

A Comparison of Self-Reported Weekly Time Demands for Cadet and Faculty Populations the United States Military Academy

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Abstract

In the immediate and continued aftermath of the COVID-19 pandemic, colleges and universities have adapted and shifted to alternate, sometimes novel, modalities of learning, all the while preserving the academic rigors and standards necessary to develop competent, critical thinkers across every discipline. Adaptation to new modes of learning, followed by the "bouncing forward" of institutions resuming use of teaching frameworks ubiquitous to the pre-pandemic classroom, requires one resource common to both individual and institutional inputs: the use and management of time. The authors have previously observed that the different teaching methods and technologies propagated in the 2020-2021 timeframe have shifted the in- and out-of-classroom time necessary for learners to achieve markers of academic proficiency and wonder if a comparison of where time commitments peak between faculty and cadet (student) samples over a mid-semester span of time may indicate a point where time becomes a limiting factor in student preparedness capacity or faculty available time.

One institution that historically places high demands on the time of its learners is the United States Military Academy (USMA). Cadets spend four years at USMA preparing to become commissioned military officers who must be able to prioritize and process a diverse stream of requirements and tasks spanning the three pillars of USMA – academics, physical fitness, and military training. Those cadets currently in their sophomore, junior, and senior year have already navigated three challenging semesters, and due to the recent global pandemic, varying degrees of shifting time ratios of in-person, remote, hybrid (combination of both in-person and remote) and asynchronous learning modalities.

This study examines the self-reported time commitments for a sample of both USMA faculty and cadets at over several mid-semester weeks during the fall semester, following further evolution to USMA's institutional learning practices. We approached this topic with the hypothesis that the relative ranking of highest to lowest weekly time commitment over a several week span is unrelated in faculty and cadet respondents as a result of manipulating the group type of respondents. Our survey is designed to tabulate several types of academic-related time commitments to include real-time class attendance, lesson preparation, time spent on graded work and other categories with a parallel faculty and cadet activity set.

The results of this study may impact, narrowly, the time management and self-awareness of respondents who did not previously account for their evolving needs in time management amidst a campaign of "bouncing forward" and in a broader sense, can open additional avenues for considering the evenness of time demands by-week for courses at USMA, alongside the academic and non-academic demands placed upon both educators and learners at this institution.

Introduction

General Background. Educational institutions rely on a consistent, judicious, and balanced understanding of time demands across academic, athletic, student/community wellness, and support programs. For an education system to work harmoniously, both students and faculty must use their time towards learning, teaching, and continuing education productively, neither overcommitting to unrealistic demands, nor spending too paltry a sum of time towards educational pursuits to derive or provide, respectively, conditions for a high caliber of learning.

This system is well-established in academia. Students take courses which are assigned a certain number of credit hours, which correspond to a typical number of hours they will be directly engaged with that course in the week. Academic counselors review student schedules to determine if a student's semester course load is underloaded or overloaded and if they are on target to graduate on time, as prescribed by the institution itself or the student's personal educational goals. Guidelines vary by institution for the minimum and maximum credit hours authorized at the undergraduate level, but at a basic level the college system requires for a bachelor's degree 120 credit hours which would on average equate to 15 credit hours per semester (Endsley 2017). Each credit hour represents one hour of in-class time and two hours of out-of-class preparation and homework which facilitates both students and faculty to estimate two aspects of an academic time demand inherent in a semester schedule.

Pandemic-induced Adaptations. The COVID-19 pandemic has led to institutions implementing a variety of changes in learning modalities, media, and student-faculty interaction. As of the Fall 2021 semester/quarter, schools are in various degrees of moving past the most stringent restrictions of 2020 due to COVID-19. Accordingly, the extents of, alternatively, re-adoption of pre-pandemic beneficial touchpoints, recidivism back into cumbersome learning methods, and transformation to new paradigms incorporating more time-efficient practices are of key import for educators. Today's college students and professors alike have adapted to the variations of four semesters under different conditions with regard to COVID-19 mitigation, and all mitigation shifts introduce changes in the distribution of time for academic and other priorities.

Setting and Institutional Objectives. At the United States Military Academy (USMA), the setting for our study, the term of art for this evolution in practices, for both cadets and faculty, is known as "*bouncing forward*." The temporal aspect of bouncing forward is one of conservation; time is spent in each transition to a new portfolio of teaching methods and rapid adaptation on the part of both cadets and faculty is of paramount importance for the institution's expectations of cadet performance to continue to be reasonably achievable. As the academy moves forward, one widely touted mantra has been "Do less better." From USMA's signature study on bouncing forward, programs have taken measures such as classifying activities as 'critical,' 'essential,' 'enhancing' and 'ancillary,' and from this hierarchy notes "by eliminating or reducing low-return endeavors in the program, we can make available more of what restricts our ability to improve our resilience baseline under routine conditions: time (Pfluger, Butkus, Wallen and Read 2021). The overarching priorities of USMA are unchanged from pre- to post-COVID, as they are expressed in Table 1 below.

Table 1. USMA Mission and Leader Development Programs

USMA Mission			
The U.S. Military Academy at West Point's mission is "to educate, train, and inspire the Corps of Cadets so that each graduate is a commissioned leader of character committed to the values of Duty, Honor, Country and prepared for a career of professional excellence and service to the Nation as an officer in the United States Army."			
The Academy's Four Leader Development Programs			
<u>Cadets Learn to:</u>	<i>By</i>	Character	Programs
Live Honorably	<i>Following</i>	Academic	
Lead Honorably	<i>Through</i>	Physical	
Demonstrate Excellence	<i>the:</i>	Military	

Group Considerations: USMA Cadets. Cadets have a minimum course load which will keep in-class academic hours (Focus Area 1) greater than at least nine per week, even in a modified week, as well as several mandatory events within a week. Often this course load is higher than the comparable academic load at other four-year undergraduate programs. Below is a typical load that a USMA senior may take. Of note, cadets take physical and military classes which feed into their overall grade point average at a set percentage in relation to academic course grades. The schedule below shows a sample schedule with academic, military, and physical classes together.

Table 2: Typical Course Load for a USMA Undergraduate Senior (Environmental Science Major)

Course	Name	Credit Hrs.
EV310	AQUATIC SCIENCE	3
EV365	GEOGRAPHY OF GLOBAL CULTURES	3
EV388A	PHYSICAL GEOLOGY	3.5
EV450	ENVIRONMENTAL ENGINEERING FOR COMMUNITY DEVELOPMENT	3
EV471	ECOLOGY	3
MD401	1ST CLASS MILITARY PERF I	0
MX400	OFFICERSHIP	3
PE360	COMBAT APPLICATIONS	0.5
	<i>CRHR(T): 19.0</i>	<i>CRHR(C): 130.5</i>
	<i>Academic Course</i>	
	<i>Military Course</i>	
	<i>Physical Fitness Course</i>	

Studying occupies the largest individual tranche of time in a cadet’s day; however, all cadets have other responsibilities and mandatory events which consume time. Cadets have 70 days of classes in a semester: 40 classed as “Day 1” and 30 classed as “Day 2” with distinct scheduling except in the case of some classes such as foreign language classes which meet on every class day. The below tables shows where other events fit into a cadet’s typical Monday-Friday class day. As stated within a “Day 1” schedule, cadets often have a block of time taken up with lecture or other military, academic, or character development requirement mid-day called Commandant’s/Dean’s time.

Table 3A: Cadet Academic “Day 1” Schedule

<i>Morning:</i>	
7:00-7:30	Breakfast
7:40-11:50	Class or study
<i>Afternoon:</i>	
12:00-12:35	Lunch
12:45-2:00	<i>Commandant’s/Dean’s Time</i>
2:10-4:10	Class or study
4:25-6:00	Athletics/Extracurriculars
<i>Evening:</i>	
6:30-7:15	Mandatory Dinner (Thursday only)
7:15-7:30	Cadet Duties
7:30-8:30	Study/Extracurriculars
8:30-11:30	Study time
11:30	Taps
12:00	Lights Out

Table 3B: Cadet Academic “Day 2” Schedule

<i>Morning:</i>	
7:00-7:30	Breakfast
7:40-11:50	Class or study
<i>Afternoon:</i>	
12:00-12:35	Lunch
12:45-4:10	Class or study
4:25-6:00	Athletics/Extracurriculars
<i>Evening:</i>	
6:30-7:15	Mandatory Dinner (Thursday only)
7:15-7:30	Cadet Duties
7:30-8:30	Study/Extracurriculars
8:30-11:30	Study time
11:30	Taps
12:00	Lights Out

Group Considerations: USMA Faculty. Time demands for faculty, on the side of a minimal limit, are to an extent standardized by each professor or instructor's duty description, teaching load, additional duties, and other coaching, teaching, program leadership or service roles. Faculty at USMA are comprised of both military and civilian professionals. The majority of military faculty, known as "junior rotators," come to USMA in their 10th-14th year of military service after receiving a master's degree and teach for 2-3 years. Senior rotators typically arrive at USMA with 16-20 years of military service and have obtained doctorate level education. Civilian faculty are usually also at the postdoctorate level when in teaching positions. Finally, permanent faculty lead departments and academic centers and usually have upwards of 20 years of military service or substantial longevity as civilian academic professionals. USMA does not allow cadets to claim dependents, nor does it provide for "family housing" for cadets, who come to USMA from every State, from United States Territories, as well as international sources. In contrast, the majority of USMA staff and faculty have families co-located with them here in New York.

Research Question

As educators, we observe that cadets at USMA live and study in a time-stressed environment. Cadets sometimes tell faculty that they are in a "Thayer Week," which in USMA vernacular means a week with a significantly higher intensity of academic requirements than a "typical" academic week. We would like to understand if this is a real phenomenon by analyzing week to week variation in cadet time demands. Further, we would like to track in a parallel fashion faculty time demands during the same multi-week period so that we can answer the question of whether faculty time-intense weeks overlap with time-intense weeks of cadets. We wonder if, absent a clear driving rationale why these highs and lows in time demand would be linked, the relative ranking of highest to lowest weekly time commitment is not correlated between cadets and faculty at USMA. A time study appeared well-suited to an analysis of the question, as we can establish multiple criteria for use of time, compare against groups of interest, and draw some conclusions on compatible vs. incompatible explanations (Matthew and Rogers 1955).

Hypothesis

The relative ranking of highest to lowest weekly time commitment over a span of several weeks is comparable in faculty and cadet respondents as a result of manipulating the group type of respondents.

Methodology

Creation of Time Allocation Worksheet. The first step in our procedure was to standardize a time allocation worksheet, which served to collect activity names and hours to completion during each week of the study for both cadets and faculty alike. Because USMA already has a classification system for faculty priorities known as the "Five Faculty Domains" or "Five Pillars," we began with this framework. Colloquially, many instructors at USMA refer to a "sixth pillar," which consists of prioritizing self-development and family as an aspect of wellness and work-and-quality-of-life balance. Within one department of USMA, several faculty members tested out this

concept between March 2020 and the summer of 2021, resulting in the iterative refinements to the time worksheet shown in Appendices 1A-1D. The original March 2020 worksheet allowed for only the “Five Faculty Domains”, but user testing in Spring 2020 resulted in the addition of the “sixth pillar” in subsequent worksheets.

Table 4: Parallel Activity Category Classifications for Faculty Domains (FD) and Cadet Focus Areas (FA)

No.	Faculty Domain	Cadet Focus Area
1	Teaching	In-class Academic Time
2	Scholarship	Out-of-class Academic Time
3	Service	Military & Physical Obligations
4	Cadet Development	Team/Club
5	Faculty Development	Leader/Peer/ Character Development
6	Self-Development/ Readiness/ Other	Self-Development/ Readiness/ Other

Adapting Domains to Cadet-compatible Focus Areas. The next necessary step was to identify a nearest-neighbor time use category for each of the six Faculty Domain designators. We are labeling these closest-equivalent categories as Focus Areas for cadets to distinguish them from Faculty Domains. For this, we matched the cadet-driven outputs necessary for fulfillment of moving through the four leader development programs. Teaching and Scholarship on the part of faculty have the nearest relationship to In-class academic time (attending classes, going to office hours in particular) and Out-of-class academic time (homework, research, and group work in particular), respectively.

The teaching and learning tasks inherent in Domains/Areas 1 and 2 are not individually complimentary to a high enough degree to move on without further classification. Therefore, we determined that one of our summary data metrics would be Academic time consisting of the sum of FD1 and FD2 for faculty and the sum of FA1 and FA2 for cadets. Though this superset is not specified anywhere on the Time Allocation Worksheet, it is trivial to compute in data compilation for comparative purposes.

For Service as a faculty domain, the nearest cadet time category is Military and Physical Obligations, because through these obligations cadets are preparing directly for their career of service. For Cadet Development as a faculty domain, the nearest cadet time category is Team and Club time, because most faculty time spent developing cadets is spent where the cadets are present and engaged in their teams and clubs.

For Faculty Development as a faculty domain, the nearest cadet time category is Leader/Peer/Character development. USMA is a leadership laboratory where cadets take on leadership positions within their own body, the Corps of Cadets, and in so doing develop each other. Our sixth domain is directly relevant to cadets, rounding out our time comparison linkages.

Establishing Worksheets for Study Period. We selected a mid-semester period of five weeks to collect data over, which would ensure cadets were not still adapting to their schedules or preparing for the end of their semester during the study but simply in the middle of a semester’s rhythm.

Call for Participants. We queried over 100 cadets and faculty with our updated spreadsheet (faculty version and cadet version). These cadets and faculty represent a diverse set of majors, departments, and backgrounds. Ultimately, we began the study with eleven cadet participants and five faculty participants, who logged their activities and hours with our spreadsheets reflected in Appendix 1D and Appendix 2 at the end of each week of the study. As a reminder of how the week was structured, we added to each worksheet tab a snapshot of the USMA academic calendar for that week as shown in the table below.

Table 5. USMA Academic Calendar for Week 1 of Study (Fall Semester)

19	20 1 -13 Dean	21 2 -11 S2-4/ SeminarA- 6/V2-4	22 Study Day	23 2 -12 SeminarB-6/ T2-4/W2-4	24 1 -14 CCEP	25 F FB v Miami (OH)
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We also classified participants into only the two groups of cadets or faculty. Even though some faculty are more senior than others, some studies demonstrate that the time effects of teaching do not tend to vary significantly between faculty experience levels (Moore, Randall, and Bonney 1987). Participants submitted worksheets directly to the authors who aggregated the files in an Excel workbook and assigned each participant an ID# to mask identity.

Time Sum Equations. Cadets and faculty at USMA who elected to take part in our survey sent us their time allocation worksheets for weeks 1-3. Within the Excel workbook, we aggregated times using the following formulas operationalized to the Excel workbook matrix.

For total time per week by given participant (cadets represented by i, faculty represented by j):

$$t_{tot,i} = t_{FA_1} + t_{FA_2} + t_{FA_3} + t_{FA_4} + t_{FA_5} \dots \dots \dots (1a)$$

$$t_{tot,j} = t_{FD_1} + t_{FD_2} + t_{FD_3} + t_{FD_4} + t_{FD_5} \dots \dots \dots (1b)$$

For a given week,

$$\bar{t}_{student} = \frac{\sum_{i=1}^m t_{tot,i}}{m} \dots \dots \dots (2a)$$

$$\bar{t}_{faculty} = \frac{\sum_{j=1}^n t_{tot,j}}{n} \dots \dots \dots (2b)$$

Predictions

Given that the number of influences on both cadet and faculty population are opaque, nonlinear, transient, and ill-defined, making predictions for the observations within samples of cadets and faculty is impractical. Empirical data will reflect a wide array of obligations and choices in the use of time among both groups. It is at least possible to place an upper limit on time—with 168 hours in a week, parties will have to deduct time spent sleeping, eating, and taking part in activities that are unrelated or unproductive regarding the mission of USMA. Even so, the relative time intensity may relate to each other in one of three major frameworks.

The first framework is one of **non-relation**. If fluctuations in cadet time demands/uses bear no correspondence with fluctuations in faculty time demands/uses, this study will find evidence supporting a low degree of correlation among the relative rise and fall from week-to-week of time demands for each group. In this draft paper, the non-relation framework is our baseline expectation, until or unless either:

a) a clear relationship is evident within the bounds of Weeks 1-3 of data and a 90% confidence interval, or

b) the remaining six weeks of study data can illuminate trends, since our final paper will have enough data points for us to conduct a Student's t-test which will provide much more robust statistical comparison capability than our dataset possesses at the point of Week 3.

The second framework is one of **one-to-one correspondence**. The underlying theory behind this work is that events cadets prepare for are also events that faculty prepare for, and if faculty are spending more time with cadets in settings such as office hours to help them with time-intensive events, faculty time may show a surge during the same week that cadet time does.

This finding would hold if the rises and falls in time demands by week aligned with high affinity for faculty and cadet group aggregate reporting. A direct comparison would show that the fractional change in time demand from one week to the next is proportional by some constant and that this relationship would hold through all five weeks of the study. This requires a high bar of proof to clear, and yet it can only be ruled out if this proportionality schema is evidently maladaptive for the sample with a 90% confidence interval applied. A one-to-one correspondence would provide some evidence towards correlation between faculty and cadet time demands. Equation 3a below shows mathematically how the proportionality of a one-to-one correspondence would manifest itself.

$$\frac{\bar{t}_{student_{week\ 1}}}{\bar{t}_{faculty_{week\ 1}}} \propto \frac{\bar{t}_{student_{week\ 2}}}{\bar{t}_{faculty_{week\ 2}}} \propto \frac{\bar{t}_{student_{week\ 3}}}{\bar{t}_{faculty_{week\ 3}}} \dots (3a)$$

The third framework is **one of one-to-one correspondence with lag**. The underlying theory behind this framework is that a “heavy” week for cadets, particularly in the sense of academics, will often result in their proffering of significant assessable work to professors and instructors. Examples of such work are problem sets, tests, essays, papers, oral recitations, briefs, debates, projects, and lab reports. Faculty, in turn, must devote time to grading that work in some increased proportion relative to a “typical” faculty week, just as cadets devoted more than typical

time to creating the work. Equation 3b below shows mathematically how the proportionality of a one-to-one correspondence with lag would manifest itself.

$$\frac{\bar{t}_{student_{week\ 1}}}{\bar{t}_{faculty_{week\ 2}}} \propto \frac{\bar{t}_{student_{week\ 2}}}{\bar{t}_{faculty_{week\ 3}}} \propto \frac{\bar{t}_{student_{week\ 3}}}{\bar{t}_{faculty_{week\ 4}}}\dots(3b)$$

Results

Our paper includes five weeks of collected data. The findings below in Table 6 represent aggregated data over a six-week period during the fall semester. All data tables and figures which follow in this section and the discussion section reflect the full range of data collected.

Table 6: Hours Per Week for Academic and Total Faculty Domain and Focus Area time, Mean and 90% Confidence Bound

	Academic Hours		Total Hours	
	Cadet	Faculty	Cadet	Faculty
Week 1	28.33	29.04	64.11	54.54
+/-	2.975	4.956	4.472	6.873
Week 2	27.50	28.25	62.50	54.59
+/-	2.382	6.367	4.001	7.833
Week 3	25.75	27.00	58.78	49.88
+/-	4.340	6.878	7.185	11.393
Week 4	28.61	25.92	60.28	43.42
+/-	3.701	3.711	5.189	7.672
Week 5	31.78	22.21	62.76	51.92
+/-	4.010	2.248	8.544	9.718

Quality Assurance/Quality Control. Prior to collecting data, we selected a criterion for which to conduct a QA/QC check of data. This screening criteria was that no more than 15% of any given respondent’s time values in a category may be greater than two standard deviations above the mean or less than two standard deviations below the mean. This check caught one respondent with 17.5% of time values outside of this range. Upon removing this respondent, one more individual had 20% of time values outside of the criteria range and moved out of the dropped out data list as a result. With these two respondents screened, our data herein is for nine cadets and six faculty members.

Discussion

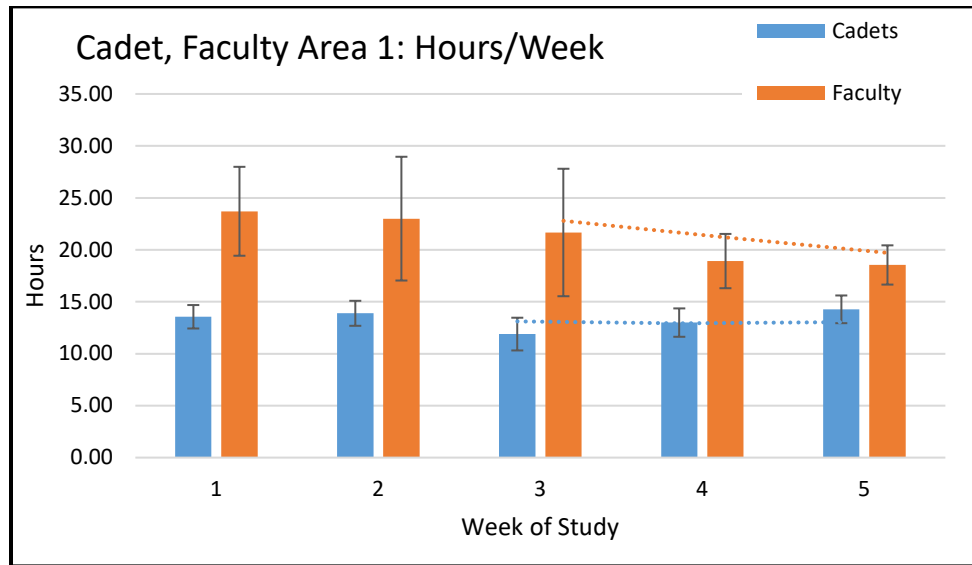


Figure 1: Sample means for Weeks 1-5 for Cadet In-class Academic Time and Faculty Teaching efforts (FA1, FD1)

Cadets spend between 10 to 15 hours in class during the weeks surveyed, compared to between 15 and 30 weekly faculty hours supporting the teaching domain as Figure 1 shows. The overall time ranking of these three weeks are for the cadet population at large is unclear. For that reason, a comparison of Focus Area 1 and Faculty Domain 1 does not posit evidence for either of the relational frameworks. A three-week moving average indicates that faculty time in academics trended downward through the study, while cadet time engaged in academics in-person stabilized.

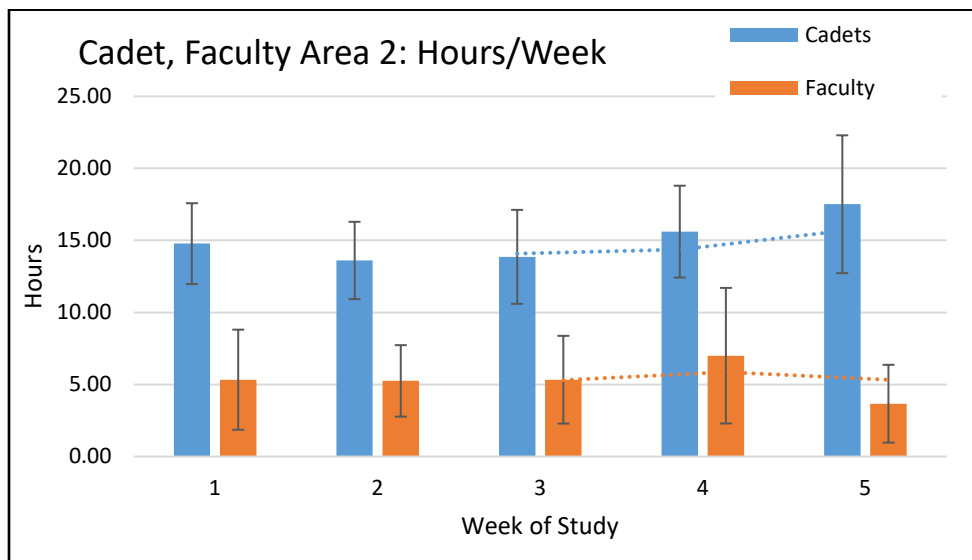


Figure 2: Sample mean for Weeks 1-5 for Cadet Out-of-class Academic Time and Faculty Scholarship efforts (FA2, FD2)

As shown in Figure 2, cadets spend significantly more time on activities such as homework, research and group work outside of class than the surveyed faculty spend on scholarship. However, scholarship is a lower priority for junior rotating faculty than for senior faculty, so a different sample leaning more heavily on other faculty groups than the present sample (which is mostly comprised of junior rotators) may reveal more scholarly heft to paint a more complete comparative picture.

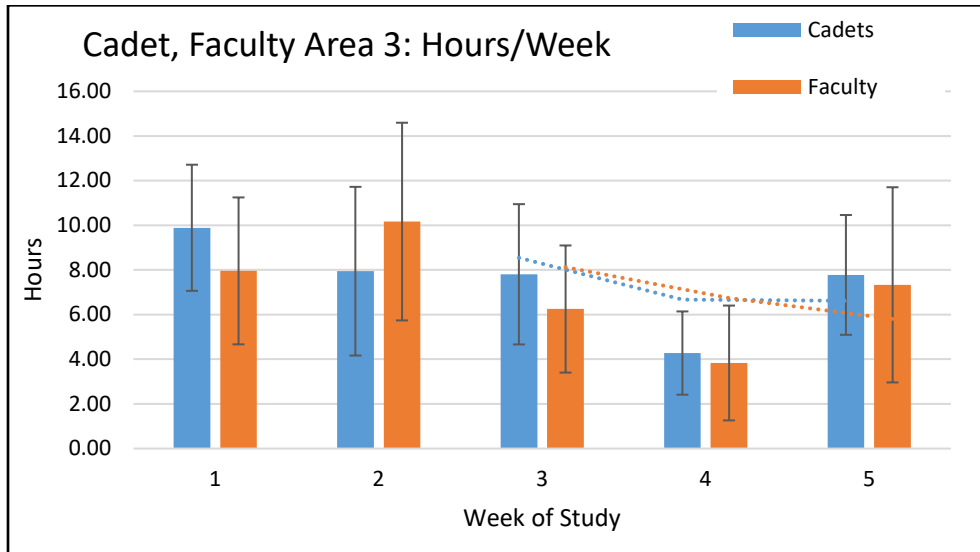


Figure 3: Sample mean for Weeks 1-5 for Cadet Military and Physical Obligations and Faculty Service efforts (FA3, FD3)

Figure 3 demonstrates that cadets tend to report spending more time preparing for the military/physical aspects of their future careers of service than faculty spend in present service outside of the time tracked in other categories. This is a reasonable interpretation because all cadets must train for mandatory military and physical events, while faculty service requirements are significantly less uniform. Faculty and cadet time here appears to settle into a one-to-one framework in the last few weeks of the study. However, the confidence bound is too wide to identify trends in this category from one week to another.

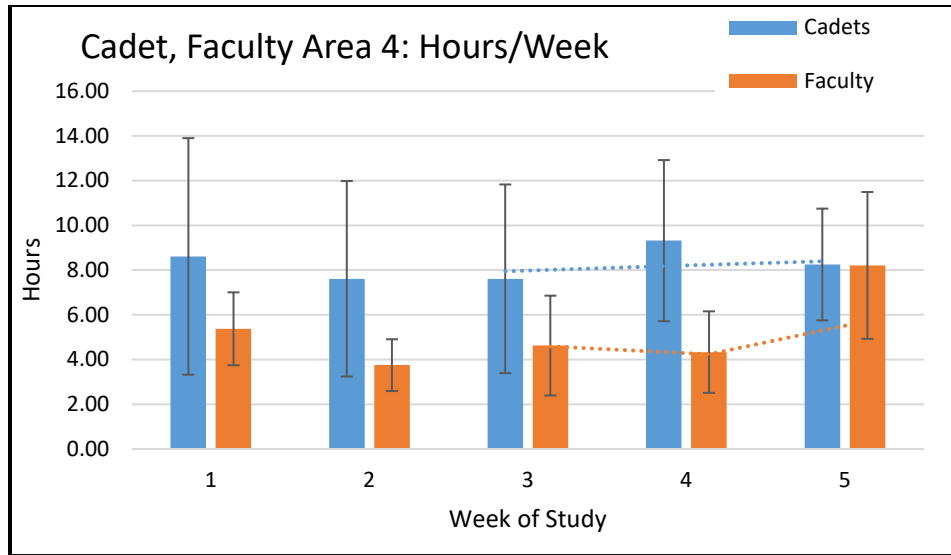


Figure 4: Sample mean for Weeks 1-5 for Cadet Team/Club Time and Faculty Cadet Development efforts (FA4, FD4)

Figure 4 demonstrates that cadets tend to report spending more time with their teams and clubs than faculty spend towards similar individual and team development. This is a reasonable interpretation because all cadets are also athletes, whereas not all faculty work with a cadet club or team in developing the team and its members, and some faculty choose much less time-intensive means to affect cadet development. However, the confidence bound is too wide to identify trends in this category from one week to another.

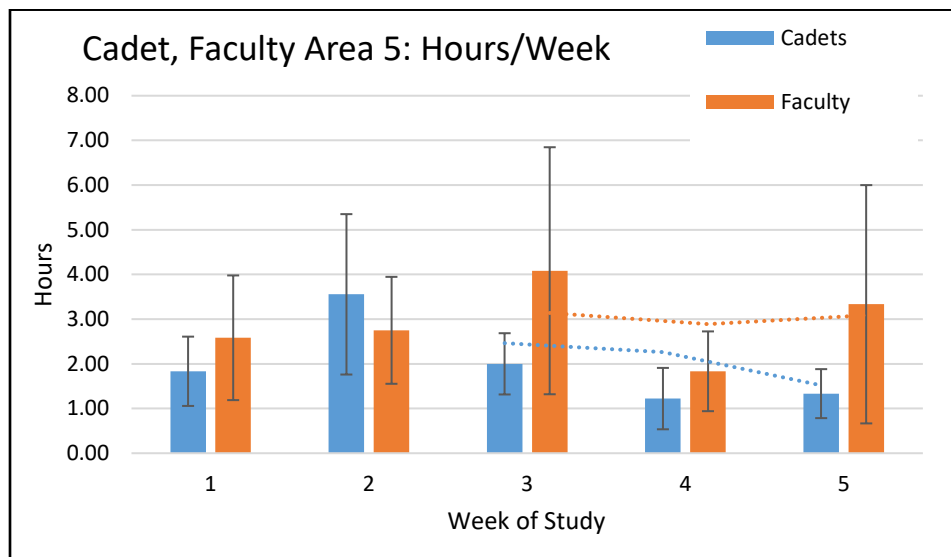


Figure 5: Sample mean for Weeks 1-5 for Cadet Leader/Peer/Character Development and Faculty-coded Faculty Development efforts (FA5, FD5)

Figure 5 demonstrates that cadets tend to report spending a decreasing amount of time supporting development of their peers and character of their profession as the study progressed

whereas faculty did not appear to trend up or down. However, the confidence bound is too wide to identify trends in this category, especially for faculty and the wide range of survey category totals.

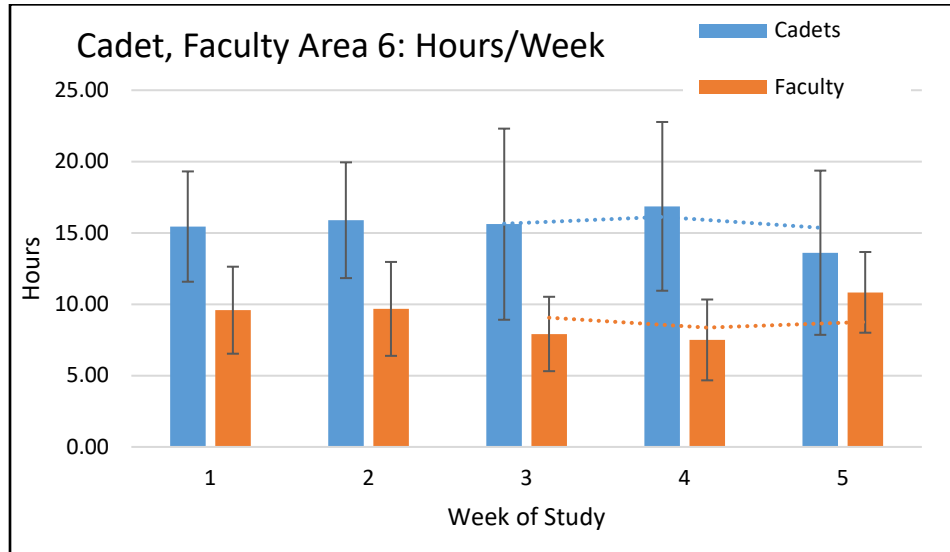


Figure 6: Sample mean for Weeks 1-5 for Cadets and Faculty Under the Category of Self-Development/ Readiness/Other (FA6, FD6)

Figure 6 demonstrates that cadets tend to report more time supporting self-development, readiness, wellness, and other related priorities than faculty do. However, the confidence bound is too wide to identify trends in this category from one week to another. Of further note, some participants placed this as their penultimate time-intensive priority, after teaching (faculty) and out of class academic time (cadets).

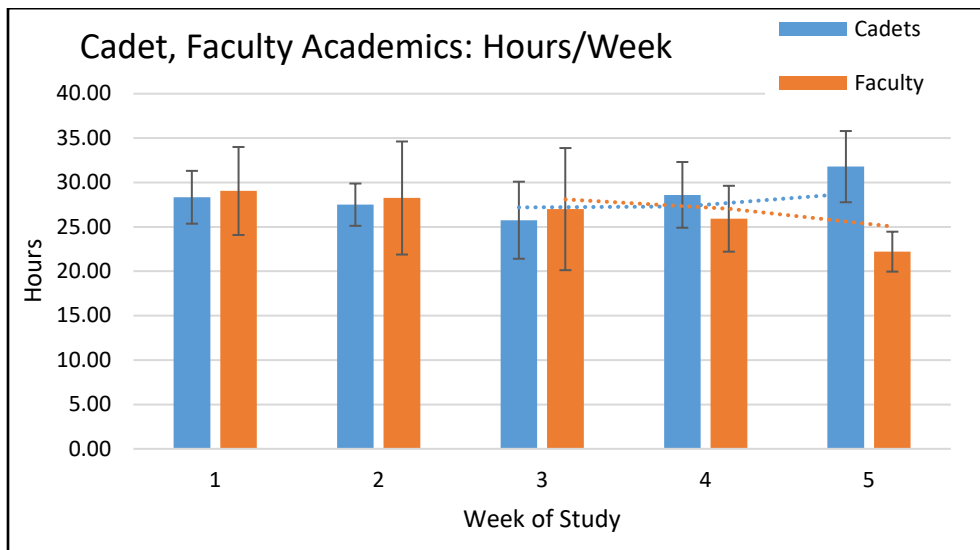


Figure 7: Sample mean for Weeks 1-5 for Cadets and Faculty Aggregated Academic Time (FA1+FA2, FD1+FD2)

Figure 7 reflects academic time by summing FA1 and FA2 for cadets and FD1 and FD2 for faculty and comparing them against each other. In so doing, the results reveal that the academic aspect of both groups' time began at a nearly equivalent volume, with self-reported academic hours averaging within 30 hours +/- 10% and fairly consistent confidence bounds particularly three weeks into the study. However, as more time progressed, cadet academic time demands increased. By contrast, faculty time demands decreased—every week on average for the sample. Figure 7 best supports non-relation, but data precision is insufficient to quantify this with statistical tools.

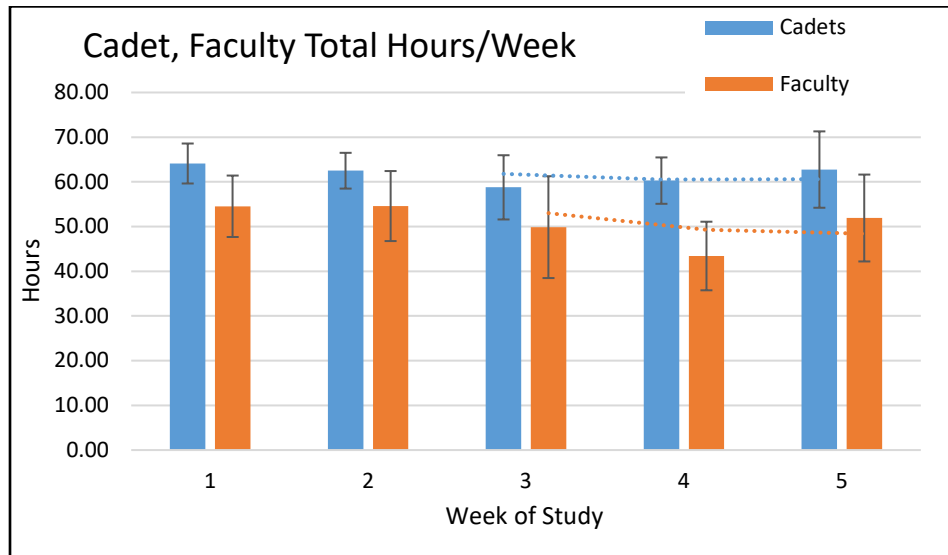


Figure 8: Sample mean of all supported time activities for Weeks 1-5 for Cadets and Faculty

Using Figure 8 and in looking at total time reported towards USMA/professional priorities, cadet and faculty times are reasonably distinct in Week 1 and Week 4 and overlap slightly with their respective confidence bounds in other weeks.

The data suggests that, within the bounds of a 90% confidence interval, the cadet population spends more self-reported time engaged in pursuit of their professional obligations than the faculty population during certain weeks. This trend does not appear likely to follow a one-to-one correspondence or correspondence with lag but either possibility is technically possible within the confidence bound.

As one further examination into correspondence of means at a weekly interval, Figure 9 contains scatterplots of the Total Academic Hours and the Total Hours from both a one-to-one correspondence and an offset one-to-one with lag correspondence.

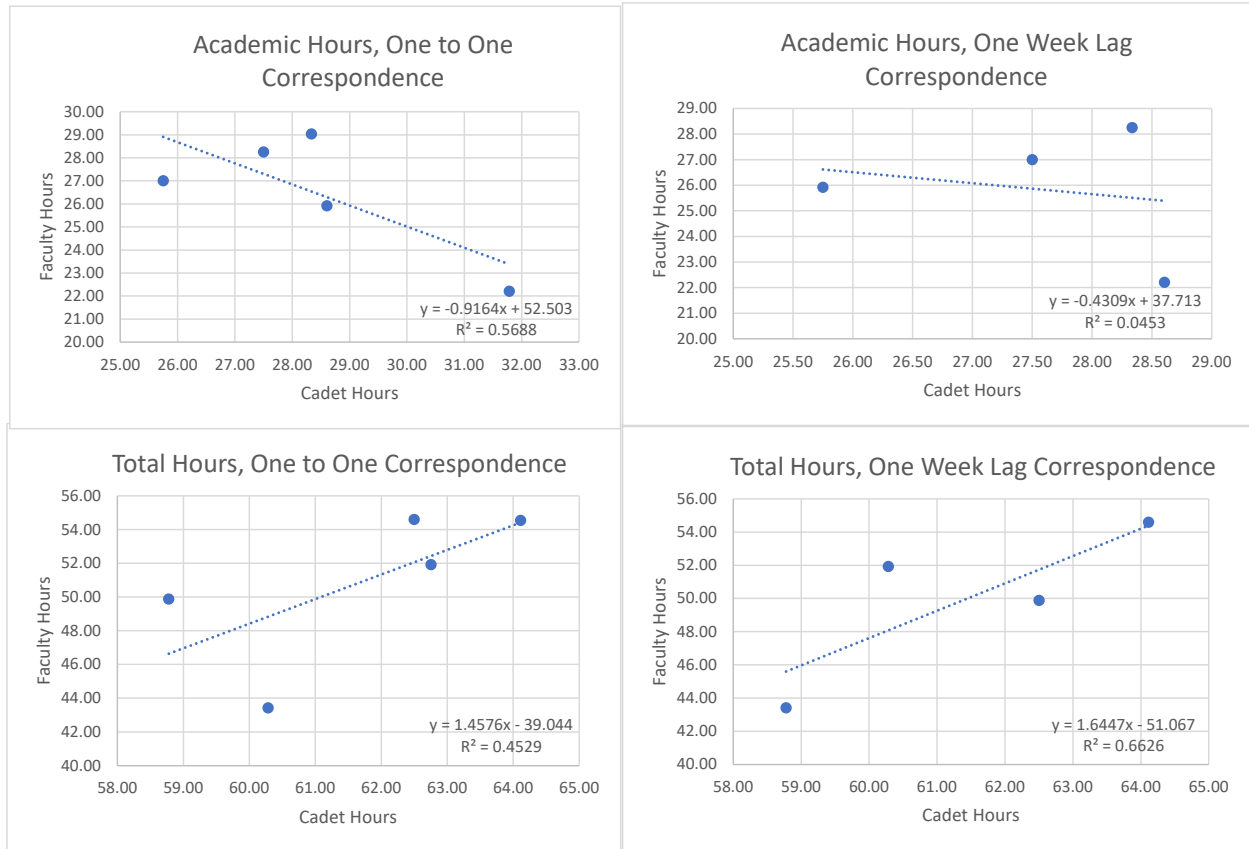


Figure 9: Cadet and faculty compared total hours and total academic hours for direct comparison (top and bottom left) and with faculty hours staggered by one week to examine potential lag (top and bottom right).

Of the two types of combined time aggregates and the two relationally significant frameworks, a linear regression demonstrates the highest correlation at total hours with a one-week lag correspondence, with an R^2 of 0.6626. This degree of explainable correlation is far from convincing, but relative to total academic hours, the data provides more support for theory of a one-week lag in faculty time intensity post-cadet time intensity, though it is still possible that there is no real relationship.

Sources of Uncertainty

This study's findings require several caveats that touch on several known unknown quantities and unknown unknown quantities.

1. Our sample sizes are small. With only eleven participant volunteers in our cadet sample, our study resembles more of a pilot than a comprehensive analysis because we cannot provide a high degree of coverage across all types of demographics at USMA. The Corps of Cadets at USMA consists of approximately 4,400 cadets at any given time. A robust future survey could collect data from at least 5% of this population or 220 cadets or more. This would also require 50 or more faculty to participate to achieve a similar ratio from the faculty group.
2. The cadet-participant time allocation worksheet is not set up in its current form to capture representation of gender, class year, ethnicity, race, affluence, geographic or national origin, academic major, level of education, or class rank/standing. Some of these variables may be worth capturing for cross-tabulation in future study, but the signature feature of the Time Allocation Worksheet concept is that it should be as simplified as possible to maximize its utility to the user.
3. Additionally, all cadets in the study share—not by design but in practice—the trait of being non-engineering majors who chose the Environmental Engineering sequence of classes to satisfy their USMA engineering three-course requirement (cadets in non-engineering majors may choose from several different tracks of engineering specialties in their three-course sequence requirement). According to The National Survey of Student Engagement, a widely used instrument for assessing the quality of undergraduate education, STEM majors spend an average of 17% more time on homework than humanities majors (NSSE 2021). This is not something we are able to capture with our sample representation.
4. There may be a degree of reporting bias reflecting generational differences between the cadet and faculty groups. Even though cadets log more hours in support of USMA priorities, many cadets log time spent talking to friends and family as wellness or self-development time under the sixth focus area. This is fair—most cadets are living away from their most significant support structures and need those touchpoints to be emotionally healthy. However, faculty are much less likely to think of or report time with friends and family because most faculty return home at the end of a teaching day.
5. Some participants stated that they partake in some degree of multitasking. Our instructions to them were to only count any given hour of time for the activity usage it was best suited for. For example, an instructor who grades papers while proctoring an exam must decide if the time in class counted for teaching or grading, and this required some judgement on what use of time was most or more efficient.
6. Our QA/QC screening criteria was that no more than 15% of a respondent's categorical time sums could be outside of a range two standard deviations greater or less than the mean of that sample's time sum value. Differing QA/QC standards would influence some overall trends.

Conclusions

1. Additional subsequent weeks of data integration are necessary to differentiate between the three possible framework explanations for faculty and cadet time relationships. In an 18-week semester, five or six weeks constitute a one-third slice of a continuous academic campaign including six- and ten-week grades reports (in the case of USMA), a significant quantity and diversity in graded events, course modules, extracurricular activities, and mandatory and optional beneficial further activities. However, an expansion of the time period along with a greater sample size could illuminate hidden trends.

2. The data from Weeks 1-3 of this study does not necessarily support the idea of a “Thayer Week” phenomenon on a larger scale for the Corps of Cadets. While it is certainly clear from the longitudinal data that individual fluctuations from week to week can vary by as much as 50%, these blips mostly disappear rather than stabilize with the samples as a whole taken into account. Indeed, from Week 1 to Week 5 there is no more than a 7% change in time devoted to academic focus areas among the cadet sample from one week to another. In contrast, the faculty sample mean total time sees a nearly 11% jump between Week 1 and Week 2 while academic time varies by just under 10% in the same period. Therefore, if anything, there may be more of a “Thayer Week” effect for faculty than for cadets at USMA despite the fact that cadet programmed time is more restrictive and uniform than that of faculty overall.

3. With more time progressing in the semester, the sample means indicate trends of faculty requiring less time to be devoted to teaching/academics while cadets overall see an increase during the study period of sample mean times devoted to learning/academics. One workable theory may be that while professors/instructors spend considerable time preparing a course, often one already familiar to the teacher, early in the semester, cadets learning a subject for the first time must pace their time out more effectively.

Future Study Opportunities

Application within Federal Service Academies. The United States Naval Academy, United States Air Force Academy, United States Coast Guard Academy, and the United States Merchant Marine Academy are all structured similarly. That is, at each of these schools, cadets or midshipmen spend four years at a regimented institution earning a Bachelor's degree as well as a military commission in preparation for a career of service. These rising leaders and undergraduates are thus challenged in the military, physical, and character facets of development in addition to academics.

This study methodology could fit any other service academy as it is flexible enough to capture those fundamental similarities in the faculty domains and cadet focus areas. Applying this beyond USMA could help the academies see the commonalities and differences in the ways in which time is constrained or available for the academies' missions.

Within USMA, or within any applicable institution, this type of time allocation analysis can benefit course directors, program directors and curriculum coordinators. Every course at USMA undergoes annual or semiannual review in a Course Assessment Report (CAR) which the course director assembles at the end of a full semester. Course End Surveys are the primary tool which

inform course directors of cadet perceptions of whether or not time was sufficiently allocated for all of the work inherent in the course.

Broad Application. The conceptual basis for our longitudinal time comparisons between educators and students is ripe for operational employment at any educational institution interested in either comparative time or time-as-a-proxy-for-manpower types of internal assessment. It is true that equivalents to the “Five Faculty Domains” would look different at any given public or private undergraduate program. However, teaching, scholarship, student services, public service, faculty support, and self-development type categories may fit a wide swath of academics’ employment in time. Categorical transformation may require more complex consideration for students as not all students participate in athletics, service, or other activities that are either mandated or strongly encouraged for their service academy counterparts.

The application of this time study method to large sample sizes would necessitate reassessment of the primary survey collection mechanism. With the objective that our survey should be eminently accessible and simple to use for participants, a smartphone app could theoretically reduce the time to log activities and provide a more user-friendly interface even than our Excel workbook. Alternately, a computer-based Microsoft Forms survey would feature interoperability between computer and smartphone platforms. Prior to adoption on a campus-wide scale, either of these media are suitable for application of an engineering design process and A/B testing to refine the data integration process and the user-facing functionality, respectively. Beyond those options, a vast array of project management-enabling software might be adapted to suit the goals of this educational group comparison concept.

Ultimately, any broad application of this time allocation survey, whether through the means above or other means, has greater potential with increasing automation to reduce the labor of aggregating individual survey results into the overall compilation, opening opportunities for data interpretation via more powerful processing tools.

Acknowledgements

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Appendix 1A: March 2020 Precursor to Faculty Domain Time Allocation Worksheet

Faculty Domain Time Allocation Worksheet											
	Teaching		Cadet Development		Service		Scholarship		Faculty Development		Time (hr/wk)
	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	
1											
2											
3											
4											
5											
6											
		sum	0	sum	0	sum	0	sum	0	sum	0
Total time in faculty domains (hr/wk) 0											
Instructions											
1. Scrub your calendar for a typical week or over the last few weeks to identify events and time allocation											
2. Enter events and time in hr/wk											
3. Compare faculty domains to see where time is spent and if there are imbalances relative to priorities for your current faculty category											

Appendix 1B: Winter 2020 Version of Faculty Domain Time Allocation Worksheet

CPT Wiley Faculty Domain Time Allocation Worksheet (Typical 20-2 Average Pre-COVID19)															
	Teaching			Cadet Development			Service			Scholarship		Faculty Development		Self Development/Readiness	
	Event	Time (hr/wk)	Time (hr/wk)	Event	Time (hr/wk)	Time (hr/wk)	Event	Time (hr/wk)	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)
1	Live, in classroom sessions	9	Team Practices (Marathon, Orienteering)	4.5	Additional Duty Facilities manager	2.5	Faculty Seminar (AVG)	0.75	PMP Prep	1.5					
2	Grading	7	UCF/OCF	1	Dept Social Event	2			Counseling	1					
3	Prep for teaching	5	Engineer Small Group (AVG)	0.5	ACFT Prep	1.5			Faculty Sport (i.e. Ultimate Frisbee)	1					
4	Observing future class	4	CCEP/Character Lunch (AVG)	0.5	ABET Prep (AVG)	1.5			Mentorship	1					
5	Additional Instruction (AI)	3							Bible Study	0.75					
6	Course Director Duties	1.5							Department Administrative	0.5					
7	Labs	1.5													
8	Course Sync Mgs	1													
9	Cadet Accommodations	1													
		sum 33		sum 6.5	sum 7.5	sum 0		sum 0.75	sum 5.75					sum 10.75%	
		percentage 61.68%		percentage 12.15%	percentage 14.02%	percentage 0.00%		percentage 1.40%	percentage 10.75%						
		(hr/wk) 53.5													
OBJ:	Find efficiencies in time here														
	Flex as needed time here														
	Even out time here														
	Increase time here														
	Maintain time here														
	Protect time here														
	Instructions 1. Scrub your calendar for a typical week or over the last few weeks to identify events and time allocation 2. Enter events and time in hr/wk 3. Compare faculty domains and self development/resiliency time to see where time is spent and if there are imbalances relative to priorities for your current faculty category														

Appendix 1C: Summer 2020 Version of Faculty Domain Time Allocation Worksheet

CPT WILEY Faculty Domain Time Allocation Worksheet (20-25 Summer Detail)												
	Teaching/Primary Duty		Cadet Development		Service		Scholarship		Faculty Development		Self Development/Readiness	
	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)
1	CLD Detail at 10 hours/shift and 6x/week	60	Department Academic Counselor	0.5	Facilities Officer	5	Project 1: Future Effort	0	Meeting w/ mentors	1	Department Administrative	1.5
2	EV300 Block 1 Preparation	2	Mentoring others included in CLD Detail Time	0	ABET 2020 Preparation	2					Religious activity (every other week)	0.5
3												
4												
5												
6												
7												
8												
9												
		sum 62		sum 0.5		sum 7		sum 0		sum 1		sum 2
		percentage 85.52%		percentage 0.69%		percentage 9.66%		percentage 0.00%		percentage 1.38%		percentage 2.76%
		72.5										
	Total time in faculty domains (hr/wk)											
Self-Assessment	Find efficiencies in time here		Flex as needed time here		Find efficiencies in time here		Maintain time here		Maintain time here		Protect time here	
	Instructions 1. Scrub your calendar for a typical week or over the last few weeks to identify events and time allocation 2. Enter events and time in hr/wk 3. Compare faculty domains and self development/resiliency time to see where time is spent and if there are imbalances relative to priorities for your current faculty category											

Appendix 1D: Fall 2020 and Beyond Faculty Domain Time Allocation Worksheet

CPT X Faculty Domain Time Allocation Worksheet (Typical Week, Pre-COVID19, Post-COVID19, etc.)																
	Teaching			Cadet Development			Service			Scholarship		Faculty Development		Self Development/Readiness		
	Event	Time (hr/wk)		Event	Time (hr/wk)		Event	Time (hr/wk)		Event	Time (hr/wk)		Event	Time (hr/wk)		
1	In-class teaching	12		Team Practice	4.5		Project 1	4		Meeting w/ mentors	1		ILE / PMP / Other	1.5		
2	Grading	6		Club Activity	2		Department Additional Duty 2	1.5		Mentoring others	1		Department Administrative	1.5		
3	Prep for teaching	6		CCEP/Character Lunch (AVG)	0.5		Department Additional Duty 3	0.5					Faculty sports	2		
4	Observing future class	4											Religious activity	1		
5	Additional Instruction (AI)	3														
6	Course Director Duties	1.5														
7	Labs	1.5														
8	Course Sync Mtgs	1														
9	Cadet Accommodations	1														
		sum	36		sum	7		sum	4.5		sum	4		sum	2	
		percentage	60.50%		percentage	11.76%		percentage	7.56%		percentage	6.72%		percentage	3.36%	
		Total time in faculty domains (hr/wk)	59.5													
Self-Assessment	Find efficiencies in time here			Flex as needed time here			Find efficiencies in time here			Maintain time here		Maintain time here		Protect time here		
	Instructions															
	1. Scrub your calendar for a typical week or over the last few weeks to identify events and time allocation															
	2. Enter events and time in hr/wk															
	3. Compare faculty domains and self development/resiliency time to see where time is spent and if there are imbalances relative to priorities for your current faculty category															

Appendix 2: Sample Cadet Focus Area Time Allocation Worksheet

CDT X Focus Area Time Allocation Worksheet (Typical Week Pre-COVID19, Post-COVID19, etc.)																	
In-Class Academic Time			Out-of-Class Academic Time			Military and Physical Obligations			Team/Club			Leader/Peer/Character Development			Self Development/Readiness/Other		
Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)	Event	Time (hr/wk)
1	LF203	4	LF203	5	Football Game Attendance	4	Team Practices	6	Squad Leader duties	1.5	Video Games (Stress Relief)	3					
2	CH385	3.5	CH385	4	Mandatory Meals	3			Meeting with Mentors	1	Studying for FE Exam	1.5					
3	CH390	2	CH390	4	Drill Practice	1.5					Company Administrative	1.5					
4	EV300	2	EV300	4	Mandatory Briefing	1.5					Religious activity	1					
5	MS300	1.75	MS300	3							IOCT Practice	1					
6	PH206	1.5	PH206	3							Pick-up Ultimate Frisbee	1					
7	PL300	1.5	PL300	2													
8																	
9																	
		sum	16.25	sum	25	sum	10	sum	6	sum	2.5	sum	9				
		percentage	23.64%	percentage	36.36%	percentage	14.55%	percentage	8.73%	percentage	3.64%	percentage	13.09%				
		Total time in focus areas (hr/wk)	68.75														
Self-Assessment	I tend to multitask during time here			Be more efficient with time here			No influence on time here			Schedule out in advance time here			Flex as needed time here				
	<p>Instructions</p> <ol style="list-style-type: none"> Scrub your calendar for the week given to identify events and time allocation Enter events and time in hr/wk Compare focus areas and self development/resiliency time to see where time is spent and if there are imbalances relative to priorities for your current focus areas <p>Reflections for the week:</p>																

Appendix 3A: Interim Time Study Workbook Data Aggregation Tab, Weeks 1-3

C01	Cadet Focus Area Summary Table															QA/QC Check									
	Week 1					Week 2					Week 3					Total	QA/QC Failures	QC Failures %							
	FA1	FA2	FA1+FA2	FA3	FA4	FA5	FA6	Total	FA1	FA2	FA1+FA2	FA3	FA4	FA5	FA6				Total	FA1	FA2	FA1+FA2	FA3	FA4	FA5
18	30	48	14	4	0	26	92	18	30	48	7	16	0	27	98	18	30	48	14	16	0	27	105	2	0.083
13.6	17	30.6	8.5	3	1	24	67.1	13.6	15	28.6	6.5	1.5	1	23	60.6	13.6	20.5	34.1	9.5	1.5	1	28.5	74.6		
16.5	14.5	31	8.5	18	2.5	9	69	16.5	17.5	29	4	18	4	9	64	16.5	11.5	28	4	15	3	5	55		
13	9	22	3	0.5	6	62	16	9	2.5	3	19.5	0.5	4	52	8	5	13	2.5	18.5	1	3	1	0.042		
13	16	29	13	7.5	2.5	13.5	65.5	13	10.5	23.5	5.5	16	8	15.5	68.5	8	5	13	2.5	18.5	1	3	38		
12	15	27	18	5	3	16	69	12	23	35	20	0	3	13.5	71.5	12	21	33	14	5	3	11	66		
9.5	5.5	20.5	15	6.5	1.5	10	53.5	15	6	21	13	6.5	6	21.5	88	12.5	25	10	7	2.5	15.5	60	1	0.042	
14	23.5	37.5	6	0	4.5	28	76	14	16	30	3	0	8.5	25	66.5	14	16.5	30.5	11.5	0	3.5	22.5	68		
13.75	17.5	32	13	4	0	15.5	68.4	13.75	13.75	24.5	15	4	0	9.5	60.9	12.9	17.75	30.65	16.25	0	4	18	85.25	3	0.125
13.98	18.18	32.16	10.09	8.59	2.05	16.18	69.07	14.75	16.09	30.34	8.50	8.05	3.45	16.50	66.84	12.61	17.57	30.18	8.48	7.86	2.00	16.86	65.39		
2.273	8.987	9.817	5.989	8.972	1.903	7.135	13.276	2.324	7.148	7.733	6.535	7.679	3.228	7.593	12.763	3.179	9.996	12.176	5.455	7.580	1.432	11.854	19.315		
0.431	0.208	12.524	-1.688	-9.352	-1.761	1.911	42.616	9.603	1.985	14.874	-4.569	-7.813	-3.092	1.314	41.215	6.756	-2.424	5.831	-2.432	-2.286	-0.864	-6.045	26.756		
18.524	36.156	51.794	21.270	26.534	5.852	30.652	96.521	18.897	30.886	46.808	21.569	23.404	9.911	31.686	92.367	18.971	37.551	54.533	19.987	25.023	4.864	39.772	104.017		
1.127	4.457	4.869	1.127	4.449	0.944	3.533	6.533	1.152	3.245	3.885	3.241	3.808	1.601	3.766	6.530	1.576	4.938	6.038	2.705	3.759	0.710	5.881	9.573		
Faculty Domain Summary Table																									
Faculty Domain Summary Table																									
F01	Week 1															QA/QC Check									
	Week 1					Week 2					Week 3					Total	QA/QC Failures	QC Failures %							
	FD1	FD2	FD1+FD2	FD3	FD4	FD5	FD6	Total	FD1	FD2	FD1+FD2	FD3	FD4	FD5	FD6				Total	FD1	FD2	FD1+FD2	FD3	FD4	FD5
23	4	27	4.75	3.75	1	7.75	44.25	22.75	3.25	26	11	3	5.8	48.8	16	8	24	2	1.5	8	8	48.5			
23	1	24	5.5	4.5	1.25	8.75	44	27.75	1.5	29.25	4.5	5.5	1.5	9.25	50.24	0.5	24.5	6	4	1.5	10.25	46.25			
28.25	2.5	30.75	8	6	5.25	14.5	64.5	20.5	5.5	26	12	4	2	19	63	20	5	25	13	7	2	13.5	60.5		
33	5	38	2	8.5	0.5	2	51	37	6	43	3	2	1	7	56	36	3	39	5.5	3.75	2	52.25			
14.5	4	18.5	13	7.5	2.5	13.5	55	13	10.5	23.5	5.5	16	8	15.5	68.5	36	3	39	5.5	3.75	2	52.25			
24.35	3.30	27.65	6.65	6.05	2.10	9.30	51.75	24.20	5.35	29.55	7.20	6.10	3.10	11.31	57.26	26.40	3.90	30.30	6.40	4.00	3.10	7.15	50.95		
6.905	1.565	7.318	4.144	1.987	1.909	5.017	8.515	8.912	3.899	7.791	4.040	5.683	2.837	5.698	8.443	9.209	2.793	7.950	4.022	1.961	2.748	5.092	6.561		
0.344	0.170	13.014	-1.639	-2.075	-1.718	-0.234	34.721	6.377	-1.442	13.968	-0.881	-5.267	-2.575	-0.086	40.374	2.983	-1.686	14.400	-1.644	0.079	-2.395	-3.083	37.828		
38.159	6.480	42.286	14.839	10.025	5.918	19.344	68.779	42.023	12.142	45.132	15.281	17.467	8.725	22.706	74.146	44.817	9.486	46.200	14.844	7.921	8.958	17.333	64.072		
5.079	1.151	5.383	3.049	1.462	1.404	3.690	6.263	6.559	2.800	5.731	2.972	4.181	2.087	4.192	6.211	6.774	2.054	5.848	2.958	1.442	2.021	3.745	4.826		
Cadet, Faculty Area 1: Hours/Week																									
Cadet, Faculty Area 1: Hours/Week																									
Cadet, Faculty Area 2: Hours/Week																									
Cadet, Faculty Area 2: Hours/Week																									
Cadet, Faculty Area 3: Hours/Week																									
Cadet, Faculty Area 3: Hours/Week																									
Cadet, Faculty Area 4: Hours/Week																									
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Cadet, Faculty Area 6: Hours/Week																									

