Engagement of Students at the United States Air Force Academy

Mr. Scott Blum, University of Colorado, Colorado Springs

PhD Student at the University of Colorado, Colorado Springs and Air Force Academy Assistant Professor

Cadet Engagement at the United States Air Force Academy: A Mixed Methods Analysis of Officer Development

Since the 1970s, a great deal of research has been conducted regarding the relevance of student engagement to the desired outcomes of educational institutions. However, all of this research has been directed at civilian institutions, generally within one or both of the objectives of academic performance and persistence. This study uses a convergent parallel mixed methods approach to examine engagement by cadets at the United States Air Force Academy (USAFA) to determine whether the mediators of student engagement developed by researchers are applicable to a military academy that has identified specific outcomes other than performance and persistence as developmental objectives for graduates who will go on to become officers in the Air Force. Specifically, the objectives of the Air Force Academy go beyond the common university mission of delivering the Bachelor of Science degree mandated by Congress, and are outlined in its mission statement to "educate, train, and inspire men and women to become officers of character motivated to lead the United States Air Force in service to our nation". [36]

Current literature has established a strong linkage between the level of engagement and educational outcomes relative to traditional measures such as GPA, social leadership, and persistence.[1, 16, 17] However, the military academies of the United States have established desired outcomes that have a notably different focus than those of a traditional civilian institution of higher education. The military academies, and the Air Force Academy specifically, have formulated an overall curriculum based not only on a strong and diverse educational course load focused heavily on engineering disciplines, but also an immersive program of military training and history, and a foundational program of athletics designed to enhance physical fitness and the leadership attributes associated with teamwork.[36]

How students engage with their studies and what they, institutions, and educators can do to improve engagement have been well researched since the 1980s [35, 40] Astin [4] showed that active student engagement both physically and cognitively had beneficial effects on a wide range of developmental outcomes used by most institutions and that almost any form of student involvement would demonstrate those benefits. A life of engagement has been shown to be especially meaningful to military officers,[29] so it is likely that the military organization as a whole might benefit from officer candidates that take an engaged and meaningful stance toward life. Along this line of thought, USAFA has based its current developmental program upon the premise of *purposeful engagement*—sustained experiences and relationships over time that are meaningful to the individual and that challenge the capacities of each individual. [7] However, to date there has been no direct research on what motivates engagement at military academies, and very little is known about the effectiveness of specific, local interventions.[35]

The phenomenon of engagement seems well suited to the Air Force Academy's additional military and athletic goals but has not been tested. This lack of research raises a question: What factors influence a cadet to engage in the activities that lead to success at the United States Air Force Academy in terms of the major emphasis areas related to officer development? This study focuses on determining whether prior theory can be used or modified to motivate cadet engagement, whether the factors used to evaluate student engagement at civilian universities are relevant to the developmental objectives of the Air Force Academy, why

cadets at USAFA choose to engage or not engage in purposeful developmental activities, and what the leadership of the Air Force Academy can do from a policy and procedural framework to encourage cadet engagement. In the process of the analysis, established predictors of engagement such as academic challenge, campus environment, intrinsic motivation, peer relationships, faculty influence, and administrative policies were found to hold true in the Air Force Academy setting. Additionally, a unique factor was identified that highlighted the importance of student understanding of the relevance of instruction to their future role as Air Force officers.

Theoretical background

USAFA leaders have made explicit what their definition of engagement is in the context of their desired outcomes regarding academic education, military training, and athletic preparation. They have defined engagement to be "experiences and relationships that are sustained over time and meaningful to the individual" (p. 18).[7] They expanded on this definition to explain that the context should include experiences that connect those whose skills are developing with those who are supporting their development and should include elements of cognitive, emotional, and behavioral activity. This purposeful definition by USAFA leadership is well aligned with the definition provided by Astin [3] as the "amount of physical and psychological energy that the student devotes to the academic experience" (p. 518). With such close alignment of definitions and objectives, it was fitting that this study was undertaken from the perspective of Astin's input-environment-outcome (IEO) theory.[1]

Figure 1 shows the core premise of this study, the IEO theory of Astin.[1] This model links three main components of student inputs, the effects of the college environment, and purposeful student outcomes. In this model the student inputs are the "talents, skills, aspirations, and other potentials for growth and learning that the new student brings … to college" (p. 225). This set of traits was expanded to include the personal motivation, background, and goals that a student possesses upon arrival. The college environment that Astin referred to represents those aspects of the institution that are capable of shaping or directing the student's progress and development. Astin described such factors as administrative policies, faculty interactions, curriculum and pedagogy, and peer relationships. Other factors included elements of the study environment, quality of effort on the part of both faculty and student, and integration of the student into the culture of the institution. The student outcomes are explained by Astin to encompass those aspects of student development that the university purposefully attempts to influence, though defining the outputs of interest is "clearly the *sine qua non* of meaningful research on college impact" (p. 224).

Astin[1] also explained the relationships between these three factors. The college environment was clearly affected by the kinds of students who enroll (shown in relationship *A*). The principal concern relating to college impact was usually the direct relationship of college environment on student outcomes as expressed in relationship *B*. Relationship *C* expresses the concept that some portion of the outcomes a student realizes was affected by inputs independent of the college environment. Significantly, this model also allows for the analysis of certain interactions expected by theory that have direct impact on the question being studied. The effect of input was expected to be different in different college settings as shown by the *AC* interaction.

This interaction was of particular interest when comparing military academies to civilian institutions. Another interaction of special interest was how the effect of the specific environment was different for different students as shown in *AB*. This goes to the heart of the question of why cadets choose to become engaged or not become engaged once enrolled at the Air Force Academy.

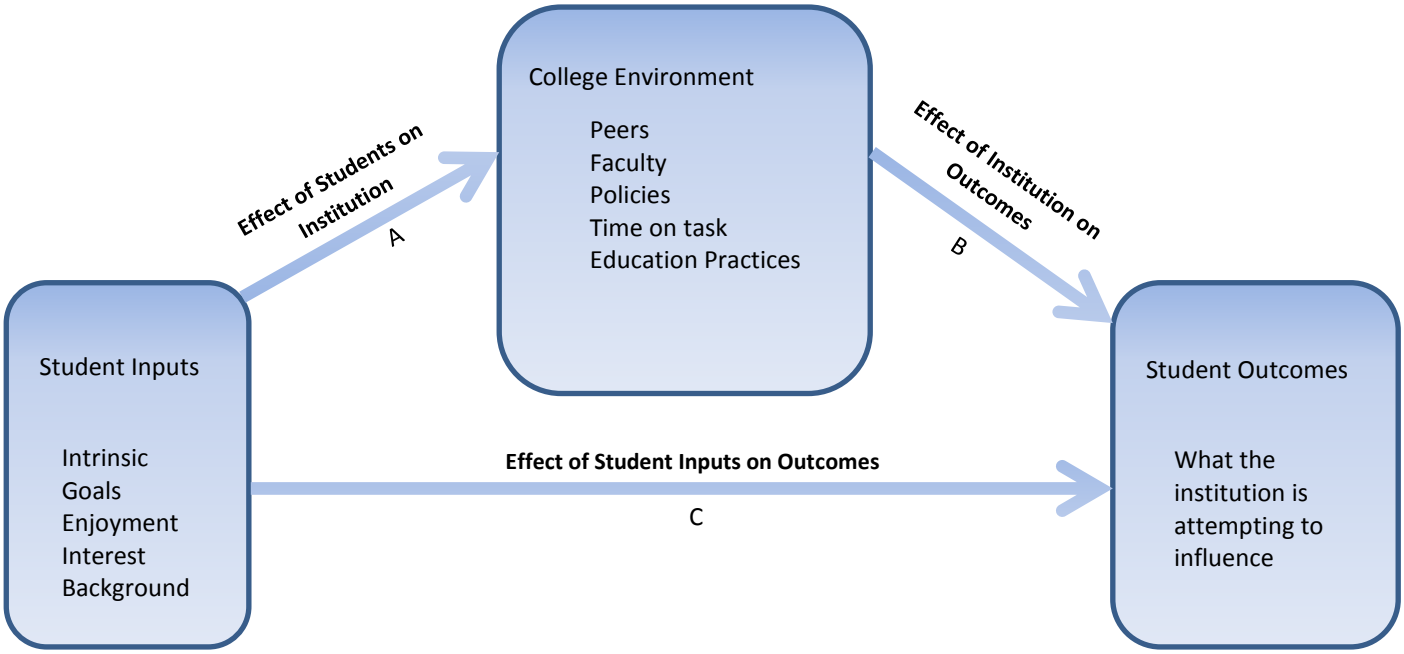

Figure 1. Input-Environment-Outcome model.[1]

Definitional issues

In order to properly study the question, it was important to be clear on the terminology. Often in the literature the term *engagement* was used with whatever meaning the particular author was researching, rather than a universally accepted standard. Eccles and Wang[12] highlighted major themes for the meaning of engagement throughout the literature that included dropout prevention, academic motivation, self-determination, achievement, self-efficacy, and intrinsic motivation. They explain the different definitions in the contexts of the associated behavioral, emotional, and cognitive perspectives taken by different research disciplines. They emphasized that as any consideration of the impact and policy making implications was contemplated, it was critical to understand that the definition of engagement was foundational to the question being asked.[12]

Engagement as a construct has manifested itself in many forms. Within the theoretical framework of Astin's[4] foundational work, it was established as "the amount of physical and psychological time and energy the student invests in the educational process" (p. 518), and that definition is still one of the most common in use by researchers. However, many researchers have expanded on that definition, recognizing the students' cognitive investment in, active participation in, and emotional commitment to their own learning.[40] Kuh, Cruce, Shoup, Kinzie, and Gonyea[17] developed the National Survey of Student Engagement (NSSE), the tool most often used to measure student engagement in undergraduate education, and in doing so expanded

the definition to explicitly include the effect of institutional factors. They said student engagement represents both the time and energy students invest in educationally purposeful activities and the effort institutions devote to using effective educational practices.[7]

Other researchers have modified the definition to include other terms with very similar concepts. For example, Schreiner and Louis[30] considered engaged learning to be "a positive energy invested in one's own learning, evidenced by meaningful processing, attention to what is happening in the moment, and involvement in specific learning activities" (p. 6), while other authors point out very subtle and nuanced differences between concepts variously referred to as involvement, integration, or engagement.[39]

At its core, however, engagement has been understood to be about what the student does and what the institution does with at least two key components: the amount of time and effort students put into their studies and other activities in which they participate and how institutions of higher education allocate their resources and learning opportunities to encourage students to participate and benefit from such activities.[39] Whatever definition has been used in recent years, the affective and cognitive components of student engagement have played an integral role in addition to the behavioral dimension.[31]

Models of student engagement

Given the long and extensive history of research surrounding student engagement in higher education, it is not surprising to find a myriad of theories that have been published to explain the phenomenon and its relationship to the research question of interest. However, there is significant overlap between the foundational theories of engagement.[12] Two overarching families of theories and frameworks have guided research on college impacts over the past thirty years: developmental, which have focused on intra-individual changes relating to the nature, structure, and processes of individual growth; and college impact models, which have placed emphasis on environmental and inter-individual origins of student change.[34]

Astin[1] first expounded a theory of student involvement in the educational process in his seminal paper on the methodology of college impact, developing the IEO model. In this model, he considered the direct effects of student inputs, the college environment, and student outputs, as well as the relationships between them and the interactions between those relationships.[1] He refined the model over the years as more data were collected and analyzed to become the IEO model in use today.[3, 4] He explained that this model maintained relevance because it was simple, could be used by faculty and staff, explained most of the empirical knowledge about environmental influences on student development, and remained capable of embracing principles from divergent disciplines such as classical learning theory and psychoanalysis.[3] In the IEO model, student engagement occurred along a continuum, had qualitative and quantitative features, was developed in direct proportion to the amount and quality of student involvement, and measured the effectiveness of an institution's policies or practices in relation to the resultant increase in student involvement resulting from those policies or practices.[3]

As Kuh[15] refined his model in developing the NSSE, he shifted the focus somewhat. Although he still considered the impact of student inputs and college environment, he modified

how those concepts were envisioned, borrowing heavily from the work of Chickering and Gamson.[8] To him, engagement was positively related to objective and subjective measures of gains in general abilities and critical thinking.[27] Even though the focus was still on student engagement, the influence of institutional policies and practices on levels of engagement took a more preeminent role.[27]

Terenzini and Reason[34] showed that students came to college with a variety of personal, academic, and social background characteristics and experiences that both prepared and predisposed them to engage with the various formal and informal learning opportunities they were afforded by the institution. Precollege characteristics had a powerful influence on students' subsequent college experiences. However, students both selected, and were selected by, institutions. Therefore, the clusters of precollege characteristics that summarized all the students of a college ultimately shaped the characteristics, climates, and cultures of the institution.[34]

The NSSE incorporated this concept of students shaping the school into its framework and established a more explicit linking of student behaviors and effective educational practices—including more direct links to desired educational processes and outcomes—while emphasizing actions that institutions could take to increase student engagement.[39] Under this model, who students were when they first started college guided how they performed in college, however, Kuh believed those factors did not explain everything that matters to student success in college.[17] He determined that once college effects were taken into account, pre-college characteristics and experiences diminished considerably.[17]

Other researchers have argued that this model does not provide a complete picture of engagement. They pointed out that it does not consider the commitment of psychological energy or the relationship between the quality of student effort and student learning.[30] Other theories were developed to explain the impact of engagement on student development. For example, experiential learning theory took a dynamic view of learning entirely separate from the IEO model. Instead, it was based on a learning cycle which in turn was driven by the resolution of dual dialectics which it defined to be action/reflection and experience/abstraction.[24]

Regardless of the model, it has been well established that engagement has a positive effect on student outcomes and development toward desired objectives.[17, 35, 40] Hu and Wolniak[14] demonstrated strong empirical evidence that pointed to student engagement as what mattered most in student learning and personal development during college. In addition to individual development of the student as a person, engagement theories informed perspectives on student development and added to our understanding of the impact of various student activities.[14]

Because of the empirical evidence for the role of engagement at undergraduate institutions, it was useful to seek out commonalities in theories that showed near-universal support. Student peer group has been shown to be the single most potent source of influence on growth and development during the undergraduate years—every aspect is affected in some way with the greatest impacts noted on leadership development, overall academic development, and self-reported growth in problem-solving, critical thinking, and cultural awareness.[4] It should be noted, however, that in this context peer environment referred to a broader, more general, and subtle set of influences than mere interaction with other students—it embodied a system of

dominant and normative values, beliefs, attitudes, and expectations that characterized the ethos of the student body.[34]

Next to peer group, faculty represent the most significant aspect of the student's undergraduate development.[4] Chickering and Gamson [8] showed that frequent student-faculty contact was one of the most important factors in student motivation and involvement and that knowing a few faculty members enhanced intellectual commitment among students. Specifically, notable features of engagement have regularly been shown to include the academic challenge provided by faculty as well as interacting with faculty both in and out of the classroom environment.[35]

Another major point of agreement among engagement theories has been the impact the institution's environment had on the level of student engagement. There have been two basic types of environmental measures: characteristics of the total institution and special enriching educational experiences within the institution.[2] These measures have been used to measure the effect of institution policies and processes. To be effective, an institution's environment must have a strong sense of shared purpose, support from peers, administrators, and faculty, adequate resources, consistent policies and procedures, and must continue to examine how the goals of the institution are being achieved.[8] Institutions have affected their environment in various ways, including setting policies, holding high expectations, keeping bureaucratic regulations to a minimum, allocating sufficient resources, providing support of programs and facilities, and encouraging diversity in staffing.[8]

Methods

This study seeks to identify whether the concepts of student engagement that have shown to be effective in traditional educational settings can be similarly effective in the setting of the United States Air Force Academy. Astin's IEO[1, 3, 4] model and the conceptual framework of the National Survey of Student Engagement[15, 16] set the foundation for the types of student inputs and college environments that should positively affect the development of the student in terms of the outcomes of interest to the institution. These models were used to inform the research design, methods, and analysis in an effort to determine whether this model is appropriate in a military academy setting and, if so, what modifications enhance the stated objectives of USAFA.

The specific issues this study addresses fall under four areas of inquiry:

1. Do the measures of engagement that traditionally predict student success at civilian institutions also predict cadet success when measured against the stated developmental objectives of the Air Force Academy?
2. What factors influence a cadet to engage in the activities that lead to success at USAFA in terms of the major officer development areas of critical thinking, working with others, communication, and *officership*—meaning how suited a graduate is to the role of an Air Force Officer?
3. Why do cadets choose to become engaged or not become engaged once enrolled at the Air Force Academy?
4. What administrative actions can USAFA take to encourage cadet engagement and officer development?

Design

The study was structured as a convergent parallel mixed methods design. In accordance with the methodology described by Creswell and Plano Clark,[10] this method of design relied on an equal weighting of qualitative and quantitative data collected in parallel, analyzed separately, then merged.

The National Survey of Student Engagement (NSSE) was used to collect quantitative data about the effect of student engagement on the outcomes espoused by the Air Force Academy, specifically emphasizing the first two research questions. The NSSE developers and administrators at Indiana University have established five benchmarks that are constructs made out of forty-two separate questions from the survey.[21] These benchmarks have been validated over the years by multiple researchers in limited contexts,[5, 6, 15, 18, 19, 22, 23, 30, 33] which were loosely aligned with the USAFA undergraduate model. The constructs used were intended to predict the impact of various measures of student engagement on the desired outcomes of the institution.[21] In the case of the Air Force Academy, the outcomes selected for measurement were based on the published strategic plan,[11] which established priorities for cadets based on the imperative "to educate, train, and inspire men and women to become officers of character motivated to lead the United States Air Force in service to our Nation" (p. 1). The skills outcomes identified by USAFA are listed in Appendix A.

While the NSSE collected quantitative data, a series of cadet interviews and observations were used to collect qualitative data that reflected the engagement level and motivators of engagement toward the same outcomes already listed. These data were of primary importance to the last two research questions. To assess both the impact of the college environment and to gauge the level of interaction between environment and student as represented in the *AB* interaction of Figure 1, data were collected via observation of cadets operating in their unique military college environment among the various areas USAFA emphasizes: academic, military, and extra-curricular. Additionally, interviews with a representative sample of cadets addressed their background and preparation prior to entering USAFA to determine their inputs in the context of this model, their experiences with the unique environment at USAFA, and the interaction of those two items as represented by the *AC* interaction in Figure 1.

The reason for collecting both the quantitative NSSE data and the qualitative cadet data was to compare, corroborate, and validate the results from two forms of data. Examining the motivators and impacts of student engagement from multiple reference frames followed the IEO concept [3] and allowed for a greater insight into whether the concepts of student engagement in traditional educational settings are applicable in the setting of the United States Air Force Academy than was available by using only one source.[10] For example, understanding the motivators of engagement may not allow for policy changes on the part of the USAFA administration without knowing that the type of engagement being encouraged was having the desired effect on officer development. Correlating both qualitative and quantitative analysis into one set of findings can assure analysis of the appropriate motivators and the appropriate outcomes desired for the Air Force Academy.

Although the data from the quantitative NSSE tool were originally collected in the spring semester of 2011, the data were not released for use in this study until the same time the cadet interviews were being held in the spring semester of 2013. Because of this time restriction, the results of the NSSE could not inform the direction of the interviews or the observations of cadets, nor could subsequent surveys be administered. Because all the data were inherently independent in their collection, it was only combined in the interpretation portion of the study using the data integration strategies detailed by Creswell and Plano Clark.[10] As a consequence, the results of all the data were incorporated into the final analysis only after collection using the concurrent, parallel methodology.

Sample

The target of this study was the population of cadets from the class of 2014 who were still attending USAFA in the spring semester of 2014. The class of 2014 was chosen because they represent a target group that was representative of cadets currently attending the academy, but who have already made individual commitments to the Air Force upon graduation. By regulation, upon the first day of classes of a cadet's junior year, they incur a commitment to serve in the Air Force for a minimum period of time,[37] prior to their second-class (junior) year, cadets are free to depart the Academy with no further obligation to the Air Force. Because the policy objective of the Air Force Academy is to develop officers of character,[7, 11] the population of interest was geared toward those who will actually serve in the Air Force. Additionally, the class of 2014 was selected because they were the only class of the two with a commitment (junior and senior) that has been administered the NSSE. Finally, the class of 2014 is also scheduled to receive the NSSE administration again in the spring semester of their senior year, which will allow for the results of this analysis to be expanded to account for a longitudinal study.

Based on these motivators, the list of all cadets administered the NSSE during their freshman year in the spring semester of 2011 was culled to include only those cadets who were still enrolled in the spring semester of 2013. The cadets who left either voluntarily or involuntarily no longer fit the criteria for inclusion because formal Academy policy was geared toward preparing Air Force officers.

For the quantitative analysis of the NSSE data, all cadets who actually took the survey and were still attending USAFA were included. The only missing cases were those cadets who were unavailable to take the survey during their freshman year due to scheduling or physical constraints. Because scheduling and physical injury are essentially random events, the 723 cases of data collected are assumed to be representative of the 1,000 cadets in that class. This assumption is tested and confirmed in the analysis section. Qualitative observations of cadet activities were selected based on several criteria. First, they all had to include members of the class of 2014 for consistency, though the nature of USAFA events meant that all of the observations also included members of other classes participating simultaneously. Second, the events observed were spread across the spectrum of emphasis—military, academic, and extracurricular—because they were areas identified by the USAFA administration and the Center for Character and Leadership Development as vital to the developmental outcomes being sought by the Academy in its program.[7] The activities observed were a military parade in celebration of

the anniversary of the founding of the Air Force Academy, a cadet Falconeering Club demonstration of a falcon performing maneuvers in flight to simulate its natural hunting prowess, and three presentations of cadet academic research at a local conference for undergraduate research.

Using guidance from Creswell,[9] the interview portion of the study was anticipated to require a sample size of between three to ten cadets. The final sample size was eight upon reaching saturation, that is, the answers became extremely redundant by that point in the interviews, indicating the decreasing marginal utility of interviewing more cadets. The sample was chosen as a purposeful, random sample. To maintain consistency with the NSSE results and the observational data, and to ensure sufficient experience with the activities that USAFA has to offer, cadets were chosen for interviews from the junior class of 2014 exclusively.

For the interview subjects, a comprehensive list of the class of 2014 was obtained from the Directorate of Education, and through random selection, invitations were sent out to individual cadets requesting their participation. The response rate was lower than expected at approximately 2%, which in itself provides insight into cadet willingness to participate in events at USAFA. In the end, the random selection of candidates, the sending of the recruitment request invitations, and the interview scheduling process was iteratively repeated until the final sample of cadets representing the saturation point was reached. The demographic breakdown of this group is shown in Table 1. The sample selected represents a cross-section of available activities to cadets on both a voluntary and non-voluntary basis, with personal hobbies and backgrounds possessed prior to attending USAFA (such as singing, religion, and prior military experience) mixed with interest items developed after arriving (such as intercollegiate athletics, soaring, and cadet clubs.)

Table 1
Demographic Breakdown of Cadet Interview Subjects

Subjects (All Juniors at the United States Air Force Academy)			
Subject	Gender	Race	Unique Perspectives
Cadet 1	Male	White	Soaring Instructor, Musical Performer
Cadet 2	Female	Black	Prior Enlisted, Intercollegiate Athlete
Cadet 3	Male	Hispanic	Intercollegiate Athlete, Prep-School Attendance
Cadet 4	Male	White	First Generation College, Religious Affiliation
Cadet 5	Male	White	Very Small Hometown, Intercollegiate Athlete
Cadet 6	Female	White	Prior College, Intercollegiate Clubs
Cadet 7	Male	White	Home Schooled, Prior College
Cadet 8	Male	White	Pre-Med

After arranging a meeting with each volunteer, interviews were conducted and lasted approximately one hour. Major themes identified were sent to the participating cadets for feedback or modification through member checking, though none made any changes.

Data analysis was conducted in relation to the phenomenon of engagement defined by the study. The NSSE results were analyzed using ordinary least squares regression analysis within

the five constructs established by the NSSE Institute at Indiana University[21] in relation to the outcomes specified in the Dean of Faculty Strategic Plan.[11]

The theoretical framework described by Astin[1] was used as the basis for coding interviews and observations, with the goal of determining where engagement in a military academy experience diverged from a civilian university experience. The results of the analysis were then compared to the theoretical framework and to the results of the NSSE analysis to determine what factors affected a cadet's level of engagement and were predictors of success as well as to identify why cadets choose or choose not to engage in activities the Air Force Academy would like them to engage in.

The data from both analyses were combined to develop an overall picture of what factors of engagement support the Air Force Academy's officer development vision as well as how to encourage the engagement level of cadets within those factors. The results also indicate potential directions and future actions on the part of USAFA leadership to help improve overall cadet development as Air Force officers.

Variables and measures

The Dean of Faculty Strategic Plan[11] lists specific outcomes that USAFA wishes to instill in graduates commissioned as officers in the Air Force. Those outcomes that can be tied to measures within the NSSE were expressed as critical thinking, communication, literacy, and teamwork. There were additional desired outcomes such as stamina and discipline that were not associated with explicitly objective measures because there was no accepted measure tied to the sub-categories of toughness, stamina, courage, and self-discipline.[11] For the outcomes that can be measured via the NSSE instrument, the Academy has input several specific questions to the survey as listed in Table 2. Individually these outcomes were taken as dependent variables for this study. The independent measures for student engagement were the five benchmarks established by the NSSE and externally validated for undergraduate institutions.[6, 15, 18, 22, 30, 33]

Table 2
Variable Definition and Range of Values

	N	*Range*	*Min*	*Max*
Dependent Variables				
Thinking Critically and Analytically (Gnanaly)	661	1-4	1	4
Working Effectively with Others (Gnothers)	664	1-4	1	4
Speaking Clearly and Effectively (Gnspeak)	659	1-4	1	4
Writing Clearly and Effectively (Gnwrite)	663	1-4	1	4
Independent Factors				
Academic Challenge (AC)	691	0-100	10.39	89.39
Active and Collaborative Learning (ACL)	722	0-100	5.56	100.00
Enriching Educational Experiences (EEE)	680	0-100	1.19	100.00
Supportive Campus Environment (SCE)	673	0-100	5.56	100.00
Student Faculty Interaction (SFI)	691	0-100	0.00	100.00
Total Cases	723			

Descriptive statistics

Table 3 summarizes the descriptive statistics for the dependent variables of interest (Gnanaly, Gnothers, Gnspeak, and Gnwrite). It also shows the summary data for the independent variables of interest (AC, ACL, EEE, SCE, SFI), and the covariates collected in the survey. To control for individual cadet differences in ability and aptitude, the measures for grade point average (GPA) and military performance average (MPA-the military equivalent of an academic GPA) were included in accordance with the underlying conceptual framework espoused by the Academy's Center for Character and Leadership Development.[7]

Table 3
Descriptive Statistics for Dependent Variables and Factors of Analysis from the National Survey of Student Engagement

	ID	*M*	*SD*
Dependent Variables			
Thinking Critically and Analytically	Gnanaly	3.56	0.66
Working Effectively with Others	Gnothers	3.49	0.73
Speaking Clearly and Effectively	Gnspeak	3.25	0.82
Writing Clearly and Effectively	Gnwrite	3.28	0.77
Independent Factors			
Academic Challenge	AC	60.62	11.86
Active and Collaborative Learning	ACL	53.72	15.06
Enriching Educational Experiences	EEE	37.96	13.60
Supportive Campus Environment	SCE	71.53	16.76
Student Faculty Interaction	SFI	43.06	17.89
Control Variables			
Grade Point Average	GPA	2.91	0.53
Military Performance Average	MPA	3.05	0.22

Overall the scores for thinking critically and analytically (Gnanaly) ranged from 1 to 4, where the Likert-type scale represented the continuum from *very little* (1) to *very much* (4). Similarly, on the same scale the measures for working effectively with others (Gnothers), speaking clearly and effectively (Gnspeak), and writing clearly and effectively (Gnwrite) all ranged from 1-4. The independent data all were scored on a scale from 0-100 possible points from the calculation of the NSSE benchmarks, which all represented the mathematical mean of several other survey questions as demonstrated in Appendix B. Academic Challenge (AC) had values observed from 10.39-89.39, Active and Collaborative Learning (ACL) ranged from 5.56-100, Enriching Educational Experiences (EEE) values ranged between 1.19-100, Supportive Campus Environment (SCE) varied 5.56-100, and the values for Student-Faculty Interaction (SFI) varied between 0-100.

All of the variables exhibited some missing data, with the missing data representing between 0% and 8% of the total cases. Although the potential exists for the missing data to skew the results, a Little's test was performed ($p = 0.091$) showing insignificant at the 0.05 level.

With this result, data were assumed to be missing completely at random and missing cases were eliminated using the SPSS direction to delete cases listwise without attempting to impute any missing data.

Quantitative Analysis

In the quantitative model four separate analyses were performed, one for each dependent variable of interest. Based on theoretical frameworks and historical development by the Air Force Academy, several other measures on the NSSE were expected to influence measures of cadet performance and were therefore included as control variables.[7] For the analysis, the questions recording the established measures of grade performance and military performance (GPA and MPA) were added as covariates.

Prior to the analysis, prescreening was performed to evaluate underlying assumptions. The dataset was a purposeful random selection from the population of interest, the class of 2014 at USAFA. No significant outliers were identified, although there were multiple examples in the extreme values of most variables.

Testing the continuous variables for normality showed a relatively good fit. All skewness values measured within acceptable standards between a low of -1.43 and a high of 0.591. All kurtosis values also fit within the acceptable range of -0.722 through 1.932.[32] A check showed no indication of collinearity outside acceptable ranges among the vector of independent variables with all VIF scores below a value of 3.0 and tolerance values greater than 0.1.[20] All of these results may be found in Appendix C.

Prior studies have shown multiple regression as appropriate for modeling the research question.[6, 13, 19] The continuous nature of the outcome variable, combined with the nature of the research question, led to the performance of an ordinary least squares (OLS) regression of the form:

$$\text{(Dependent Variable of Interest)} = \beta_0 + \beta_1\,(\text{AC}) + \beta_2\,(\text{ACL}) + \beta_3\,(\text{EEE}) + \beta_4\,(\text{SCE}) + \beta_5\,(\text{SFI}) + \beta_6\,(\text{Meets Academic Requirements}) + \beta_7\,(\text{Meets Military Requirements}) + \beta_8\,(\text{Grade Point Average}) + \beta_9\,(\text{Military Performance Average}) + u_i$$

Where the dependent variable of interest alternatively represents the desired outcomes of think critically and analytically (Gnanaly), work effectively with others (Gnothers), speak clearly and effectively (Gnspeak), or write clearly and effectively (Gnwrite).

Testing the constructs for reliability yielded mixed results as shown in Table 4. The Academic Challenge factor had a Cronbach's $\alpha = 0.68$, Active and Collaborative Learning $\alpha = 0.67$, Supportive Campus Environment $\alpha = 0.73$, Student-Faculty Interaction $\alpha = 0.74$, and Enriching Educational Experiences $\alpha = 0.58$. Relative to the commonly used standard of 0.70 SCE and SFI appear to have an acceptable level of reliability, while AC and ACL have marginal results. EEE appears to have reliability concerns. The set of questions that make up the benchmarks with their associated Cronbach values are listed in appendix B.

Table 4
Cronbach's Alpha Values for the Five NSSE Benchmarks

	α	N
AC	0.68	11
ACL	0.67	7
SCE	0.73	6
SFI	0.74	6
EEE	0.58	12

Qualitative Analysis

Protocol

The interview protocol used for the qualitative analysis was a semi-structured format in which general questions were asked to initiate conversation, but the cadets were told that these were intended as starting points and that they should feel free to interject any other thoughts on USAFA and engagement generated throughout the course of the discussion. The interview protocol is listed in Appendix D. All cadets strayed from the formal questions to provide valuable additional thoughts.

Creswell's[9] phenomenological methodology was applied to the transcriptions during analysis. In the coding process, the transcripts were reviewed several times for overall feel of what the cadets were trying to communicate. The transcripts were then read for each question/response pairing to identify significant words or phrases that either captured the essence in vivo or summarized the meaning. During this stage, the context and literal transcription were both considered to arrive at a list of significant code words or phrases.

The individual words or phrases were then consolidated to account for duplications, and the words were grouped into a smaller collection of clusters with similar meanings. Following that, each cluster was compared to come up with themes that had similar constructs. The transcripts were reviewed again to determine that the themes fit within the context as a circular validation of the process.

Researcher position

As a cadet myself years ago during the cold war, and then during two military assignments as a faculty member at the Air Force Academy, I have experienced first-hand the array of engagement opportunities USAFA has to offer. I have been a provider of cadet professional and academic development and also a recipient. I also spent a 26-year career in the Air Force, so I have a thorough grounding in the culture of the Air Force and the Air Force Academy. Though I have this background, it was important for me not to impose my preconceived notions on the current generation of cadets. As I observed activities and interview subjects, I was careful not to impose my thoughts onto their answers.

Methodological rigor was applied to assure verification, validation, and validity as shown in Table 5. Verification was provided by referencing the literature search, comparison to field notes, negative case analysis, and bracketing the researcher's experiences including those as a USAFA cadet, as an Air Force Officer who has supervised and trained USAFA graduates, and as a faculty member at USAFA. Validation was accomplished with the use of multiple methods (interviews and observations) and member checks. Specifically, the resulting themes were sent to the subjects for member checking and to provide opportunity for clarification. There were no corrections by the individual interview subjects. Further validation was provided by theme verification from faculty and staff familiar with the USAFA culture and experience in dealing with cadets.

Table 5

Data Verification and Validation Methods

Themes	Bracketing Research Bias	Faculty Peer Review	Multiple Methods	Member Checks	Negative Case Analysis
Intrinsic/Personal Factors	X	X	X	X	
Peer Group Relationships	X	X	X	X	
Faculty/Staff Influence	X	X	X	X	X
USAFA Policies	X	X	X	X	X
Relevance/Context Setting	X	X	X	X	X

Regression results

A level of $p = 0.05$ was used to determine statistical significance for all tests. The variables were screened for collinearity with none noted as shown by the VIF and tolerance values shown in Appendix C. For each outcome of interest, a backwards step regression was performed to arrive at the final list of statistically significant predictors. Table 6 shows the results for the OLS regression model showing the best fit for the data on thinking critically (Gnanaly). The model as formulated accounted for 30% of the variability in thinking critically with AC, EEE, and SCE being significant predictors. The other NSSE benchmarks did not test as significant, nor did any of the predicted covariates appear to be significant predictors for this outcome. The model was run with a sample size of 658 cases.

Table 6
OLS Regression Results for the Impact of NSSE Benchmarks on USAFA Thinking Critically and Analytically Outcome (Gnanaly)

	Parameter Estimate	Standard Error	Standardized Coefficient	Significance
Constant	1.51	0.13		0.00
Academic Challenge (AC)	0.02	0.00	0.34	0.00
Enriching Educational Experiences (EEE)	0.00	0.00	0.09	0.02
Supportive Campus Environment (SCE)	0.01	0.00	0.26	0.00
Adjusted R^2	0.30			

Table 7 shows the results for the model showing the best fit for the working effectively with others outcome (Gnothers). The model as formulated accounted for 30% of the dependent variable with AC, EEE, and SCE being significant. None of the other NSSE benchmarks tested as a significant predictor for this outcome. MPA was a significant covariate. The model was run with a sample size of 657 values.

Table 7
OLS Regression Results for the Impact of NSSE Benchmarks on USAFA Working Effectively with Others Outcome (Gnothers)

	Parameter Estimate	Standard Error	Standardized Coefficient	Significance
Constant	0.47	0.35		0.18
Academic Challenge (AC)	0.01	0.00	0.12	0.00
Enriching Educational Experiences (EEE)	0.01	0.00	0.14	0.00
Supportive Campus Environment (SCE)	0.02	0.00	0.42	0.00
Military Performance Average (MPA)	0.32	0.11	0.10	0.00
Adjusted R^2	0.30			

Table 8 shows the results for the OLS regression model showing the best fit for the data on the measure for speaking clearly and effectively (Gnspeak). The model as formulated accounted for 31% of the variability in the dependent variable with AC, EEE, and SCE being significant predictors. The other NSSE benchmarks were not significant. Though the GPA control variable was significant, none of the other covariates tested as a significant predictor for this outcome. GPA demonstrated an inverse effect on the outcome as demonstrated by the negative parameter. The model was run with a sample size of 653.

Table 8
OLS Regression Results for the Impact of NSSE Benchmarks on USAFA Speak Clearly and Effectively Outcome (Gnspeak)

	Parameter Estimate	Standard Error	Standardized Coefficient	Significance
Constant	1.01	0.21		0.00
Academic Challenge (AC)	0.02	0.00	0.26	0.00
Enriching Educational Experiences (EEE)	0.01	0.00	0.10	0.01
Supportive Campus Environment (SCE)	0.02	0.00	0.36	0.00
Grade Point Average (GPA)	-0.10	0.05	-0.07	0.04
Adjusted R^2	0.31			

Table 9 shows the results for the OLS regression model showing the best fit for the data on the survey question for writing clearly and effectively (Gnwrite). The model as formulated accounted for 26% of the variability in the dependent variable with only AC and SCE being significant predictors. None of the other NSSE benchmarks including EEE, which was significant in the other models, was significant in this model. Also in this model none of the covariates demonstrated significance. The model was run with a sample size of 657 cadet case values.

Table 9
OLS Regression Results for the Impact of NSSE Benchmarks on USAFA Write Clearly and Effectively Outcome (Gnwrite)

	Parameter Estimate	Standard Error	Standardized Coefficient	Significance
Constant	1.06	0.15		0.00
Academic Challenge (AC)	0.02	0.00	0.30	0.00
Supportive Campus Environment (SCE)	0.02	0.00	0.32	0.00
Adjusted R^2	0.26			

The data show that the predicted covariates were inconsistently significant in the measures that most closely align with the objectives published in the strategic plan.[11] The lack of significant covariates in relation to the theoretical framework [7] warrants further investigation.

The benchmark factors established by the NSSE Institute[21] showed a mixed level of significance. In all the analyses, the factors of Active and Collaborative Learning (ACL) and Student-Faculty Interaction (SFI) tested as insignificant predictors of the desired outcomes. With the exception of the writing outcome, AC, EEE, and SCE factors were significant, although nominally small. The small amount of predictive ability demonstrated through the adjusted R^2 values indicate a significant source of variability in the measured outcomes has not been accounted for.

The quantitative analysis of the NSSE data yielded limited predictive capacity. The measures forming the NSSE benchmarks,[21] were designed to correlate with the conceptual framework of Astin[1, 3, 4] and the seven principles for good practice in education.[8] The reliability analysis shown in Table 4 shows potential issues with the benchmarks' validity for this data set.[38] The low predictive power and small significance levels indicate a significant predictor of the variability in the measured outcomes has not yet been identified. Alternatively, the factors and control variables identified by NSSE and the staff at USAFA might be accurate predictors of the outcomes USAFA hopes to accomplish as part of its mission, but the measures of those outcomes might be inadequately specified.

Of the factors analyzed, Academic Challenge and Supportive Campus Environment consistently identified as significant predictors of all the specified outcomes. Enriching Educational Experience was significant for most of the outcomes. These results were in line with the framework developed by Astin[1, 3, 4] in the relationship marked *B* on Figure 1**.** All of these factors represent aspects of the college environment that were controllable to a greater or lesser extent through the policies implemented by the school's leadership. Though students can contribute to the academic challenge and support of the campus culture, primarily these motivators are influenced by the leadership, faculty, and staff of the institution in their policy development and implementation.

The benchmark factors that did not demonstrate significance in any of the models were Active and Collaborative Learning (ACL) and Student-Faculty Interaction (SFI). Interestingly, even though these factors were influenced to some extent by the institution's policies, these particular factors had a noticeably larger component controlled by the student personally. Whether a cadet chooses to participate in collaborative activities or enter into faculty relationships depends a great deal upon what skills and perspectives with which the cadet entered the Academy.

NSSE results consistently identified the level of academic challenge as a significant motivator of student engagement, and this factor was echoed by cadet qualitative analysis described below. When discussing what factors motivate them, cadets would refer to the positive aspects of the academic environment. The motivation could derive from a sense of pride as summed up by "the Annapolis cadets [on exchange visits to USAFA] think that is was academically more challenging here than it was as Annapolis" (Cadet 2). Another impetus for engagement was the sense of accomplishment from the academic challenge espoused by "I'm very engaged with school just because I have to work twice as hard as other kids just to stay here" (Cadet 3).

Qualitative Findings

Independent from the NSSE results, the interviews and observations were analyzed. As part of the analysis, over 250 unique expressions were identified, which clustered into five main themes. Table 10 shows the theme clusters and lists the examples of each theme most commonly cited by cadets.

Intrinsic/personal factors

The first theme that emerged was consistent with the IEO model's concept of student input,[1] which manifested itself as intrinsic or personal factors specific to the student. This theme was not explicitly measured in the NSSE factors. Previous models of engagement have recognized that students came to college with a variety of personal, academic, and social background characteristics and experiences that both prepared and predisposed them to engage with the various formal and informal learning opportunities they were afforded by the institution.[34] Ultimately, cadets engage in what they were predisposed to do. As Cadet 6 put it when asked to sum what engagement meant to her, "engagement—I wanna do it."

Table 10
Theme Clusters Affecting Cadet Engagement at the Air Force Academy

Theme Affecting Engagement	Examples of Code Phrases Used by Cadets		
Intrinsic/Personal Factors	intrinsic reasons	enjoyment	fun
	goals	family	duty
	future orientation	personal motivation	cynicism
	pride	personal focus	interest
Peer Group Relationships	peers		
	relationships		
Faculty/Staff Influence	role models	mentor	
	faculty interaction		
	leadership		
	cares about me		
USAFA Policies	athletics	choice	
	military	repetition	
	time	standards	
	extrinsic reasons		
Relevance/Context Setting	relevance		
	justification		

Cadets have different backgrounds and different motivations for personal goals within the context of the goals that USAFA has defined for them. Cadet 1 pointed out that the engagement choices he made were based on internal motivations.

> I guess just being like actively involved in something, basically not being a bystander. . . . I'll pick and choose what I can do to give me good leadership development for stuff that I'm actually going to use in the Air Force.

The subjects interviewed were consistent in their perception that extrinsic motivation was rarely successful in causing cadets to engage:

> This is what we are supposed to do because we are in the military. I think intrinsic motivation is really powerful because I've seen in it some cadets and I've seen it in ways that weren't negative that actually made a good impact. (Cadet 1)

The role that individual motivation plays in engaging in the activities of the Air Force Academy cannot be underestimated as policy is formulated by USAFA leadership.

Peer group relationships

Generally cadets arrived at USAFA with a predisposition for certain behaviors, but their peer group influenced those behaviors and the institution attempted to mold them by its philosophy and goals. This concept fell under the SCE factor in NSSE, which was shown to be significant in all the outcome measures identified. Whether a student's peers played a positive role in their academic and professional development was a strong determinant of whether the student felt well supported in their environment.

In forming student opinions and motivating students, the peer group was the single most important influence.[34] Peer effects explained why institutional selectivity affected student outcomes in general and engagement in particular—by attending college with high-quality students, a student's behavior and academic performance was higher than if they attended college with lower quality students.[28] Cadet 3 summed up this relationship as, "You know you want to be with people who are like you I guess. I really associate with people who are kind of similar to me, like me."

The peer pressure and influence effect was confirmed by the cadets encountered in this study. The influences of peers could provide negative reinforcement:

> But on the surface it's almost like we have this culture here where it's not cool to be engaged. Especially with Cadet Wing, so especially with like military stuff. If you join training staff you're a tool. Basically like that's the social perception. (Cadet 1)

Or the peer pressure could positively motivate cadets: "I wanted a base of friends outside of my classes. . . . People with similar interests, and I don't want to say personalities, because that is definitely not the case, but values, I guess" (Cadet 7).

Faculty/staff influence

According to the model, high levels of student engagement were associated with purposeful student-faculty contact, as well as active and collaborative learning.[39] In contradiction to the results of the NSSE analysis, this factor seemed to have been significant in interviews with cadets. Though the NSSE constructs explicitly sought to measure the student-faculty interaction, they were not significant to any of the outcomes used. The unique role as mentors and Officer role-models might indicate that the traditional measures of faculty and staff impact on students were inadequate for the type of relationship most important to cadets.

One aspect of the pedagogy at the Academy was the purposeful role that faculty and Air Force officer staff took in providing one-on-one interactions with cadets.[36] The effort USAFA has made in this area seems to have had a significant impact. "He does his best to make it interesting in class. . . . And that combined with the fact that he cares about me personally…. That is literally all it takes. It makes a huge amount of difference" (Cadet 7).

The unique nature of a primarily military faculty and military role models in the daily operations of cadet life presented cadets with the opportunity to envision how their activities would affect their personal futures:

> My teacher, I have to say, speaks volumes to me. He's prior enlisted, he didn't go to the Academy, but then he eventually pursued his commission through other sources. The way he teaches it's very engaging to me it helped me as far as being interested and actually trying…. He's very good, he's not only just my instructor but he's a very good mentor, he helps me through a lot of stuff outside of the classroom. (Cadet 2)

The prevalence of faculty and staff that could provide a direct role model for both the profession of arms, as well as the specific career field within that profession, had a profound impact on the cadets interviewed.

USAFA policies

USAFA policies often forced cadets to participate in events. The coercion they felt to participate in some of these events was noted as a factor for lack of engagement in other similar events. The effect of this factor was most noticeable in the NSSE benchmarks of Supportive Campus Environment and Enriching Educational Experiences, both of which regularly demonstrated significance in the analyses. The most precious institutional resource was that of student time, and the IEO theory explicitly acknowledges that the psychic and physical time and energy of students are finite.[3] The real issue in education and in student development was alignment between the explicitly stated values of an institution and the values that really drove policy and that were experienced every day by students, faculty, and staff.[3]

Institutional structures affected student engagement in predictable and substantively significant ways.[28] Cadets picked up on the relationship of institutional policies to their own development and their own motivation to engage. Cadet 3 expressly acknowledged that having the institutional support of intercollegiate participation was a prime factor in his attendance and persistence: "I guess if I were to be demoted from that position would be tough, but I guess the only thing that would be get me through is I know it's my senior year." Other cadets lamented the inconsistency of institutional standards or accountability by staff: "People aren't very motivated to do it, because there [are] no bad ramifications if they don't do it properly" (Cadet 7).

Relevance/context setting

One finding not previously mentioned in the literature was noted as highly significant to all the subjects: the relevance of the activity and the contextual setting for understanding the

benefit to the subject personally. The NSSE impact of this could also be seen in the Supportive Campus Environment and Enriching Educational Experiences measures. The subjects were all at the point in their Air Force Academy career where they have made a commitment to serve a minimum of five years after graduation. This fact generated an intrinsic motivation to relate what they were studying currently in their educational and training programs with the skills they would require upon graduation and the situations they expected to encounter as officers. The explicit linkage made between current activities and future needs cut both positively and negatively as a mediator for cadet engagement.

On the positive side, Cadet 6 pinpointed this relationship by saying, "She was talking about deployed environment versus the stateside environment, so that was really nice. Cause you get the perspective of how that's really gonna apply when you become a second lieutenant." Others summarized an ideal for role modeling behavior seen as beneficial for Air Force officers:

> Yeah. Exactly. It's like it's an operational squadron and getting to see the officers interact with each other, and interact with us, and getting to teach students and just have real life responsibilities is the coolest thing ever. (Cadet 1)

However, the impact of relevance could be detrimental when no connection was seen by the subject:

> I know, based on data that I've seen from my teachers, that there is no correlation between your GPA and how far you go in the Air Force. And there is only mild between your MPA and how far you go in the Air Force. . . . I am in Bio 315, I don't really care much about the topic, it's not gonna be relevant to me. Some of the aspects are pretty cool, but it's not relevant to anything I'm gonna do in the Air Force. (Cadet 7)

Discussion

This study was undertaken to evaluate whether the traditional measures of student engagement addressed in the literature for civilian universities were applicable in the setting of the United States Air Force Academy. The military focus of the institution's goals and objectives attracts a student body that may be different in significant ways from their peers at other colleges and universities. The results show several of the traditional predictors of engagement do apply in the military context, while some new factors were identified. Traditional components such as intrinsic motivation, peer groups, faculty and staff interactions, and governance policies were all found to be relevant to the level of student engagement.

The most noteworthy finding was a factor absent from prior research at civilian universities: the relevance or context. The importance of this influence was revealed through interviews with the cadets where they specifically identified the significance of future applicability to their motivation for engagement. The NSSE data supported this in the comprehensive importance of the Enriching Educational Experience and Supportive Campus Environment factors. Both of these factors had direct ties to cadets understanding the context of the activities the Academy developed for them and feeling they contributed to their developmental goals. The relevance factor did not fit completely into the broader category of

college environment in Astin's model,[1] but more properly as part of the interaction of college environment with desired outcome. Specifically, the unique nature of the Air Force Academy to produce officers for the Air Force, coupled with the focus felt by cadets on their individual future as being tied to a career in the Air Force, provided a level of importance to why they were doing the things they were doing that regular college students did not express in prior studies. The importance of the military context and relevance to cadets modified the original IEO model as shown in Figure 2. The context and relevance contributed to the effect of the institutional environment as well as the interaction of the institution on the cadet.

The civilian student enters college knowing that his or her future is whatever he or she makes of it, and therefore has no expectations that any particular activity offered by the college directly relates to a personal choice of activities. Rather, it can be expected that college students choose their activities based on what they think will benefit them personally and professionally in the future. At the Air Force Academy, cadets know with relative certainty that they will become officers in the Air Force first,[37] and professionals in whatever their chosen career field second. This unanimity of purpose has developed a culture where many cadets expect to see a specific correlation between the activities that USAFA mandates, and the goal they know they were working toward.

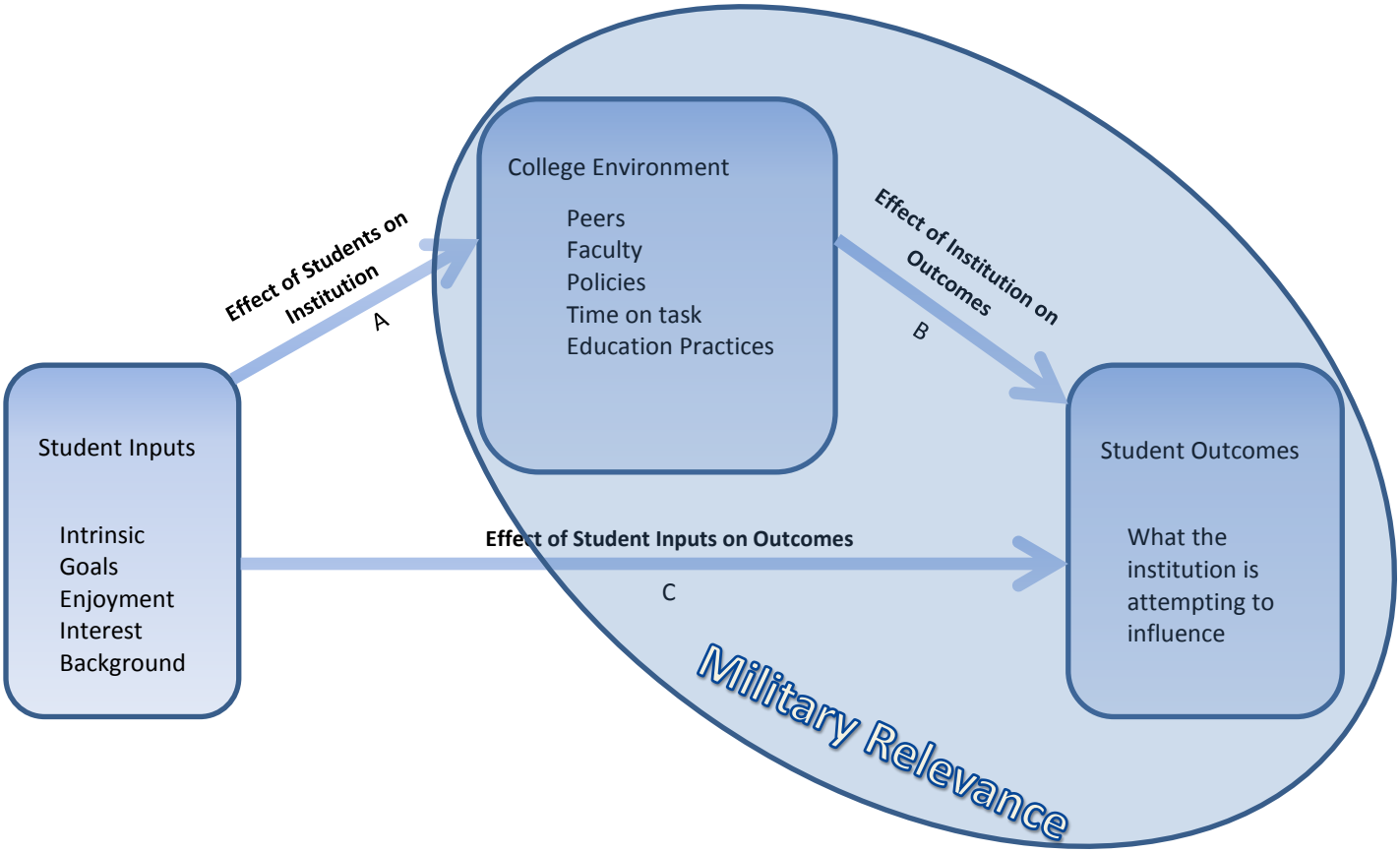

Figure 2. Input-Environment-Outcome model[1] modified to show the impact of relevance and military context.

Policy implications

Though senior leaders at USAFA can benefit from a thorough understanding of all the themes identified in this study, and can make management decisions that indirectly affect the other themes, USAFA policy was the area that leaders can have the most direct impact upon. By referencing the significant negative effect of coerced activities and the lack of transparency or communicating reasons for activities, the cadets seemed to develop a cynicism and a negative motivation for engagement. By providing a rationale for why events were mandatory, cadets were more likely to accept the decisions, even when they personally saw no benefit. This effect was likely most beneficial for large changes in area cadets view as settled, such as changes in marching schedules, eating routines, or esprit-de-corps traditions.

Another major finding that can be addressed by senior leaders was the inherent disconnect between the NSSE findings and the stated objectives of the USAFA developmental program.[7, 11] The analysis revealed that the factors developed for NSSE constructs did not have a major predictive component in the measures of Academy outcomes. This was corroborated by the cadet interviews in which multiple cadets identified intrinsic, peer, faculty, and contextual components as significant in their motivation for engagement. The NSSE factors do not include peer or contextual components in their constructs.

In the conceptual framework for cadet development, major objectives were established for thinking critically, teamwork, communication and literacy, decision-making, service to the Nation, ethical reasoning, stamina, and discipline. Many of these were unique to the military academy setting, so the NSSE was not designed with measures of these factors. The instrument developers allowed for such contingencies by allowing the school administering the survey to insert up to twenty school-specific questions in order to make it more relevant to the institution.[16]

In order to develop a survey that informs Academy leaders of what policies are having a positive impact on the goals they have set for cadet development, there needs to be a continuing effort towards recognizing the factors that affect cadet engagement in those areas. The current structure of NSSE may be sufficient for a civilian institute trying to impart the results necessary for success in the civilian world, but it was only partially successful in directing policies at the Air Force Academy. The ongoing feedback from cadets personally will be critical to understand the strengths and limitations of any quantitative instrument in this setting.

What can be determined from the present study is the importance of context or relevance to the cadet student body as well as the quantitative and qualitative evidence for the positive impact of a challenging academic environment, enriching educational experience, and supportive campus environment. These results can be directly incorporated into policy adjustments by decision makers.

For example, the incorporation of relevance can be expressly included into the academic curriculum because a large portion of the faculty is either current or former military and has personal experience they can draw upon to make connections to the cadets' future career. Additionally, extracurricular activities can be tailored to incorporate activities that show more

clearly the relationship to post-graduation career activities. In response to cadet feedback, the requirement for universal attendance at events outside of the classroom should be evaluated on a case-by-case basis to ensure that the event adds to the developmental aims of the Academy rather than detracts from those aims. Finally, the activities that USAFA already supports that have demonstrated positive impact should be supported through the appropriate commitment of resources. Such activities include setting and maintaining a challenging academic curriculum, providing extracurricular functions that enrich the holistic Academy experience, and providing cadet support socially, academically, and militarily.

Limitations and future opportunities

This study identified new areas for incorporation into the conceptual framework for cadet engagement in the Air Force Academy setting. However, there were several areas that called for further investigation or refinement. First was the limited predictive capacity and potential reliability issues with the NSSE. These issues should be addressed through the inclusion of well-researched and psychometrically sound questions specific to the Air Force Academy. Additionally, subordinate measures of the benchmarks, known as scalelets,[25, 26] could be developed specifically for use at USAFA.

Another limitation was that the interviews had limited participation with a small, self-selecting sample. The predisposition of the subjects who chose to participate and those who did not demonstrates a significant selection bias. Because the cadets who did participate in this study represent the engaged segment of the USAFA Cadet Wing that administrators wish to emulate, the results were still informative as to what motivates cadets to become engaged and what policies USAFA leadership can implement to facilitate that engagement. A third limitation was the self-reported nature of the survey data. Although prior research has established the validity and credibility of self-reported data for the circumstances under which the NSSE was administered,[16] there was a potential source for biased results and it becomes difficult to understand whether the poor predictive capability was due to measurement error in the survey, disconnects between the cadet-reported data and objective measures, or poorly posed questions that do not have explanatory power for the outcomes of interest. Another limitation to be considered was the timeframe studied. The Center for Character and Leadership Development[7] explicitly looks for engagement that was sustained and increased over time. To determine how well this goal is being met and what impact extended engagement has on cadet development, a longitudinal study of cadets from entering USAFA through graduation should be performed. Finally, as is the case with any new finding, the results need to be independently validated with another group of similarly situated subjects to ensure consistency.

The results of this study, however, provide an exciting opportunity for future research. The flexibility of NSSE to incorporated new, targeted questions allows for a refined instrument that will provide more direct measures of how USAFA policies are affecting the developmental outcomes espoused in the strategic plan.[11] Additionally, the use of mixed methods as a novel approach to this analysis provides the opportunity to validate cadet-self reported data on the NSSE. Finally, the highly structured nature of the Air Force Academy as well as the high percentage of graduates who can be tracked via the Air Force Personnel System for follow-up

studies presents a unique opportunity for longitudinal research on how well the developmental objectives of the Air Force Academy translate to effective officership post-graduation.

Conclusion

This study found a novel addition to the existing theoretical framework of student engagement for cadets at the United States Air Force Academy. The research analyzed what motivates cadets to engage or not engage in developmental activities purposefully provided by administrators, staff, and faculty to prepare them as Air Force officers and leaders. In addition to verifying the previously identified impacts of academic challenge, supportive campus environment, educational experience, intrinsic motivation, peer relationships, faculty and staff interaction, and institutional policies, the relevance of the activity to the individual was found to be a significant mediator. Adding this dimension to the existing professional development program can be helpful in increasing cadet engagement and fulfillment of the stated USAFA outcomes. The survey instrument currently used in analyzing the relationship of cadet engagement to developmental outcomes supported these findings, but was of limited use as a stand-alone predictive tool.

The findings of this study have a potential for policy changes from USAFA administrators that could have a beneficial effect on cadet engagement. This study has been provided to leadership at the Air Force Academy for consideration in any future policy decisions or management actions.

Bibliography

1. Astin, A. W. (1970a). The methodology of research on college impact, part one. *Sociology of Education, 43*(3), 223-254. Retrieved from http://www.jstor.org/stable/2112065
2. Astin, A. W. (1970b). The methodology of research on college impact, part two. Sociology of Education, 43(4), 437-450. Retrieved from http://www.jstor.org/stable/2111842
3. Astin, A. W. (1984). Student involvement: A developmental theory for higher education. Journal of College Student Personnel, 25(4), 297-308. Retrieved from https://www.middlesex.mass.edu/tutoringservices/downloads/astininv.pdf
4. Astin, A. W. (1993). What matters in college. Liberal Education, 79(4), 4-16. Retrieved from http://search.epnet.com/login.aspx?direct=true&db=aph&an=9409260313
5. Campbell, C. M., & Cabrera, A. F. (2011). How sound is NSSE?: Investigating the psychometric properties of NSSE at a public, research-extensive institution. The Review of Higher Education, 35(1), 77-103. doi: 10.1353/rhe.2011.0035.
6. Carini, R. M., Kuh, G. D., & Klein, S. P. (2006). Student engagement and student learning: Testing the linkages*. Research in Higher Education, 47(1), 1-32. doi: 10.1007/s11162-005-8150-9.
7. Center for Character and Leadership Development. (2011). Developing leaders of character: A conceptual framework. U. S. Air Force Academy, CO: USAFA Center for Character and Leadership Development Retrieved from http://www.usafa.edu/Commandant/cwc/cwcs/docs/Flip_Books/CONCEPTUALFRAMEWORK27_OCT.pdf.
8. Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. Biochemical Education, 17(3), 140-141. Retrieved from http://wwwtemp.lonestar.edu/multimedia/SevenPrinciples.pdf
9. Creswell, J. W. (2012). Qualitative inquiry and research design: Choosing among five approaches. Los Angeles, CA: SAGE Publications.

10. Creswell, J. W., & Plano Clark, V. L. (2011). Designing and conducting mixed methods research. Thousand Oaks, CA: Sage Publications.
11. Dean of Faculty, United States Air Force Academy. (2009). Dean of Faculty Strategic Plan FY 2009-2014. U. S. Air Force Academy, CO: Dean of Faculty Retrieved from http://www.usafa.edu/df/data/USAFA%20Outcomes.pdf.
12. Eccles, J., & Wang, M. (2012). Part I commentary: So what is student engagement anyway? Handbook of Research on Student Engagement, 133-145. doi: 10.1007/978-1-4614-2018-7_6.
13. Gordon, J., Ludlum, J., & Hoey, J. J. (2008). Validating NSSE against student outcomes: Are they related? Research in Higher Education, 49(1), 19-39. doi: 10.1007/s11162-007-9061-8.
14. Hu, S., & Wolniak, G. C. (2013). College student engagement and early career earnings: Differences by gender, race/ethnicity, and academic preparation. The Review of Higher Education, 36(2), 211-233. doi: 10.1353/rhe.2013.0002.
15. Kuh, G. D. (2001). The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties. Bloomington, IN: Indiana University Center for Postsecondary Research, 1-26. Retrieved from http://nsse.indiana.edu/2004_annual_report/pdf/2004_Conceptual_Framework.pdf
16. Kuh, G. D. (2009). The national survey of student engagement: Conceptual and empirical foundations. New Directions for Institutional Research, 2009(141), 5-20. doi: 10.1002/ir.283.
17. Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. The Journal of Higher Education, 79(5), 540-563. doi: 10.1353/jhe.0.0019.
18. LaNasa, S. M., Cabrera, A. F., & Trangsrud, H. (2009). The construct validity of student engagement: A confirmatory factor analysis approach. Research in Higher Education, 50(4), 315-332. doi: 10.1007/s11162-009-9123-1.
19. Lerer, N., & Talley, K. (2010). National Survey of Student Engagement's (NSSE) benchmarks–one size fits all? On the Horizon, 18(4), 355-363. doi: 10.1108/10748121011082653.
20. Mertler, C. A., & Vannatta, R. A. (2010). Advanced and multivariate statistical methods. Los Angeles, CA: Pyrczak.
21. National Survey of Student Engagement Institute. (2013). Construction of the NSSE benchmarks. Retrieved from http://nsse.iub.edu/html/benchmark_construction.cfm
22. Pascarella, E. T., Seifert, T. A., & Blaich, C. (2009). Validation of the NSSE benchmarks and deep approaches to learning against liberal arts outcomes. Paper presented at the Annual meeting of the Association for the Study of Higher Education. Jacksonville, FL.
23. Pascarella, E. T., Seifert, T. A., & Blaich, C. (2010). How effective are the NSSE benchmarks in predicting important educational outcomes? Change: The Magazine of Higher Learning, 42(1), 16-22. doi: 10.1080/00091380903449060.
24. Passarelli, A., & Kolb, D. A. (2012). Using experiential learning theory to promote student learning and development in programs of education abroad. Cleveland, OH: Case Western Reserve University Retrieved from http://learningfromexperience.com/media/2012/02/using-experiential-learning-theory-to-promote-student-learning-and-development-in-programs-of-education-abroad.pdf.
25. Pike, G. R. (2006a). The convergent and discriminant validity of NSSE scalelet scores. Journal of College Student Development, 47(5), 550-563. doi: 10.1353/csd.2006.0061.
26. Pike, G. R. (2006b). The Dependability of NSSE Scalelets for College-and Department-level Assessment*. Research in Higher Education, 47(2), 177-195. doi: 10.1007/s11162-005-8885-3.
27. Pike, G. R., & Kuh, G. D. (2005). A typology of student engagement for American colleges and universities. Research in Higher Education, 46(2), 185-209. doi: 10.1007/s11162-004-1599-0.
28. Porter, S. R. (2006). Institutional structures and student engagement. Research in Higher Education, 47(5), 521-558. doi: 10.1007/s11162-005-9006-z.
29. Proyer, R. T., Annen, H., Eggimann, N., Schneider, A., & Ruch, W. (2012). Assessing the “good life” in a military context: How does life and work-satisfaction relate to orientations to happiness and career-success among Swiss professional officers? Social Indicators Research, 106(3), 577-590. doi: 10.1007/s11205-011-9823-8.
30. Schreiner, L. A., & Louis, M. (2006). Measuring engaged learning in college students: Beyond the borders of NSSE. Paper presented at the Annual Meeting of the Association for the Study of Higher Education, Anaheim, CA. http://www.apu.edu/strengthsacademy/downloads/measuring_engaged_learning08.pdf
31. Sharma, B. R., & Bhaumik, P. K. (2013). Student engagement and its predictors: An exploratory study in an Indian business school. Global Business Review, 14(1), 25-42. doi: 10.1177/0972150912466364.

32. Tabachnick, B. G., & Fidell, L. S. (2007). Using Multivariate Statistics (Vol. 5). New York, NY: Allyn & Bacon.
33. Tendhar, C., Culver, S. M., & Burge, P. L. (2013). Validating the National Survey of Student Engagement (NSSE) at a research-intensive university. Journal of Education and Training Studies, 1(1), p182-193. doi: 10.11114/jets.v1i1.70.
34. Terenzini, P. T., & Reason, R. D. (2005). Parsing the first year of college: A conceptual framework for studying college impacts. Paper presented at the Annual Meeting of the Association for the Study of Higher Education, Philadelphia, PA. http://www.ed.psu.edu/educ/parsing-project/.pdf%20documents/ASHE05ptt.pdf
35. Trowler, V., & Trowler, P. (2010). Student engagement evidence summary. (Deliverable 2 for the Higher Education Academy Student Engagement Project). Lancaster, UK: University of Lancaster Retrieved from http://eprints.lancs.ac.uk/61680/1/Deliverable_2._Evidence_Summary._Nov_2010.pdf.
36. United States Air Force Academy. (2009). The United States Air Force Academy outcomes. Retrieved from http://www.usafa.edu/df/data/USAFA%20Outcomes.pdf.
37. United States Air Force Academy Directorate of Admissions. (2013). Discharge policy. Retrieved from http://www.academyadmissions.com/commitment/
38. Urdan, T. C. (2012). Statistics in plain English. New York, NY: Routledge.
39. Wolf-Wendel, L., Ward, K., & Kinzie, J. (2009). A tangled web of terms: The overlap and unique contribution of involvement, engagement, and integration to understanding college student success. Journal of College Student Development, 50(4), 407-428. doi: 10.1353/csd..0.0077.
40. Zepke, N., & Leach, L. (2010). Improving student engagement: Ten proposals for action. Active Learning in Higher Education, 11(3), 167-177. doi: 10.1177/1469787410379680.

Appendix A

The Tier 3 Skills Outcomes espoused by the Air Force Academy[11] are:

Ethical Reasoning and Action
Respect for Human Dignity
Service to the Nation
Lifelong Development and Contributions
Intercultural Competence and Involvement
Quantitative and Information Literacy
Oral and Written Communication
Critical Thinking
Decision-Making
Stamina
Discipline
Teamwork

Appendix B

The NSSE Benchmarks are calculated[21] as factors based on the following survey questions:

Factor	Question Content
Academic Challenge (AC) α=0.68	
	Time spent preparing for class
	Worked harder than you thought you could to meet instructors expectations
	Number of assigned textbooks, books, or book-length texts as course readings
	Number of written papers or reports of 20 pages or more
	Number of written papers or reports between 5-19 pages
	Number of written papers or reports fewer than 5 pages
	Coursework emphasizes: Analyzing the basic elements of an idea or theory
	Coursework emphasizes: Synthesizing and organizing ideas and information
	Coursework emphasizes: Making judgments about the value of information
	Coursework emphasizes: Applying theories or concepts to practical problems
	Campus environment emphasizes spending time studying on academic work
Active and Collaborative Learning (ACL) α=0.67	
	Asked questions in class or contributed to class discussions
	Made a class presentation
	Worked with other students on projects during class
	Worked with classmates outside of class to prepare class assignments
	Tutored or taught other students
	Participated in a community-based project as part of a regular course
	Discussed ideas from your readings with others outside of class (students, etc.)
Student-Faculty Interaction (SFI) α=0.74	
	Discussed grades or assignments with an instructor
	Talked about career plans with a faculty member or advisor
	Discussed ideas from your readings or class with faculty member outside class
	Worked with faculty on activities other than coursework
	Received prompt written or oral feedback from faculty on academic performance
	Worked with a faculty member on a research project

Appendix B (continued)

The NSSE Benchmarks are calculated[21] as factors based on the following survey questions:

Factor	Question Content
Supportive Campus Environment (SCE) α=0.73	
	Campus environment provides support you need to help you academically
	Campus environment helps you cope with your non-academic responsibilities
	Campus environment provides the support you need to thrive socially
	Quality of relationships with other students
	Quality of relationships with faculty members
	Quality of relationships with administrative personnel and offices
Enriching Educational Experiences (EEE) α=0.58	
	Talking with students with different religious beliefs, political opinions, values
	Talking with students of a different race or ethnicity
	An institutional climate that encourages contact among different backgrounds
	Using electronic technology to discuss or complete assignments
	Participating in internships or field experiences
	Participating in community service or volunteer work
	Participating in foreign language coursework
	Participating in study abroad
	Participating in independent study or self-assigned major
	Participating in culminating senior experience
	Participating in co-curricular activities
	Participating in learning communities

Appendix C

Collinearity Diagnostics for Relevant Variables

	Thinking Critically		Working w/ Others		Speak Effectively		Write Effectively	
	Toler.	VIF	Toler.	VIF	Toler.	VIF	Toler.	VIF
Thinking critically and analytically			0.49	2.05	0.42	2.36	0.44	2.25
Working effectively with others	0.56	1.78			0.51	1.98	0.48	2.09
Speaking clearly and effectively	0.37	2.71	0.38	2.62			0.48	2.08
Writing clearly and effectively	0.44	2.27	0.41	2.43	0.55	1.82		
AC	0.61	1.65	0.58	1.73	0.58	1.73	0.58	1.73
ACL	0.51	1.96	0.51	1.95	0.51	1.95	0.51	1.95
EEE	0.69	1.45	0.69	1.44	0.69	1.45	0.69	1.45
SCE	0.64	1.56	0.69	1.45	0.65	1.54	0.65	1.55
SFI	0.49	2.03	0.49	2.04	0.49	2.03	0.49	2.04

Continued

Appendix C (continued)

Collinearity Diagnostics for Relevant Variables

	AC		ACL		EEE		SCE		SFI	
	Toler.	VIF	Toler.	VIF	Toler.	VIF	Toler.	VIF	Toler.	VIF
Thinking critically and analytically	0.43	2.30	0.41	2.42	0.41	2.42	0.41	2.42	0.42	2.41
Working effectively with others	0.48	2.09	0.48	2.10	0.48	2.08	0.51	1.95	0.48	2.10
Speaking clearly and effectively	0.36	2.78	0.36	2.78	0.36	2.78	0.36	2.75	0.36	2.77
Writing clearly and effectively	0.41	2.43	0.41	2.44	0.41	2.44	0.41	2.42	0.41	2.44
AC			0.60	1.67	0.60	1.68	0.58	1.72	0.58	1.71
ACL	0.53	1.88			0.52	1.91	0.51	1.96	0.68	1.48
EEE	0.71	1.40	0.70	1.42			0.69	1.45	0.71	1.41
SCE	0.65	1.55	0.64	1.56	0.64	1.56			0.66	1.51
SFI	0.50	2.01	0.65	1.54	0.51	1.97	0.51	1.98		

Appendix D

The initial protocol included the following questions, designed to be the starting point for more expansive discussion:

1. What does it mean to you if someone is described as “engaged” in their own professional development at USAFA?
2. USAFA considers the term “engagement” to mean experiences and relationships with an intensive commitment by all stakeholders that are sustained over time and meaningful to an individual. Does this definition fit with your own definition, and if not what aspects do not resonate with you?
3. Can you please tell me a little about your background prior to coming to the Air Force Academy?
4. According to your own understanding of the term, did you consider yourself very engaged then, why or why not?
5. Do you consider yourself very engaged now that you are at USAFA, why or why not?
6. Since coming to the Air Force Academy, how much do you participate in class?
7. Which classes and instructors are most and least meaningful to you and why?
8. What changes would you recommend to make classes more interesting to you personally, so that you would feel like becoming more engaged in the class?
9. What military aspects of USAFA do you find most and least beneficial and why?
10. What activities outside of the classroom do you participate in and why do you enjoy them or not enjoy them?
11. What aspects of the USAFA experience do you believe most and least benefit your development as an Air Force officer and why?
12. What other activities do you participate in, either offered by USAFA or on your own, in order to better prepare yourself for becoming an officer?
13. What do you think are the best ways for students to learn leadership and officership?
14. Is there anything else you’d like to share with me about your experience with engagement at the Air Force Academy, or is there anything else you’d like me to know?