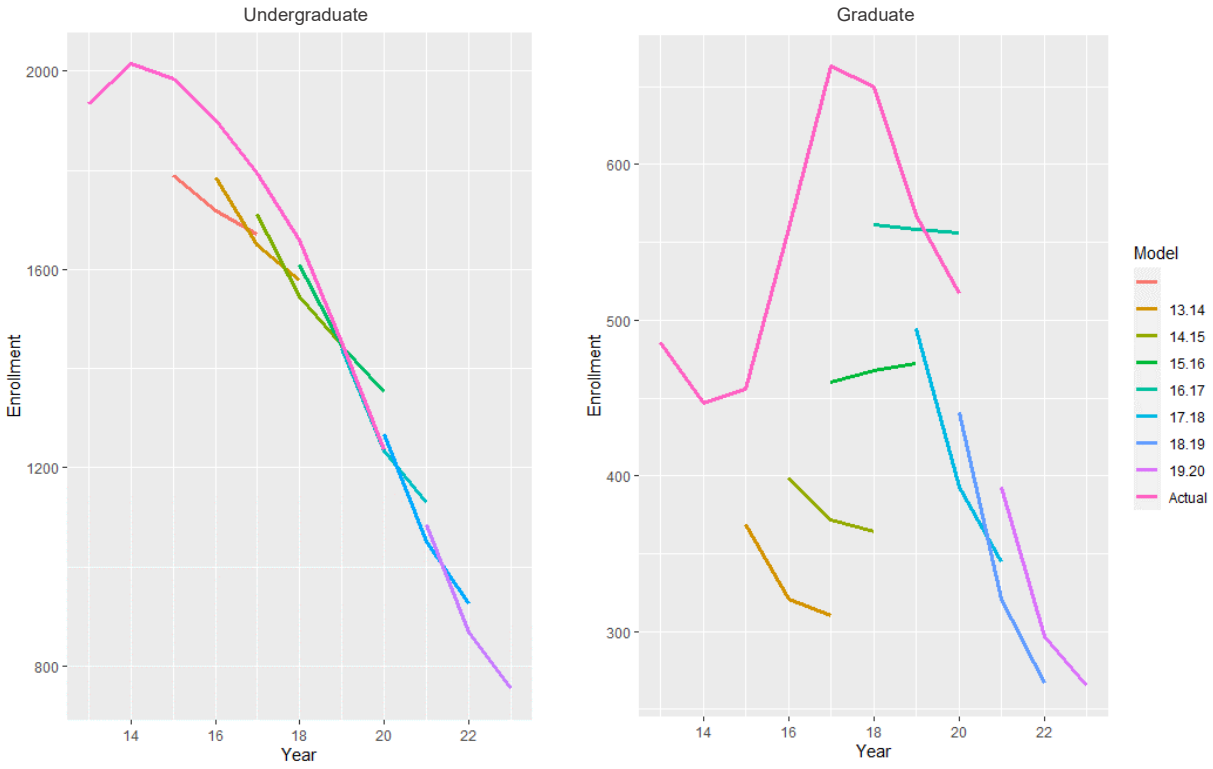

Figure 7. Undergraduate and graduate student actual and forecasted fall headcount enrollments for the Raj Soin College of Business.

Appendix G - Wright State University
Headcount Enrollment Forecasts by College for Fiscal Years 2022, 2023, and 2024
Executive Summary

Appendix G - Method IV Results

Table 15 – Correcting Headcount Estimates

UG + G	Average Headcount Projections				Correction Factor	Adjusted Values		
	F2020	F2021	F2022	F2023		F2021	F2022	F2023
CEHS	1375	1151	1080	946	0.15	1326.3	1244.5	1090.1
CECS	2023	1622	1367	1219	-0.08	1494.6	1259.9	1123.5
COLA	2019	1710	1450	1349	-0.02	1675.8	1420.2	1321.7
CONH	1059	858	734	630	-0.13	744.2	636.2	546.4
COSM	1627	1467	1292	1151	0.05	1547.8	1362.8	1214.1
RSCOB	1749	1442	1179	1019	0.00	1445.0	1181.7	1021.3
Total						8233.57	7105.28	6317.14
Corrected Total (minus BSOM, SOPP)						9560.57	8432.28	7644.14

Table 16 – Percentile Headcount Decline

UG + G	% decline relative to F2020		
	F2021	F2022	F2023
CEHS	18.2	23.3	32.8
CECS	20.3	32.8	40.1
COLA	15.3	28.2	33.2
CONH	20.4	32.0	41.6
COSM	10.1	20.8	29.5
RSCOB	17.6	32.6	41.7

Table 17 – Faculty FTE Reductions

	Actual	Calculated Reductions			
	2020	F2021	F2022	F2023	F2023
CEHS	46	8	11	15	15
CECS	57	12	19	23	23
COLA	151	23	43	50	50
CONH	30	6	10	12	0
COSM	114	11	24	34	34
RSCOB	49	9	16	20	20
Total				155	143

Appendix G - Method IV Results

The Markov modeling allows for multiple estimates based on which baseline transition period was used to forecast a future fall term. By using the approach to forecast Fall 2020, the results of which are now known, one can develop a "correction factor" that can be applied to avoid over or underestimating future enrollment. In Table 15 below, this was done for the Fall 2020 projections and the applied to Fall 2021-2023. As can be seen, the most dramatic change was to project CEHS enrollments upward, and CoNH enrollments downward. The rest of the colleges had only minimal adjustments.

Table 15 – Correcting Headcount Estimates

UG + G	Average Headcount Projections				Correction Factor	Adjusted Values		
	F2020	F2021	F2022	F2023		F2021	F2022	F2023
CEHS	1375	1151	1080	946	0.15	1326.3	1244.5	1090.1
CECS	2023	1622	1367	1219	-0.08	1494.6	1259.9	1123.5
COLA	2019	1710	1450	1349	-0.02	1675.8	1420.2	1321.7
CONH	1059	858	734	630	-0.13	744.2	636.2	546.4
COSM	1627	1467	1292	1151	0.05	1547.8	1362.8	1214.1
RSCOB	1749	1442	1179	1019	0.00	1445.0	1181.7	1021.3
Total						8233.57	7105.28	6317.14
Corrected Total (minus BSOM, SOPP)						9560.57	8432.28	7644.14

Once projected headcounts were identified, the percentage change from Fall 2020 was calculated for each year (Table 16).

Table 16 – Percentile Headcount Decline

UG + G	% decline relative to F2020		
	F2021	F2022	F2023
CEHS	18.2	23.3	32.8
CECS	20.3	32.8	40.1
COLA	15.3	28.2	33.2
CONH	20.4	32.0	41.6
COSM	10.1	20.8	29.5
RSCOB	17.6	32.6	41.7

Corrected percentile reductions, calculated from headcount declines in Table 16, were applied to current faculty numbers in each college to estimate instructional needs going forward. BUFM FTE reductions were calculated using Fall 2020 numbers as a base (Table 17).

Table 17 – Faculty FTE Reductions

	Actual	Calculated Reductions			
	2020	**F2021**	**F2022**	**F2023**	**F2023**
CEHS	46	8	11	15	15
CECS	57	12	19	23	23
COLA	151	23	43	50	50
CONH	30	6	10	12	0
COSM*	118	12	25	35	35
RSCOB	49	9	16	20	20
Total				155	143

*CoSM values will be reduced to account for Matrix faculty teaching in BSOM at the last step

Appendix H – Summary of BUFM Reduction Estimates – Four Predictive Approaches

Table 1 – Summary of Faculty Reductions – Four Approaches

	Predicted Reductions (Faculty FTE)				
College	**Approach I**	**Approach II**	**Approach III**	**Approach IV**	**Avg**
CEHS	14	4	16	15	**12**
CECS	13	21	13	23	**18**
COLA	67	55	50	50	**56**
CONH*	0	0	0	0	**0**
COSM	17	29	33	35	**29**
RSCOB	10	11	15	20	**14**
LAKE*	0	0	0	0	**0**
Total:	**121**	**120**	**127**	**143**	**129**

* Excluded from Retrenchment