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**SUMMARY**

1. PURPOSE. To provide security and policy review on the document at Tab 1 prior to release to the public.

2. BACKGROUND.

Author: Dr. Steve Jones (DFE)

Title: USAFA Assessment Handbook for Academic Majors and Minors

Circle one: Abstract    Tech Report    Journal Article    Speech    Paper    Presentation    Poster  
 Thesis/Dissertation    Book    Other: \_\_\_\_\_

Check all that apply (For Communications Purposes): *N/A*

- CRADA (Cooperative Research and Development Agreement) exists  
 Photo/ Video Opportunities     STEM-outreach Related     New Invention/ Discovery/ Patent

Description: This Assessment Handbook was written as a "how-to" resource for academic programs here at USAFA as they engage in assessment activities. I am seeking public release because of the interest it has received from counterparts at other colleges and universities. In the name of collegiality, I would like to share it with those colleagues outside of USAFA who are interested in seeing it.

Release Information: A .pdf version of this document will be shared with external audiences, upon request.

Previous Clearance information: N/A

*ADD ↘ to bottom of 1<sup>st</sup> Page.*

Recommended Distribution Statement: (Distribution A, Approved for public release, distribution unlimited.)

3. DISCUSSION. NA

4. RECOMMENDATION. DFE and DFER approve for public release

*St K Jones*  
 Steven K. Jones, AD-25  
 Director of Academic Assessment

*Consider adding disclaimer: "The views expressed in this article are those of the author(s) and not necessarily those of the U.S. Air Force Academy, the US Air Force, the Department of Defense, or the US Government."*

Tab 1: Assessment Handbook for Academic Majors and Minors

**USAFA**

**Assessment Handbook**

**For Academic Majors and Minors**

**Dr. Steve Jones**  
**Directorate of Education**  
**United States Air Force Academy**  
**July, 2014**

## Acknowledgements

I am fortunate to have the opportunity to work with truly remarkable colleagues, both here at the Air Force Academy and at other colleges and universities around the country. I have learned a great deal from my interactions with these people, and their influence has no doubt shaped the ideas contained in this *Handbook*. They are too numerous to mention by name, but I hope they know how grateful I am for their friendship, wisdom, and guidance.

I am also thankful for those colleagues who took the time to read and provide helpful feedback on one of more drafts of this document. Those people are John Christ, Rolf Enger, Trae Holcomb, Jim Homoki, Mark Jensen, Kris Jones, Bob Noyd, and David Stockburger. Their efforts have certainly made this product markedly better than it would have been otherwise.

## Table of Contents

Foreword, by BrigGen Andrew Armacost .....	4
<b>Part I: <i>WHY</i> Build Assessment into each Academic Major and Minor?</b>	
Chapter 1: USAFA’s Focus on Cadet Learning .....	6
Chapter 2: Assessment and Accreditation .....	12
<b>Part II: <i>HOW</i> to Create (or Refine) an Assessment Program in Each Academic Major and Minor</b>	
Chapter 3: Creating Cadet Learning Outcomes .....	17
Chapter 4: Building a Curriculum Map .....	26
Chapter 5: Assessment Methods: Measuring Student Accomplishment.....	36
Chapter 6: Making Sense of Assessment Results .....	50
Chapter 7: Using Assessment for Improvement .....	65
References .....	73
Appendices .....	75
Appendix A: Academic Program Self-Assessment	
Appendix B: Cadet Learning Outcomes, by Academic Program	

## Foreword

Our academic contributions to developing future officers are significant. The experiences we offer cadets are driven by our institutional outcomes, which give an important sense of purpose to the work we do. The vibrant learning-focused culture we strive to attain requires feedback mechanisms to ensure that our efforts as educators yield the important outcomes we set for our students, our programs, and our institution. A strong assessment program is essential to make this happen.

The importance of assessment is not unique to USAFA; indeed, it is apparent across the entire higher education landscape. Nowhere is this seen more clearly than in the latest accreditation criteria published by the Higher Learning Commission (HLC), which clearly state that institutions must assess “achievement of the learning outcomes that it claims for its curricular and co-curricular programs” and then use “the information from assessment to improve student learning” (Core Component 4.B.).

Prior to becoming the Dean of the Faculty, I had the opportunity to visit each academic department and learn about the assessment processes they currently have in place. It quickly became apparent that there is substantial variability in the maturity of different assessment programs. Some programs are very mature, demonstrating well-established processes for collecting and making sense of assessment data and using them to improve the experiences they offer cadets, both in and out of the classroom. Others are less far along, still working to clarify the desired learning outcomes of their academic major and mapping those outcomes to their curriculum. That variability is understandable. However, my intent is to ensure that all of our programs’ assessment efforts reach the more mature level. Doing so will allow us to meet the expectations of the HLC and will also promote a more effective learning-focused culture.

That is why I see this *Assessment Handbook* as a valuable contribution to the DF community. It serves as a guide that faculty across DF can use in developing, implementing, and improving assessment processes in all academic majors and minors. Regardless of where your own assessment program currently stands, I encourage you to use this guide to help make it better. By doing so, we can all ensure that the educational experiences offered to our cadets are as effective as they can possibly be.



Brigadier General Andrew P. Armacost  
Dean of the Faculty

Part I: **WHY** Build Assessment into each Academic Major and  
Minor?

## Chapter 1 – USAFA’s Focus on Cadet Learning<sup>1</sup>

In the past two decades, both the Air Force Academy and the higher education community at large have experienced a significant paradigm shift, from a traditional “instruction focus” to a newer “learning focus” (Barr & Tagg, 1995; Huba & Freed, 2000; Tagg, 2003). According to the older instruction-focused paradigm (in which many of us grew up), faculty members’ primary teaching-related task was to deliver instruction – to transmit their disciplinary knowledge to students. In this view, successful faculty members were those who had the most up-to-date knowledge of their discipline and who were able to transmit that knowledge in ways that were both clear and well-organized. There was obviously a hope that students benefitted from the process, but identifying the exact nature of that benefit was generally not emphasized.

More recently, faculty members have come to realize a fundamental problem with the instruction-focused paradigm. It is possible for faculty members to deliver instruction – and perhaps even deliver it really well – without it having much of an impact on students. You may have experienced this phenomenon yourself. Have you ever delivered a clear, well-organized lesson within your discipline, only to be disappointed when you discovered that your cadets didn’t really understand what you were trying to convey? If so, then you are acutely aware of the frustrations that arise when what you teach may not be the same as what your cadets learn.

This brings us to the newer learning focus – and the emphasis on assessment that comes with it. Rather than being content with the mere delivery of various units of instruction, colleges and universities (to include USAFA) are being called upon to consider the impact of that instruction. What are students really learning in our courses and programs? Are they accomplishing what we want them to accomplish? And, in those situations where they are not, what can we do to improve so that their learning improves?

### Where Did The Learning Focus Come From?

Many factors have contributed to the heightened emphasis on student learning, both here at USAFA and nationwide. One obvious factor is the rising cost of a college degree. According to the College Board ([http://trends.collegeboard.org/college\\_pricing](http://trends.collegeboard.org/college_pricing)), tuition costs at public four-year institutions have grown by an average of over 5% annually over the past ten years, a figure which has consistently

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<sup>1</sup> Some of the information in this chapter comes from Jones, Noyd, & Sagendorf’s (2014) *Building a Learning Pathway to Student Learning: A How-to Guide to Course Design* (Stylus Publishing), which describes the origin of the learning focus in significantly more depth.

exceeded the rate of inflation. This has led writers and policymakers to question whether the education students receive is really worth the growing price tag; the answers haven't always been pretty. For instance, under the George W. Bush administration, the Secretary of Education's Commission on the Future of Higher Education (i.e., the "Spellings Commission") released a scathing review of higher education practices (U.S. Department of Education, 2006) noting a "remarkable absence of accountability mechanisms to ensure that colleges succeed in educating students." (p. vii). Since that time, Derek Bok's (2006) *Our Underachieving Colleges*, Arum & Roksa's (2011) *Academically Adrift*, and Keeling & Hersh's (2011) *We're Losing Our Minds: Rethinking American Higher Education* have achieved popular success by pointing out areas in which colleges and universities appear to be falling short. There appears to be increasing public concern about the quality of student learning in college, and those concerns aren't likely to go away unless (and until) college faculty and staff respond by adopting a more intentional approach to promoting and assessing student learning.

A related concern has been raised in national conversations about the purpose of a college education in the first place (e.g., Association of American Colleges & Universities, 2007; Summers, 2012). What do we really want students to learn from their college experience? What do we want to be true of those people who attend and graduate from our colleges and universities that is not true of those who don't? Is mastering disparate pieces of disciplinary content (like what has traditionally been delivered in our classes) really what we are looking for? Or is college supposed to be about something more?

The answers that are emerging in this national conversation are intriguing. Despite the fact that most college courses have historically been organized around the content of a particular discipline, many of the things people ultimately want students to learn in college do not necessarily seem to be tied to specific disciplinary knowledge. For example, in their published set of "essential learning outcomes" for 21<sup>st</sup> century students, the Association of American Colleges and Universities (AAC&U, 2007) stresses the importance of general-purpose "intellectual and practical skills," such as critical thinking and written communication; "personal and social responsibilities," such as intercultural competence and ethical reasoning; and "integrative and applied learning" that allows students to build strong connections across disciplinary boundaries. Accomplishing these lofty goals isn't likely to happen by accident – and it almost certainly won't happen if our programs are based solely on delivery of disciplinary knowledge. Instead, they will require intentional effort on the part of faculty and staff, as well as a heightened awareness about the nature and quality of our students' learning.

### The Learning Focus at USAFA

Here at the Air Force Academy, we have especially important reasons to focus on cadet learning. First, the Air Force Academy has a vitally important mission – to develop officers of character motivated to lead the Air Force in service to the nation – which we can obviously not afford to take lightly. It is for that reason that we have established our own set of institutional learning outcomes that are just as rigorous as those published by AAC&U, and it will take a very intentional effort from all faculty and staff to help cadets achieve them. Second, as a federally-funded institution, we are stewards of valuable taxpayer dollars. As a result, we owe it to the American public to use their money responsibly, making sure that we foster cadet learning to the very highest extent possible. Finally, and arguably most importantly, focusing on student learning is simply the right thing to do. Here at USAFA, we have a tremendous opportunity to positively impact the lives of thousands of America’s most talented young people ... why wouldn’t we want to make sure that we are doing that in the very best way we possibly can?

It is within this context that USAFA has adopted a “learning focus” that calls us to (1) be very clear about what we want cadets to learn; (2) design learning experiences (both in and outside the classroom) that are well-aligned with those learning goals; (3) collect assessment data that inform us about the extent to which cadets are meeting the goals; (4) make sense of the assessment data; and (5) use what we’ve learned to continually improve our programs in areas where we may be falling short. This can be depicted visually in Figure 1, which is a slight variant of an image disseminated throughout the Academy over the past several years.

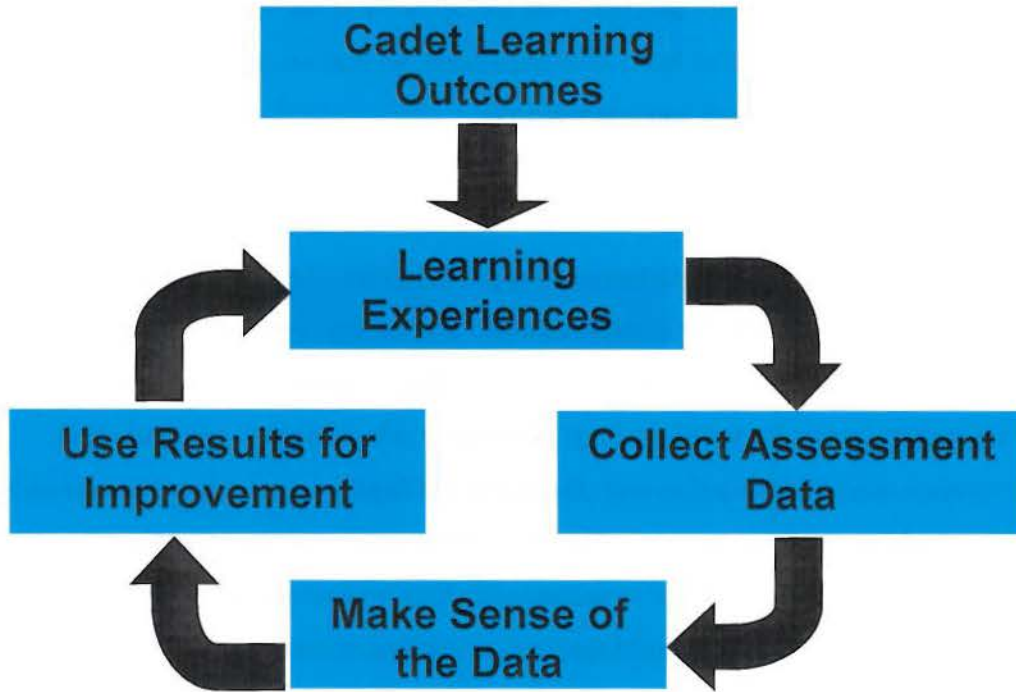


Figure 1. The learning focus

In addition to framing the assessment efforts at the institutional level, this learning-focused model is also an effective means of framing the more specific assessment efforts within your academic major or minor. That is, an effective assessment program in your program will have each of the elements of the model, to include:

- (1) Outcomes for cadet learning in your academic major or minor;
- (2) A set of learning experiences (potentially to include both academic courses and extracurricular programs) that help cadets achieve those cadet learning outcomes;
- (3) A strategy for collecting assessment data showing the extent to which cadets have achieved your learning outcomes;
- (4) A means of making sense of the assessment data that have been collected; and
- (5) A process that allows your department or program to make improvements based on what you learn.

This *Assessment Handbook* was written to provide guidance to departmental assessment representatives and other faculty members who are charged with leading assessment efforts in their respective academic programs. It is a “how-to” book, meant to guide you through the steps of the learning-focused model as they pertain to your academic assessment program. Along the way, I will also

highlight some of the best assessment practices that are currently in place across the faculty. The hope is that this document can help all of us learn from each other, so that we can all engage more effectively in the dynamic process of assessment and improvement.

### Organization of the Handbook

This *Assessment Handbook* is divided into two distinct parts. In Part I (i.e., Chapters 1 & 2), the emphasis is on **why** it is important for each of our academic majors and minors to engage in assessment of cadet learning. As you've seen, the most important reasons to engage in assessment have to do with our shared commitment to improving cadet learning. However, it is important to recognize that accreditation plays a motivating factor as well. Therefore, in Chapter 2, I introduce the accreditation process and show why the requirements of USAFA's institutional accrediting body (i.e., the Higher Learning Commission of the North Central Association) make it imperative that you and your faculty colleagues seriously engage in the process of assessment and improvement.

In Part II (Chapters 3-7), the emphasis shifts from the **why** of assessment to **how** assessment can be done. The learning-focused model shown in Figure 1 serves as the organizational framework for this part of the *Handbook*. Specifically:

- Chapter 3 is dedicated to helping you create effective learning outcomes for the cadets in your academic major or minor. The chapter begins by describing the characteristics of well-written cadet learning outcomes; the second half of the chapter includes guidance regarding how to work with faculty in your department to generate effective cadet learning outcomes for your academic major or minor.
- Chapter 4 is designed to help you build a "curriculum map" showing the relationship between your cadet learning outcomes and the various courses in your academic major or minor. As in Chapter 3, this chapter will include some tips on making effective curriculum maps, and it will also include some examples of curriculum maps currently in use at USAFA.
- Chapter 5 is focused on methods of collecting assessment data. This chapter is perhaps best thought of as a catalog of different assessment methodologies, each with its own distinctive set of strengths and weaknesses. See this chapter for techniques – many of which are already in place somewhere here at the Academy – for determining the extent to which cadets are actually achieving your program's cadet learning outcomes.

- Chapter 6 is all about making sense of your assessment results. This chapter will highlight some of the processes that departments currently have in place, and it also includes two reporting templates that may be helpful if faculty in your department are looking for a place to start.
- Finally, Chapter 7 is designed to help you use the information from your assessments to make improvements in your program. This is the last chapter in the handbook, and it includes far fewer technical details than some of the earlier chapters do. However, it is arguably the most important chapter in this entire document. That is because ***doing assessment is valuable only to the extent that the data are used to make your courses and programs better***. As such, this chapter pays homage to what George Kuh and his colleagues (2005) refer to as “positive restlessness,” an ethos of constant improvement that permeates high-performing educational institutions.

## Chapter 2 – Assessment and Accreditation

In general, accreditation refers to a means by which external agencies assure the quality of education being provided at a given institution. In the United States, that accreditation can take on two forms. Higher education institutions are accredited by one of six regional accrediting organizations recognized by the U.S. Department of Education and the Council for Higher Education Accreditation, with each organization being responsible for overseeing degree-granting institutions in a given portion of the country (<http://www.chea.org/Directories/regional.asp>). In some cases, academic programs can also be accredited by discipline-specific accrediting bodies. Perhaps the most familiar example of this kind of specialized accreditation is the American Bar Association, which accredits law schools and administers the bar exam to prospective lawyers.

Here at the Academy, AFI 36-3501 mandates that we maintain both our institutional accreditation and other appropriate division or discipline-specific accreditation when they are available. Our institutional accreditation is maintained through the Higher Learning Commission of the North Central Association of Colleges and Schools (<http://ncahlc.org/>). The following academic majors at USAFA also have the more specific programmatic accreditation:

- All of the Engineering majors, as well as Computer Science, are accredited by ABET (previously named the Accreditation Board for Engineering and Technology; <http://www.abet.org/>).
- The Management major is accredited by The Association to Advance Collegiate Schools of Business (AACSB International; <http://www.aacsb.edu/>).
- The Chemistry major is approved by the American Chemical Society (ACS; <http://portal.acs.org/portal/acs/corg/content>).

All of USAFA's accrediting bodies have published expectations they have of member institutions with regard to assessment and improvement. For the Higher Learning Commission (2012), those expectations are outlined most clearly in Criterion Four, entitled "Teaching and Learning: Evaluation and Improvement," specifically within Core Component 4.B., shown below:

*Core Component 4.B. The institution demonstrates a commitment to educational achievement and improvement through ongoing assessment of student learning.*

- 1. The institution has clearly stated goals for student learning and effective processes for assessment of student learning and achievement of learning goals.*
- 2. The institution assesses achievement of the learning outcomes that it claims for its curricular and co-curricular programs.*
- 3. The institution uses the information from assessment to improve student learning.*
- 4. The institution's processes and methodologies to assess student learning reflect good practice, including the substantial participation of faculty and other instructional staff members.*

In order to maintain its status as an accredited institution, the Academy is required to submit both an Assurance Argument and an Evidence File to the Higher Learning Commission<sup>2</sup>. The Assurance Argument is a relatively short narrative (limited to no more than 35,000 words) that presents the Academy's case for how we meet each of the core components. The Evidence File consists of those documents that are referred to in the Assurance Argument.

What does this mean for you? Take a close look at the items listed in Core Component 4.B. This core component essentially lays out the same expectations that we described in Chapter 1. That is, faculty from each curricular program (i.e., academic major or minor) are expected to:

- (1) Articulate the cadet learning outcomes for the major or minor;
- (2) Identify the learning experiences (potentially to include both academic courses and extracurricular programs) that help cadets achieve those learning outcomes;
- (3) Develop a strategy for assessing the extent to which cadets have achieved those learning outcomes;
- (4) Create a method of making sense of the assessment results; and
- (5) Use a process that allows them to make improvements based on what is learned.

In other words, in order to maintain institutional accreditation, faculty from each academic major and minor will need to successfully enact the various steps of the learning-focused cycle.

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<sup>2</sup> USAFA is on a ten-year accreditation cycle; the Higher Learning Commission's next review of our Assurance Argument and Evidence File will take place in the Spring of 2019.

### An Important Caveat

While assessment is vitally important to our continued accreditation, it is important to remember that assessment isn't something we do solely because of accreditation. At the Air Force Academy, the most important reason we do assessment is because of our shared commitment to cadet learning. We all recognize the vital mission we have to educate, train, and inspire cadets to become leaders of character, and assessment is an important way that we can improve our ability to accomplish that mission. In that regard, assessment has much more to do with our *commitment* than it does with our need for *compliance* with external demands.

To further reinforce the idea that the assessment efforts play an important role in your department's culture, we have created several "Principles of Assessment-Based Improvement" to help guide your approach<sup>3</sup>. Those principles are listed here:

Within USAFA departments and academic programs, assessment ...

1. Guides continuous improvement of our ability to foster achievement of the learning outcomes.
  - Assessment is not an end in itself, but a vehicle for improving cadets' learning experiences. Assessment is useful to the extent that it helps decision makers in their efforts to make the department or program better.
  - Assessment cultivates a "culture of evidence" that guides decisions throughout the department or program.
  
2. Recognizes the intentionally developmental nature of the cadet experience.
  - Learning is a complex activity that takes place over time. Therefore, we fully expect that cadets will demonstrate growth and development over the entire span of their academic program.
  - To facilitate this development, our curricula should be intentionally designed to guide cadets through increasingly complex levels of learning.
  - Recognizing that the level of cadet accomplishment at one point in a cadet's career will be different than the level of accomplishment at a second point in a cadet's career, assessment of

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<sup>3</sup> These principles are borrowed heavily from the AAHE Assessment Forum (1996), the Higher Learning Commission (2003), and the Association of American Colleges & Universities (2008).

cadet learning will ideally occur multiple times over the course of cadets' time in our majors and minors.

3. Is a shared responsibility.

- Promoting cadet development is the Academy's *raison d'être*. Everyone has a stake in it, and everyone has a stake in seeing it improve.
- As a result, assessment is not a task (or set of tasks) done by the Director of Academic Assessment, nor is it a task solely for your Departmental Assessment representative. It is a collaborative activity engaged in by all faculty, staff, and cadets.
- Assessment also involves important constituencies beyond the Academy, to include alumni, supervisors in the field, and the larger Air Force. These groups can provide valuable feedback about the quality of our graduates, as well as a stronger sense of the appropriateness of our cadet learning outcomes. In Chapter 5, you will read more about how some USAFA programs are leveraging their connections with the graduate community to gather valuable assessment information.

4. Is itself subject to critical examination and continual improvement<sup>4</sup>.

- Programmatic assessment plans are intended to be living documents, and assessment procedures should be regularly reviewed and updated. No assessment program is perfect, and we can all learn from each other how to make our programs better.
- Assessment structures and processes are routinely benchmarked against peer institutions and the state-of-the-art in higher education.

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<sup>4</sup> As evidence of the dynamic nature of assessment structures and processes, it is important to note that the accreditation criteria used by the Higher Learning Commission changed in 2012. Therefore, the criteria against which USAFA will be judged during our next comprehensive evaluation will be different than the ones used during our last accreditation visit.

Part II: ***HOW*** to Create (or Refine) an Assessment Program in Each Academic Major and Minor

## Chapter 3 – Creating Cadet Learning Outcomes

Imagine that it is Graduation Day. After the graduates throw their hats in the air, you meet up with some of the young men and women who were cadets in your department’s academic major or minor. What characteristics would you like them to have as a result of being in your program? What will they know? What skills will they have? What attitudes or habits of mind will they possess? By imagining the characteristics that you want cadets to have at the end of your academic major or minor, you have taken the first step toward defining the learning outcomes of your program.

Cadet learning outcomes refer to the knowledge, skills, and attitudes that your cadets will possess at the time of graduation as a result of participating in your academic major or minor. Articulating these outcomes is a necessary first step in developing the assessment program for your major or minor, as they establish the “targets” that you hope to achieve and that you use to measure the extent of your success. Therefore, this chapter is written to help you write (or refine) the cadet learning outcomes for your major or minor.

### A Word About Terminology

One of the biggest sources of confusion in the assessment world involves the varied language that people use to describe those things that they want students to learn. Sometimes (as here), you will hear people refer to the “outcomes” of an academic program. Other times, you may hear people use words like “goals” or “objectives” instead. Unfortunately, there doesn’t appear to be universal agreement about the distinctions between these terms, so many people end up using them somewhat interchangeably. For the purposes of this *Handbook*, be aware that I will be using the phrase “cadet learning outcomes” to describe the knowledge, skills, and attitudes that your cadets will possess at the time of graduation as a result of participating in your academic major or minor.

This chapter is divided into two parts. The first part reviews the characteristics of effective cadet learning outcomes. Consider these characteristics to be “best practices,” and I encourage you to write your program’s cadet learning outcomes in ways that are consistent with them. The second part of the chapter includes some more specific advice about steps that you can take if you are working on developing cadet learning outcomes for your academic major or minor.

### Characteristics of Effective Cadet Learning Outcomes

1. *Effective cadet learning outcomes articulate the knowledge, skills, and attitudes that cadets will have at the end of your academic major or minor. The focus of well-written learning outcomes is on what cadets will be like. This is distinct from what you – the faculty – will do to help them get there.*

While this seems like a simple idea, it is quite common for faculty to write cadet learning outcomes in ways that violate this principle. The most common mistake occurs when faculty write outcome statements that focus on what they (i.e., the faculty members) will do in the major or minor, rather than what the cadets will learn as a result of being in the program. For instance, faculty may write that the academic major will “cover” certain fundamental knowledge in the discipline. This is a mistake, as it places the emphasis on what the faculty members will teach, rather than on what the cadets will learn.

In order to avoid this mistake, assessment professionals typically write learning outcome statements beginning with a phrase like the following:

“As a result of being in this academic major, cadets will ...”

Notice that this outcome statement explicitly focuses on cadets – what they will have achieved as a result of being in the academic major.

2. *Effective cadet learning outcomes are actionable.*

Well-written cadet learning outcome statements are useful because they guide action, both by faculty and cadets. Here are three ways that your outcome statements will play a valuable role within your academic major or minor.

- As you will see, well-written cadet learning outcome statements serve as the foundation of your assessment efforts. Faculty engage in assessment in order to determine the extent to which cadets are learning what you want them to learn. As a result, your program’s assessment efforts will be effective to the extent that they inform you and

your colleagues how cadets are progressing toward accomplishment of your agreed-upon learning outcomes.

- Second, cadet learning outcome statements provide a common target for faculty. Generally speaking, cadets are not likely to achieve the outcomes set out for them by accident. Instead, outcome achievement will come from intentional effort on the part of the faculty and staff charged with designing and teaching courses within your major or minor. Getting faculty within the program to agree on what those cadet learning outcomes are is the first step toward achieving them.
- Finally, learning outcome statements provide a common target for the cadets in your academic major or minor. Cadets are busy people, and it is not uncommon for them to bounce from one activity to the next without giving too much thought to why those activities exist. If we don't communicate with them about the outcomes we intend to develop through our activities, they are not likely to put the pieces together by themselves. Being transparent with your intentions can guide their behavior and make it much easier for them to take responsibility for their own development.

In order to maximize how actionable your cadet learning outcomes are, I encourage you to be mindful of how many you create for your academic program. If your major or minor has only one or two cadet learning outcomes, those outcomes will likely be written so broadly that they won't guide anyone's actions. On the other hand, if your program has too many cadet learning outcomes (say, a dozen or more), faculty and cadets may feel pulled in so many different directions that they don't meaningfully accomplish any of them. While there is no magic number of cadet learning outcomes to strive for, our most effective academic programs have generally written somewhere between 3 and 11.

Another way you can ensure that your cadet learning outcomes are actionable is to pay special attention to how you word them. For instance, many programs have written cadet learning outcomes to include action verbs that specify exactly what they expect cadets to be able to do in order to demonstrate accomplishment of them. So, you might indicate that you want cadets to "design experiments," or "communicate economic analyses," or "evaluate historical data." Using this approach refines the preferred format, such that each outcome statement will look more like the following.

“As a result of being in this academic major, cadets will <action verb> <direct object>.”

Bloom’s (1956) Taxonomy, as well as more recent variations (e.g., Anderson & Krathwohl, 2001; Fink, 2003) provide numerous examples of action verbs that can be used to help you specify the cadet learning outcome statements in your academic major or minor.

3. *Effective cadet learning outcomes are clear and understandable to faculty and cadets.*

If you really intend your outcome statements to guide the behavior of faculty and cadets in your academic major or minor, they will need to be written such that both faculty and cadets know what those statements mean. In addition, faculty and cadets’ understanding needs to be *shared* so that it is clear what the expectations are for cadet learning in your program. This will make it markedly easier for both faculty and cadets to know how to make progress towards the outcomes, as well as to recognize when they have actually been achieved. In general, everyone is more likely to hit the target if they have a clear understanding of what that target is.

In some cases, the need for your outcomes to be clear and understandable may force faculty members to “unpack” the more complex outcomes in your major. For instance, many programs have indicated that they want their cadets to “think critically.” By itself, however, it isn’t immediately clear what “think critically” really means, and different programs may emphasize slightly different aspects of this important skill. Therefore, to reduce confusion, you may find it necessary (or at least beneficial) to break the larger concept of “think critically” into a series of statements that delineate exactly what you mean. If, by critical thinking, you mean “evaluate evidence,” “construct arguments,” or “make a decision in the face of competing perspectives,” now is the time to state those more specific expectations for all to see.

4. *Effective cadet learning outcomes are developed across your entire curriculum.*

As you write cadet learning outcomes for your academic major or minor, keep in mind that they represent the knowledge, skills, and attitudes that cadets will develop in your program as a whole. Necessarily, that means that the cadet learning outcomes will not be accomplished in a single course, but will instead bridge across multiple courses. As such, your cadet learning

outcomes need to be more than just a collection of specific course objectives. Instead, they will be connective, tying together the various experiences that cadets will be having as they complete the requirements of your academic major or minor.

Taken together, these four characteristics describe what well-written cadet learning outcome statements look like, and provide a guide as you write (or refine) the outcomes for your own academic major or minor. To gauge your progress, I also refer you to the first dimension (“Cadet Learning Outcomes”) of the Academic Program Self-Assessment that we have been using within DF over the past several years. That first dimension is shown in Table 1 at the end of this chapter (see p. 24). The rubric is shown in its entirety in Appendix A.

### Generating Cadet Learning Outcomes

Writing effective cadet outcome statements can be hard work. Thankfully, you are not alone in taking on the task, and you have access to many other people who can help you. This section includes a sampling of the people you can turn to for help / guidance if you find yourself in need of it.

#### 1. Your Faculty Colleagues

Articulating the cadet learning outcomes for your major or minor is a deeply reflective exercise, and the learning outcomes you ultimately select will provide a word picture of the characteristics you want your cadets to have upon graduation. Given that your entire program will be involved in achieving these outcomes, it is a good idea to engage as many faculty within your program as you can in generating them. This will maximize the chances that your cadet learning outcomes will be complete, and it will also lead to greater buy-in from your faculty colleagues.

Here are some specific ideas for how you can get your departmental conversations started.

- a. Start with an exercise similar to the one that opened this chapter (which was based on an exercise in Fink, 2003). That is, ask your colleagues to imagine your cadets upon graduation and describe the characteristics they would like cadets to have at that time. As I asked you, encourage your colleagues to think about the knowledge, skills, and attitudes that your graduates would ideally possess. How do your colleagues want your cadets to be different than they were when they started your academic major or minor?

- b. Ask your colleagues to reflect upon their own professional experience. As Huba & Freed (2000) point out, learning outcomes ought to reflect the knowledge, skills, and attitudes needed by professionals in your field. With that in mind, encourage your colleagues to think about what they need in order to be successful. This can be an especially powerful exercise here at USAFA because of our unique blend of military officers and civilian academic professionals. By combining the insights of these two groups, you can begin to piece together a robust description of the characteristics your cadets need to have as they walk across the graduation stage.
- c. Ask your faculty colleagues to reflect on the role your discipline can play in the accomplishment of USAFA's larger institutional outcomes. Your academic major is not a stand-alone entity; instead, it is embedded within the larger context of the Air Force Academy. Therefore, the institution may look to your program to contribute to the overall development of skills like written communication, cultural competence, or scientific reasoning. What contributions can your department make with regard to these broader Academy outcomes?
- d. You might ask members of your department to complete a written instrument, such as the Teaching Goals Inventory (Angelo & Cross, 1993). The Teaching Goals Inventory is essentially a values clarification exercise, where faculty members rate a series of plausible learning outcomes based on how frequently they try to achieve them. For instance, faculty in your program may consider the outcome of "Develop ability to distinguish between fact and opinion" to be absolutely essential, something they nearly always try to achieve in their courses. On the other hand, they may rate "Develop aesthetic appreciations" as relatively unimportant, something they rarely try to achieve in their courses. If that were the case, then you would likely develop an outcome relating to cadets' ability to distinguish between fact and opinion, but you probably wouldn't develop an outcome relating to developing aesthetic appreciations.

## 2. Professional Organizations and/or Colleagues at Peer Institutions

The Air Force Academy is certainly not alone in articulating and assessing student learning outcomes. Therefore, in addition to conversations within your program, it is also possible to look

elsewhere in the higher education community for guidance pertaining to your cadet learning outcomes. For instance:

- a. As noted in Chapter 2, several of USAFA's academic majors are eligible for disciplinary accreditation. For some of those programs, the disciplinary accrediting body has already provided guidance regarding how to create programmatic learning outcomes. One salient example is ABET, which accredits USAFA's engineering and computer science programs and has identified student learning outcomes that are common to all of its accredited programs at the undergraduate level. It should come as no surprise, then, that all of USAFA's ABET's accredited programs have cadet learning outcomes that look remarkably similar to one another.
  - b. Even if your program does not have a disciplinary accrediting body, it is quite possible that a professional organization in your discipline has provided suggestions for the kinds of outcomes that may be appropriate for your major or minor. For instance, while the American Psychological Association does not offer accreditation to undergraduate programs, they have still published guidelines for what they consider an appropriate undergraduate psychology program to be (available online at <http://www.apa.org/ed/precollege/about/psymajor-guidelines.pdf>). Similarly, the American Association for the Advancement of Science (AAAS) has also published a series of recommendations for undergraduate programs in biology (available at <http://visionandchange.org/files/2011/03/VC-Brochure-V6-3.pdf>). If you haven't done so already, it is worth looking to see if a professional organization in your discipline has also published this kind of information.
  - c. Many of your colleagues at peer institutions are likely to be engaged in articulating learning outcomes for their students. As a result, you can get some great ideas by learning more about the work that these colleagues have already done. North Carolina State University hosts an outstanding compilation of assessment-related resources from colleges and universities around the country that may assist in such an effort. It is available at: <http://www2.acs.ncsu.edu/UPA/archives/assmt/resource.htm>.
3. Your Graduates and their Supervisors

The Air Force Academy is in the fortunate position that all (or at least nearly all) of our graduates are hired by the same company upon graduation. This means that, relatively speaking, it is fairly

easy for us to reach out to our graduates once they are on active duty, and it is similarly easy to be in touch with their work supervisors. By maintaining connections with each of these constituencies, you can gain valuable inputs into what your graduates need (or need more of) in order to be successful as officers on active duty.

One example of this practice that is already in place here at USAFA is the Engineering Program Advisory Council (EPAC). This group consists of professionals in the field who are familiar with the most pressing current issues in engineering and who also have an opportunity to work with our cadets upon graduation. Every two years, this group convenes at the Academy to share ideas, alert our engineering programs to emerging trends, and provide feedback on our graduates' performance. Might it be possible for you and your department to create something similar to help you articulate (or refine) the learning outcomes for your major or minor?

#### 4. Your Colleagues Around USAFA

Finally, I encourage you to remember that you have a rich set of connections here at USAFA. Our Departmental Assessment Network consists of at least one assessment POC in each academic department, and many of them have already written successful learning outcomes for their programs. As such, I encourage you to draw upon their wisdom and expertise as you craft outcomes within your own program. To help you do that, I have compiled all of the cadet learning outcomes that exist as of the writing of this document. That list of outcomes is provided in Appendix B. I encourage you to peruse this list, taking a look at the work that your colleagues have done. Please feel free to reach out to one another as you take the important step of articulating student learning outcomes for your academic major or minor.

Finally, please know that your support network also includes me (Steve Jones, Director of Academic Assessment) and the other faculty and staff who work in the Center for Educational Excellence (CEE). We are committed to partnering with you in whatever way we can to enhance the effectiveness of your educational programs. Please don't hesitate to call upon us for consulting or other assistance.

Table 1

## Academic Program Self-Assessment

## Cadet Learning Outcomes

This table includes one row of the broader Academic Program Self-Assessment rubric that has been in place within DF. (The rubric is printed in its entirety in Appendix A.) In conjunction with your colleagues, identify which description (i.e., Level 0, 1, 2, or 3) best matches the current state of cadet learning outcomes within your academic major or minor.

Elements	Question(s) To Think About	Level 0	Level 1	Level 2	Level 3
Cadet Learning Outcomes	Has my department written cadet learning outcomes for this major in a way that allows for meaningful assessment?	Cadet learning outcomes have not been written for this major.	Cadet learning outcomes have been written for this major. However, they are not written in terms of what students will know or be able to do as a result of being in the major.	Cadet learning outcomes have been written in terms of what cadets will know or be able to do as a result of being in the major. However, modest improvements are needed because one of the following is true: <ol style="list-style-type: none"> <li>1. Outcomes are not actionable (i.e., they don't include an action verb).</li> <li>2. Outcomes are not clear and understandable to faculty and cadets.</li> </ol>	Cadet learning outcomes have been written for this major in a way that allows for meaningful assessment. <ol style="list-style-type: none"> <li>1. Outcomes are written in terms of what cadets will know or be able to do as a result of being in the major.</li> <li>2. Outcomes are actionable (i.e., they include action verbs).</li> <li>3. Outcomes are clear and understandable to both faculty and cadets.</li> </ol>

## Chapter 4 – Building a Curriculum Map

In the previous chapter, the focus was on developing learning outcomes for your academic major or minor. Once those outcomes are in place, it is time to take the next step in your assessment planning process: building a curriculum map. A curriculum map is simply a matrix that shows how courses in your program are aligned with each of the learning outcomes you have identified. In other words, a curriculum map will show you in which courses particular outcomes are being developed and/or assessed.

### A Simple Example of a Curriculum Map

As an example of what a curriculum map might look like, consider Table 2, which shows a curriculum map from a hypothetical department at USAFA. This department has identified 4 different learning outcomes (LO#1 – LO#4) for cadets in their major. There are 10 different courses in this major (labeled Course #1 – Course #10) that all cadets are required to take, and an “X” in a box indicates that the course in question both spends significant time developing the associated outcome and includes a significant graded test or assignment that the department can use for assessment. The pattern of X’s indicates which courses are aligned with which learning outcomes (e.g., reading the top row of the map, one can see that Course #1 is aligned with both LO#1 and LO#3).

Table 2

## A Sample Curriculum Map

Learning Outcomes				
Course	LO#1	LO#2	LO#3	LO#4
Course #1	X		X	
Course #2		X		X
Course #3				
Course #4	X			
Course #5		X	X	
Course #6	X	X		
Course #7	X		X	
Course #8		X	X	
Course #9	X	X	X	
Course #10			X	

What Can a Curriculum Map Tell Us?

Building a curriculum map is helpful for multiple reasons. First, a curriculum map will inform members of your department where in the curriculum cadets are developing each of your outcomes. Generally speaking, the programmatic learning outcomes you created in Chapter 3 are unlikely to be developed to an equal degree in each of your academic courses. Instead, some courses are likely to contribute heavily to the development of one learning outcome, while other courses contribute more heavily to the development of other outcomes. Identifying the pattern of outcome development helps focus faculty members on what is expected of them when they teach a particular course, and it will also help you and your faculty colleagues have more effective oversight of what your cadets are experiencing in your program.

As illustration, consider the sample curriculum map in Table 2. If a faculty member is assigned to be the course director for Course #1, this map makes it clear that the program is relying on that course to develop and assess LO#1 and LO#3. So, while the faculty member may have the latitude to make some adjustments to the course based on his/her own experience and professional expertise, any adjustments

to the course will need to be done within the constraints outlined in the curriculum map. Certainly, if the course director wished to stop developing and assessing either LO#1 or LO#3, that action should be coordinated with other faculty in the program.

A second, related, benefit of creating a curriculum map is that it will help you and your program ensure that all cadets have an adequate opportunity to achieve each of the cadet learning outcomes as they progress through the program. As illustration, let's return again to the sample curriculum map in Table 2. Notice that LO#1, LO#2, and LO#3 are developed across multiple courses in the major. However, LO#4 is only aligned with Course #2. Is that enough emphasis to help cadets fully develop LO#4? If not, the department may wish to refocus one or more of the other courses so that they do a better job of achieving LO#4. One candidate could potentially be Course #3, which is currently not shown as being aligned with any cadet learning outcomes<sup>5</sup>.

A third reason for building a curriculum map is assessment. As will be discussed in Chapter 5, one of the most beneficial sources of assessment data pertaining to cadet learning outcomes is cadet performance on tests and assignments embedded within the curriculum. A curriculum map will identify the courses that are most likely to have the kinds of tests and assignments that can provide these forms of embedded assessment data. When it comes time to compile assessment information with regard to a particular cadet learning outcome, a well-designed curriculum map can help you and your colleagues know where to look. As an illustration, look again at our sample curriculum map in Table 2, which indicated that Courses #1, #4, #6, #7, and #9 could be potential sources of assessment data for LO#1.

Finally, building a curriculum map can help guide continuous program improvement. For instance, imagine that LO#1 refers to effective written communication. Further, imagine that you and your colleagues discover evidence that cadets are performing well in some aspects of their writing, but poorly in others. To improve cadet writing, one sensible strategy would be to feed that information back to those courses (#1, #4, #6, #7, & #9) that are already aligned with LO#1. Perhaps those courses could add an extra lesson dedicated to the development of the deficient writing skill, or perhaps they could emphasize the deficient skill in their grading of written assignments. Regardless, those specific courses

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<sup>5</sup> In addition to discovering outcomes that may not be adequately developed, a curriculum map can also help you discover courses that are not sufficiently outcomes-focused. For instance, if it is really true that Course #3 does not develop or assess any of the program's cadet learning outcomes, one might begin to wonder why it remains a required part of the department's curriculum.

are probably the best ones to adjust in order to bolster cadet performance in the deficient areas. As such, knowing which courses are aligned with each outcome will help close the loop more effectively.

### Constructing Your Own Curriculum Map

As you undertake the task of creating a curriculum map, there are several important ideas to keep in mind.

1. Get Faculty Involved.

A curriculum map will have far-reaching consequences for the courses in your program. As such, it is a good idea to solicit broad faculty participation in its creation. You could start, for instance, by ensuring that your colleagues are familiar with your program's cadet learning outcomes and then work with leaders of individual courses to align those courses with the outcomes. Follow-on discussions could involve coordinating with faculty to ensure that all learning outcomes are adequately addressed. Based on the sample curriculum map above, for instance, it may be wise to speak with the course director of Course #3 to see which outcome(s) could most reasonably be aligned with that course. In addition, it might be wise to encourage one or more course directors to more closely align with the outcome (LO#4) that is currently underrepresented in the curriculum.

In discussing a curriculum map with your colleagues, recognize that an important philosophical issue may emerge. Generally speaking, faculty members are hired for their disciplinary expertise, and the courses they teach will likely reflect their depth of knowledge in the field. However, the idea of a curriculum map suggests that faculty members will need to focus on more than just their disciplinary knowledge; your program will also rely on them to develop and assess the broader cadet learning outcomes. Awareness of faculty members' responsibility to the larger cadet learning outcomes will be especially important if those outcomes involve skills (e.g., effective written communication) or responsibilities (e.g., respect for human dignity) that are not tied directly to faculty members' disciplinary expertise<sup>6</sup>.

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<sup>6</sup> A similar argument could be made with regard to the relationship between core courses and the broader institutional outcomes. In order for the Academy to achieve its broad institutional outcomes, we rely on a subset of core courses to develop and assess them, even if they extend beyond a course's disciplinary content.

## 2. Establish Clear Expectations.

In creating your map, it is important to ensure that you and your colleagues – particularly those in course director roles – are very clear about the expectations that come with aligning a course with a particular outcome. For instance, your department may decide that alignment with an outcome means that (1) a significant portion of the course be dedicated to developing that outcome in cadets; and (2) there is at least one significant graded event (i.e., test or assignment) in the course that the department can use to assess cadet progress toward the outcome. Fulfilling these expectations will obviously require effort on the part of course directors and instructors, so it is important to reach agreement on what these expectations should be.

## 3. Build a System of Accountability.

Regardless of the expectations adopted in your major or minor, it is also a good idea to establish some sort of accountability mechanism to ensure that courses are actually achieving them. That way, as course directors and individual instructors change, you and your colleagues can still be assured that a given course is contributing meaningfully to particular cadet learning outcomes. One way that programs can do this is by requiring course directors to submit a written “assessment plan” at the beginning of the semester that lays out how the course will accomplish each of its outcomes. This plan is often paired with some sort of “course report,” submitted at the end of the semester<sup>7</sup>. In addition to describing what the course did to accomplish the outcomes, such a report could also summarize relevant outcomes assessment data. In programs that currently implement some version of assessment plans and/or course reports, these documents are typically reviewed by a curriculum committee, the assessment director, and other members of the department’s senior leadership to so that there is broad awareness of how cadets are developing throughout their academic program.

## 4. Ensure That All Cadets Have The Opportunity to Achieve The Learning Outcomes.

Finally, it is a good idea to ensure that all of your cadets have the opportunity to achieve your cadet learning outcomes, regardless of the path they take through your major or minor. In some programs, this is relatively easy, as all cadets take the same set of required majors’ classes. In other programs, however, this can be somewhat trickier, simply because cadets have choices

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<sup>7</sup> In some departments, this course report is a written document, often written in the form of a Memorandum. In other departments, it is provided in the form a briefing that is given to departmental leadership. More information about these end-of-course reports is provided in Chapter 6.

about which of several paths to take. In these programs, faculty may choose to align their outcomes only with the subset of courses that all cadets are required to take. Another strategy is to align outcomes with multiple courses such that cadets will encounter them equally, no matter what choices they make. Regardless, the key is to make your learning outcomes unavoidable as cadets progress through your curriculum.

As you prepare and/or review the curriculum map for your own program, I refer you to the second dimension (“Curriculum Map”) of the Academic Program Self-Assessment we have been using within DF. That dimension is shown in Table 5 on page 35. The rubric is shown in its entirety in Appendix A.

### Examples of Curriculum Maps

There is no single correct way to construct a curriculum map, and departments within DF have taken a variety of approaches. This section includes a couple of examples so you can get a better feel for the range of possibilities.

Among the most straightforward is the map (shown in Table 3 on page 32) created by the Department of Law for its Legal Studies major. As in the sample shown previously, the cadet learning outcomes (referred to as “program goals”) for the Legal Studies major are listed across the top and the courses offered as part of the major are shown down the left-hand side. In a departure from the previous example, however, note that required courses are annotated with an asterisk, making it easy to see where all cadets will encounter the outcomes. The dots in the matrix represent the relationships between the courses and the program goals. For reference, the program goals are shown at the bottom of the page.

Table 3

## A Curriculum Map from the Department of Law

25 May 2010

**Alignment of Law Course Goals  
To DFL Program Goals**

*Note: The goals reflected below are from 10 January 2008. Law 440 (Cyberlaw) and Law 466 (Advanced Topics in LOAC) are courses added since then. The goals reflected for those new courses are from their predecessor courses (Law 495 and Law 499 respectively).*

Course Name	Crs #	1(a)	1(b)	2(a)	2(b)	3(a)	3(b)	4
Law for Air Force Officers* (Core)	Law 220	•		•	•	•	•	
Legal Research, Writing, Advocacy*	Law 221	•	•	•	•			
Crime and Criminal Justice*	Law 331	•	•	•	•		•	
Business Law	Law 340	•		•	•	•		
U.S. Constitutional Law*	Law 351	•	•	•	•	•	•	
Law and Literature	Law 360		•	•	•			
Law of Armed Conflict	Law 361	•		•	•	•		
Law for Commanders*	Law 421	•	•	•	•	•		•
Cyberlaw	Law 440	•		•	•	•		
National Security Law	Law 456	•	•	•	•	•	•	
International Law	Law 461	•		•	•			
Advanced Topics in LOAC	Law 466	•		•	•			
Legal Studies Capstone*	Law 485	•	•	•	•	•	•	•
Special Topic	Law 495							
Law and Economics	SS 420		•	•	•			
Negotiations	SS 483		•	•				•

\* = Required course for legal studies major

**Legal Studies Program Goals**

1. Develop officers who can solve legal problems and critically think.
  - a. Apply FIRAC method (Facts, Issue, Rule, Application, Conclusion) to solve legal problems and analyze cases
  - b. Apply additional critical thinking skills
2. Develop officers who can communicate effectively.
  - a. Demonstrate public speaking skills
  - b. Demonstrate writing skills
3. Develop officers with knowledge of selected aspects of the law.
  - a. Demonstrate knowledge of function of law and due process of law
  - b. Demonstrate knowledge of the American legal system
4. Develop officers who can apply their knowledge and skills (from other legal studies program goals) to the military and relate them in other contexts.

Another, somewhat more complex, approach is provided by the Department of Civil and Environmental Engineering (DFCE; see Table 4). The curriculum map they have created for their Civil Engineering program, shown on page 34, has additional features not included in the Legal Studies example. For instance, in recognition that some courses are likely to contribute to a particular outcome in a more significant way than others, this map provides an indication of the *strength* of the relationship between each course and the associated outcomes. Those cells marked with a “3” indicate that the course has a “large contribution” to that outcome, those cells marked with a “2” indicate an “average contribution” to that outcome, and those cells marked with a “1” indicate a “small contribution” to that outcome.

It is also worth noting that some of the cells are shaded. The shaded cells indicate those courses that will provide embedded assessment data pertaining to accomplishment of each outcome. This makes it clear that it is possible for a course to make meaningful contributions to the development of a given outcome without necessarily being responsible for providing assessment data at the program level<sup>8</sup>. However, note that at least some assessment data are available across the curriculum for each of the program’s learning outcomes.

A related strategy – not shown in either the Legal Studies or Civil Engineering maps – would be to differentiate between courses that “introduce” an outcome from those that “develop” it and those that “assess” it. For instance, a particular outcome may be “introduced” in a 200-level course, further “developed” in a 300-level course, and ultimately “assessed” in a 400-level course. Using this strategy, it would be easy to imagine a curriculum map with labels such as “I,” “D,” and “A” to differentiate between the different roles each course plays in the overall accomplishment of each outcome.

Regardless of the particular approach your academic major or minor takes, it is important to create a curriculum map so that faculty and staff understand the relationships between the courses they teach and the program’s cadet learning outcomes. Building such a map will help keep your faculty members focused, help maintain oversight of how each outcome is being developed, show you where assessment data can reasonably be collected, and point you to where to turn when your department works to improve cadets’ outcome achievement.

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<sup>8</sup> Clearly differentiating between those courses that contribute to particular outcomes and those that provide program-level assessment data can be useful in managing the workload associated with assessing your outcomes. Even though many courses are relied upon to develop each outcome, program-level assessment data may not necessarily be collected in all of them.

Table 4

## A Curriculum Map from the Department of Civil and Environmental Engineering

Department of Civil and Environmental Engineering  
(Updated: August 2009)

[Appendix C-1]  
PCOs and Supporting Courses – Civil Engineering Program

Course	Program Curricular Outcomes (PCOs)											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Core Program	2	3	1	1	1	2	2	1	2	1	2	2
Math 243/245		2			1							
Engr 210	2	2		1	2	2	2	2	2	1	2	2
Civ Engr 330	2	2				1	2				1	
Civ Engr 351	1	1	2	1	1		1		2		1	1
Civ Engr 361	3	1	3		1	2						
Civ Engr 362	2	2	1			2	2	2		2	2	2
Civ Engr 372	3	2	2	1	2	1				2		
Civ Engr 373	2	2		2	2	2				2		
Civ Engr 390	2	2	3			2	2	2	2		2	2
Civ Engr 474	3	2		2	2	2				2		
Civ Engr 480	3	3	2	3	2	3	3	2	3	2	3	3
Civ Engr 488	3	3	2	2	2	2						
E402 (FE)	3	3		2	2		3					
Civ Engr 405		2					2	2	2	2	3	3
Design Opt I/II	3	3		3	2	3						
Bas Sci Opt		2										
Engr Opt	2											
Academy Opt												

1 – Small Contribution; 2 – Average Contribution; 3 – Large Contribution

Shaded Course – from which assessment events are selected to evaluate PCO

Table 5  
Academic Program Self-Assessment  
Curriculum Map

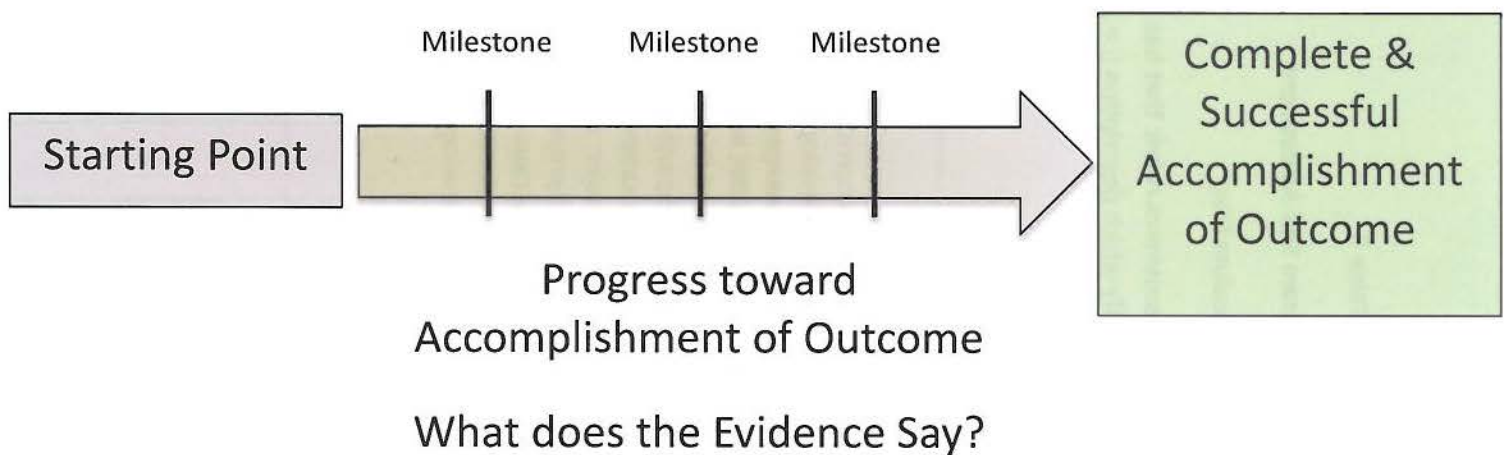
This table includes one row of the broader Academic Program Self-Assessment rubric that has been in place within DF. (The rubric is printed in its entirety in Appendix A.) In conjunction with your colleagues, identify which description (i.e., Level 0, 1, 2, or 3) best matches the current state of cadet learning outcomes within your academic major or minor.

Elements	Question(s) To Think About	Level 0	Level 1	Level 2	Level 3
Curriculum Map (Note: A “curriculum map” is a matrix that shows which courses in your major or minor are aligned with which of your cadet learning outcomes.)	Has my department developed a curriculum map showing clear linkages between cadet learning outcomes and the learning experiences (to include coursework) in the major?	No curriculum map has been developed.	A curriculum map has been developed. However, significant improvements are needed because of one or both of the following: <ol style="list-style-type: none"> <li>1. There are one or more required courses that do not map to any outcomes.</li> <li>2. There are one or more outcomes that are not addressed in the curriculum.</li> </ol>	A curriculum map has been developed, showing clear linkages between most cadet learning outcomes and the learning experiences (to include coursework) provided in the major. However, modest improvements are needed because one or more outcomes lack adequate coverage.	A curriculum map has been developed, showing clear linkages between all cadet learning outcomes and the learning experiences (to include coursework) in the major.

## Chapter 5 – Assessment Methods: Measuring Student Accomplishment<sup>9</sup>

In previous chapters, we focused on articulating your programmatic cadet learning outcomes (Chapter 3) and mapping your curriculum to those outcomes (Chapter 4). In this chapter, we turn our attention to the various methods that can be used to assess the extent to which cadets are actually accomplishing those outcomes. The journey that cadets take on the way to your learning outcomes is a long one, and assessment methods can inform you about how they are progressing (see Figure 2) and when they make it to the desired destination.

Figure 2. The Role of Assessment in Monitoring Progress toward Accomplishment of your Outcomes<sup>10</sup>



The first section of the chapter includes some general ideas that are important to keep in mind as you consider the assessment methods that are most appropriate for your academic major or minor. Then, in the second part of the chapter, I describe the many different assessment methods that are currently being used around DF, to include the strengths and weaknesses of each approach. At the end of the chapter, there is an up-to-date summary of which programs are using which methods, should you wish to draw upon the experience and wisdom of colleagues who have experience working with each method.

<sup>9</sup> This chapter draws heavily from the American Psychological Association's Assessment Cyberguide, available for download at: <http://www.apa.org/ed/governance/bea/assessment-cyberguide-v2.pdf>.

<sup>10</sup> Thank you to Bob Noyd (DFB) for his creation of this figure.

### Four Ideas to Keep in Mind

*1. Be Sure to Link Assessments to Programmatic Cadet Learning Outcomes.* As you review the assessment methods described in this chapter, remember that the purpose of these tools is to provide you and your colleagues with information about the extent to which cadets are achieving your programmatic learning outcomes. If cadets are making progress to your program's satisfaction, you and your colleagues can celebrate. If they are not, then your task is to gather specific enough information about cadets' learning that the program can make necessary adjustments to its processes. In short, the assessment methods your program uses will be beneficial to the extent that they provide the program with information about cadets' progress toward accomplishment of the outcomes.

The idea of using assessment as evidence about outcome accomplishment becomes especially important as you consider assessment methods that are embedded within academic courses. As an example, many faculty administer exams, assign papers, or ask cadets to give oral presentations in their classes, and these methods can be outstanding ways to gather information about cadets' progress toward accomplishment of programmatic learning outcomes. However, the mere presence of these graded events is not enough. To inform your department about outcome achievement, those graded events (or at least parts of those graded events) need to be deliberately targeted toward specific programmatic cadet learning outcomes, and the evidence they generate needs to be reviewed and used beyond the course, at the program level.

*2. Direct vs. Indirect Measures of Learning.* This chapter describes both direct and indirect measures of cadet learning. Direct measures are those that require cadets (or graduates) to display their progress toward accomplishment of your learning outcomes. These include course-embedded tests and assignments, summative measures of cadet performance (such as standardized tests), and examinations of how graduates perform on active duty. In contrast, indirect measures of cadet learning are based on cadets' (or graduates') reflections on their learning, rather than on an actual display of that learning. Indirect measures include cadet journals, surveys, and focus groups.

As you will see, both direct and indirect measures can be quite informative. However, it is best to build at least some direct measures into your assessment program. Because direct measures require cadets (or graduates) to demonstrate what they have learned, they provide more compelling evidence than indirect measures, which cadets could potentially "fake" or provide misleading information on. As you

review the strategies implemented across DF, you will find that the most robust assessment programs are those that rely heavily on direct measures and use indirect measures as helpful supplements.

The distinction between direct and indirect measures of learning is emphasized in the Assessment Methods dimension of the Academic Program Self-Assessment we have been using within DF. That dimension is shown in Table 6 on page 48. The Self-Assessment is shown in its entirety in Appendix A.

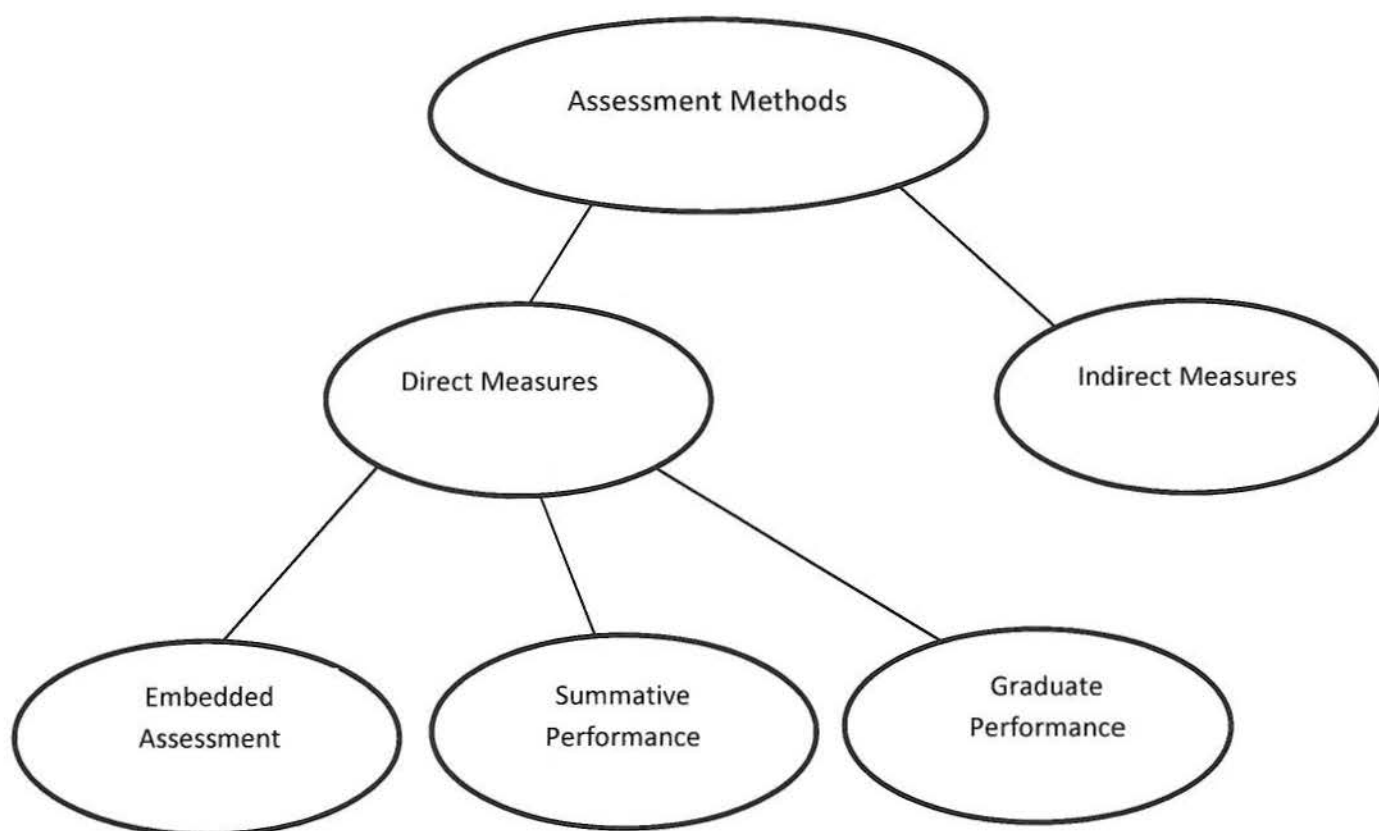
*3. Quantitative vs. Qualitative Methods.* As you learn about the various assessment methods in this chapter, you will see that some methods are quantitative in nature, while others are qualitative in nature. For some, the apparent precision of quantitative measures (which yield numerical results) may appear superior to qualitative measures (which do not). Be aware, however, that there may be situations in which the richness of qualitative data may be far more useful than a (potentially less meaningful) number. Again, combining results from each kind of measure is likely to lead to the best possible results.

*4. In General, There is No "Best" Method.* As the discussion above suggests, there is no single "best" method for you to use in assessing your cadet learning outcomes. Every method has both strengths and weaknesses. As such, it is wise to use multiple methods to assess each of your programmatic learning outcomes. By itself, each method may be imperfect; taken together, multiple methods have a much better chance of providing converging evidence about the extent to which your learning outcomes are being successfully achieved.

### Descriptions of Assessment Methods

This section introduces a variety of different assessment methods. For simplicity, these methods are organized into four distinct categories. The first three categories (Course-Embedded Tests and Assignments, Summative Performance Assessment, and Examination of Graduate Performance) are all examples of direct assessment measures. The fourth category deals specifically with indirect measures. This categorization scheme is represented visually in the concept map below (Figure 3).

Figure 3. A Concept Map of Assessment Methods



### **Direct Measures of Cadet Learning**

1. **Course-embedded tests and assignments** – As the name suggests, these are tests and assignments (or even portions of tests and assignments) that are embedded within the normal flow of academic courses. In addition to receiving a grade, cadets' work is also evaluated in terms of outcome achievement.

<b>Method</b>	<b>Strengths</b>	<b>Weaknesses</b>
A. Objective Exams (e.g., multiple choice, true/false, fill-in-the-blank items)	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Faculty can score them quickly, easily, and reliably</li> <li>• "Benchmark" items can be used across multiple semesters to gauge changes in cadet performance</li> </ul>	<ul style="list-style-type: none"> <li>• Often tests low-level knowledge; may sacrifice depth for breadth</li> <li>• Constructing high-quality test questions is more difficult than it may initially appear</li> <li>• "Benchmark" items are compromised if cadets gain access to them</li> </ul>
B. Workout Problems / Problem Sets	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Can be scored reliably if an effective scoring rubric is used</li> <li>• Especially helpful for technical disciplines</li> </ul>	<ul style="list-style-type: none"> <li>• Cadets and faculty may focus more on arriving at the correct answer, rather than on the thought process that led to that answer</li> <li>• Cadets may learn to "pattern match," allowing them to complete problems without deep understanding of course content</li> </ul>
C. Essay Exams	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Can demonstrate higher-level learning, to include application, synthesis, and critical thinking skills</li> <li>• Can be scored reliably if an effective scoring rubric is used</li> </ul>	<ul style="list-style-type: none"> <li>• Without an effective rubric, scoring may be unreliable.</li> <li>• Scoring can be time and energy-intensive</li> <li>• Essay questions are likely to focus on one aspect of outcome performance; may sacrifice breadth for depth</li> </ul>
D. Writing Assignments (e.g., term papers, lab reports, etc.)	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Forces cadets to articulate their understanding of course material</li> <li>• Helps cadets develop valuable writing skills</li> </ul>	<ul style="list-style-type: none"> <li>• Without an effective rubric, scoring may be unreliable</li> <li>• Scoring can be time and energy-intensive</li> <li>• Scores may conflate subject matter knowledge with writing skill. For the purposes of outcomes assessment, it is important to treat these separately</li> </ul>

Method	Strengths	Weaknesses
E. Oral Presentations (e.g., speech, debate, etc.)	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Forces cadets to articulate their understanding of course material</li> <li>• Helps cadets develop valuable speaking &amp; presentation skills</li> <li>• Authentic tasks will generally motivate cadets to do their best work</li> </ul>	<ul style="list-style-type: none"> <li>• Without an effective rubric, scoring may be unreliable.</li> <li>• Scoring can be difficult, especially if the presentation isn't recorded. Graders are unable to view the presentation more than once</li> <li>• Scores may conflate subject matter knowledge with speaking / presentation skills. For the purposes of outcomes assessment, it is important to treat these separately</li> </ul>
F. Poster Presentations (i.e., similar to those at professional conferences)	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Provides opportunity for cadets to communicate in multiple ways (e.g., writing, graphically, orally)</li> <li>• Allows for expert review / judgment; can be facilitated with clear scoring criteria</li> <li>• Can be easier to grade than longer papers / assignments</li> <li>• Authentic tasks will generally motivate cadets to do their best work</li> </ul>	<ul style="list-style-type: none"> <li>• Without an effective rubric, scoring may be unreliable</li> <li>• Scoring can be difficult, particularly if the oral presentation is one of the things being measured (see also "Oral Presentations")</li> <li>• Scores may conflate aesthetic sense, social interaction skills, and subject matter expertise. For the purposes of outcomes assessment, it is important to treat these separately</li> </ul>
G. Other Embedded Cadet Performances (e.g., design projects, computer programs, etc.)	<ul style="list-style-type: none"> <li>• Easy to embed within many existing courses</li> <li>• Assesses complex skills needed by professionals</li> <li>• Allows for expert review / judgment; can be facilitated with clear scoring criteria</li> <li>• Authentic tasks will generally motivate cadets to do their best work</li> </ul>	<ul style="list-style-type: none"> <li>• Complex performances will likely require a great deal of scaffolding in class in order to promote cadet success. Cadets won't necessarily know how to be successful unless they receive substantial guidance</li> <li>• Without an effective rubric, scoring may be unreliable</li> <li>• Overall scores may be a function of multiple outcomes. For the purposes of outcomes assessment, it is important to treat these separately</li> </ul>
H. Performance in Courses Outside Your Program	<ul style="list-style-type: none"> <li>• Provides information for outcomes not specifically addressed in your curriculum</li> <li>• Fosters cross-talk between academic departments</li> </ul>	<ul style="list-style-type: none"> <li>• Requires coordination with other departments</li> <li>• Grades (for example) are a crude measure of outcome achievement</li> </ul>

2. **Summative Performance Assessment** – The methods in this category tend to be implemented / reviewed at the end of a program, perhaps shortly before graduation. Cadets' performance on these summative assessments reflects upon the success / failure of the program as a whole.

Method	Strengths	Weaknesses
<p>A. Standardized Tests (e.g., FE Exam, Major Field Test)</p>	<ul style="list-style-type: none"> <li>• Allows for comparisons of cadet performance with national norms</li> <li>• Allows for trend analysis, examining patterns of cadet performance on the same instrument over time</li> <li>• Scoring burden is typically offloaded to testing company</li> </ul>	<ul style="list-style-type: none"> <li>• Existing tests may not match the specific learning outcomes in your program</li> <li>• Comparisons with national norms can be misleading, particularly if you don't know the conditions under which students at other institutions are tested</li> <li>• Potentially high financial cost</li> <li>• Potentially low cadet buy-in, leading to poor motivation to do well</li> <li>• Potentially low faculty buy-in, leading to an unwillingness to make adjustments based on test results</li> <li>• Feedback on results is potentially slow</li> </ul>
<p>B. Locally-developed summative exams (e.g., a USAFA-developed exam administered to all first-class cadets in an academic course)</p>	<ul style="list-style-type: none"> <li>• Can be tailored to match specific learning outcomes of your program</li> <li>• Allows for trend analysis, examining patterns of cadet performance on the same instrument over time</li> <li>• Relatively low financial cost</li> <li>• Allows for quicker grading and feedback than nationally-standardized tests</li> </ul>	<ul style="list-style-type: none"> <li>• Test creation may be complex and time consuming</li> <li>• Because exam is developed locally, national norms are not available</li> <li>• Potentially significant cost in terms of time dedicated to grading</li> <li>• Test is compromised if cadets gain access to it</li> </ul>

Method	Strengths	Weaknesses
C. Capstone experiences (e.g., research projects, internships, competitive teams)	<ul style="list-style-type: none"> <li>• Authentic tasks will generally motivate cadets to do their best work</li> <li>• Allows for expert review / judgment; can be facilitated with clear scoring criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially expensive in terms of both time and money</li> <li>• Unless required in your program, only some of your cadets (often only the best ones) will participate. This limits what your department can conclude about the learning of <i>all</i> cadets in your program</li> <li>• Overall performance may be a function of multiple outcomes. For the purpose of outcomes assessment, it is important to treat these separately</li> </ul>
D. Cadet Portfolios	<ul style="list-style-type: none"> <li>• By examining changes in cadets' work over time, it is possible to see growth for each individual cadet</li> <li>• Helpful for identifying strengths and weaknesses of individual cadets; allows for remediation, if necessary</li> <li>• Encourages cross-talk between courses regarding what is appropriate for cadets to include in their portfolios</li> <li>• Cadets are allowed to highlight and reflect upon their best work</li> </ul>	<ul style="list-style-type: none"> <li>• Without significant reflection by cadets, a portfolio may become nothing more than a collection of artifacts</li> <li>• Time consuming and challenging to evaluate</li> <li>• Without significant oversight, the content of cadets' portfolios may vary a great deal</li> </ul>

3. **Examination of Graduate Performance** – Given that (nearly) all of our cadets go on to work for the same employer, it is relatively easy for us to gather information about how they perform when they are on active duty.

Method	Strengths	Weaknesses
A. Archival Data (e.g., review of promotion rates, OPR's, graduate school performance, etc.)	<ul style="list-style-type: none"> <li>• A great deal of data already exists (e.g., in the Air Force personnel system)</li> <li>• Information is provided by external stakeholders who can provide a fresh perspective on graduates' performance</li> <li>• Review of these data focuses faculty attention on the quality of graduates we ultimately produce</li> </ul>	<ul style="list-style-type: none"> <li>• While data do exist, gaining access to them can be challenging</li> <li>• Existing data may not speak specifically to cadet achievement of your learning outcomes</li> <li>• Graduate performance depends on many factors besides the quality of your program, especially as the time between graduation and data collection increases</li> </ul>
B. External Stakeholder Feedback (e.g., Engineering Program Advisory Council, etc.)	<ul style="list-style-type: none"> <li>• External stakeholders can provide a fresh perspective on graduates' performance</li> <li>• Review of these data focuses faculty attention on the quality of graduates we ultimately produce</li> <li>• Allows for validation of programmatic outcomes to ensure that the program is focused on those things that the Air Force values</li> </ul>	<ul style="list-style-type: none"> <li>• Data may be difficult and/or expensive to gather</li> <li>• Information is likely to come from a relatively small number of people and may not be representative of the larger population</li> <li>• Validating that your outcomes are appropriate says nothing about how well cadets are achieving those outcomes</li> </ul>
C. Supervisor Interviews / Surveys	<ul style="list-style-type: none"> <li>• Information is provided by external stakeholders who can provide a fresh perspective on graduates' performance</li> <li>• Review of these data focuses faculty attention on the quality of graduates we ultimately produce</li> <li>• Surveys can be targeted to assess graduates' ability to demonstrate your learning outcomes on the job</li> <li>• Nearly all of our graduates work for the same employer, making outreach to supervisors relatively straightforward</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to achieve high response rate, potentially compromising value of the method</li> <li>• Some respondents may be motivated not to provide honest feedback (e.g., because they don't want to be the bearer of bad news)</li> </ul>

### ***Indirect Measures of Cadet Learning***

These strategies rely on asking cadets (or graduates) to reflect upon their USAFA experience and what they have learned from it. In general, the data are relatively easy to collect, but cadets' responses may not necessarily reflect their actual accomplishment of the learning outcomes.

<b>Method</b>	<b>Strengths</b>	<b>Weaknesses</b>
A. Cadet Journals / Reflections	<ul style="list-style-type: none"> <li>• Easy to embed within existing courses</li> <li>• Encourages cadet reflection on what they have accomplished and/or how they have developed in your program</li> </ul>	<ul style="list-style-type: none"> <li>• Cadets' responses may not accurately reflect their actual accomplishment or how they have actually developed</li> <li>• Cadets do not necessarily know how to judge their own work or development. Substantial assistance and/or support may be needed</li> </ul>
B. Course Feedback	<ul style="list-style-type: none"> <li>• Data are easy to collect within academic courses</li> <li>• Existing online infrastructure makes it easy to customize feedback form to ask about programmatic outcomes</li> <li>• Existing infrastructure allows for DF norms and analyses of trends over time</li> <li>• Data can be used to help individual faculty members improve their teaching</li> </ul>	<ul style="list-style-type: none"> <li>• Cadets' responses may not accurately reflect their actual accomplishment or how they have actually developed</li> <li>• Without intentional effort (e.g., collecting data during class time), response rates are likely to be low. Results can be influenced by who chooses to participate</li> </ul>
C. Cadet Interviews / Surveys (e.g., of first-class cadets, shortly before they graduate)	<ul style="list-style-type: none"> <li>• Data are easy to collect in academic classes or within other dedicated academic time slots (e.g., Dean's Time)</li> <li>• Interviews / Surveys can be customized to focus on specific programmatic outcomes</li> <li>• Can provide personal perspective on cadets' experience in the program</li> </ul>	<ul style="list-style-type: none"> <li>• Cadets' responses may not accurately reflect their actual accomplishment or how they have actually developed</li> <li>• Results can be influenced by who chooses to participate.</li> <li>• Results can be influenced by the quality of the survey, interviewer, and/or protocol</li> </ul>

Method	Strengths	Weaknesses
D. Focus Groups / Majors' Meetings (e.g., with first-class cadets, shortly before they graduate)	<ul style="list-style-type: none"> <li>• Protocol can be customized to focus on specific programmatic outcomes</li> <li>• Can provide even more in-depth perspective on cadets' experience in the program</li> <li>• May reveal previously unseen areas of concern</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively time-intensive</li> <li>• Data will be gathered from a subset of the cadets in your program. Results can be influenced by who participates</li> <li>• Results can also be influenced by the quality of the focus group facilitator and the questions asked</li> </ul>
E. Graduate Interviews / Surveys	<ul style="list-style-type: none"> <li>• Interviews / Surveys (including those administered by the institution at large) can be customized to focus on specific programmatic outcomes</li> <li>• Can provide personal perspective on graduates' experience in the program</li> <li>• Graduates may have broader perspective on their USAFA experience once they have been in the operational Air Force for a while</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to achieve high response rate, potentially compromising value of the method</li> <li>• Graduates' responses may not accurately reflect their actual accomplishment or how they actually developed</li> <li>• Graduates' responses may be influenced by numerous factors other than the quality of your program</li> </ul>

### Conclusion

All assessment methods have both strengths and weaknesses, meaning that there is not likely to be a single "best" method for use in your program. Rather than looking for a single "best" method, it may be wiser to consider a combination of methods, recognizing that multiple methods are likely to provide you with richer information about how well cadets are progressing toward accomplishment of the outcomes than any single method would by itself. Adopting multiple methods is also wise because, as you will inevitably see, some methods are better matched to particular outcomes than others are. For instance, objective exams can be credibly used to assess cadets' fundamental knowledge in your discipline. However, they would be far less appropriate for assessing cadets' attitudes or beliefs. For these types of outcomes, other methods are almost certainly more appropriate.

If you are considering the incorporation of a new methodology into your academic assessment plan, I would encourage you to move slowly. Try the new method out on a small scale and see if it provides you with valuable information. If it does, then you can consider expanding the scope of your efforts. If it

doesn't, then you can either revise your approach or abandon the method in favor of something that will be more useful for your particular needs. Above all, stay focused on the overarching purpose of gathering assessment data, which is to inform you and your colleagues about the degree to which cadets are progressing toward successful accomplishment of your stated learning outcomes.

Another good idea for adopting a new assessment methodology is to learn from DF colleagues who have blazed the trail before you. All of the assessment methodologies described in this chapter are currently being used somewhere around DF. Rather than reinvent the wheel, it would be wise to touch base with those who have experience using particular methods. They can almost certainly help you make best use of any method you are considering. To facilitate this type of cross-talk between programs, I've compiled Table 7, shown on page 49. This table includes a row for each of the assessment methods discussed in this chapter and a column for each of USAFA's academic majors. The "X's" in the table indicate which methods the assessment representatives from the relevant department(s) report that they currently use. So, for instance, if you were interested in learning more about the use of portfolios at USAFA, I would encourage you to seek out your peers in English, Math, or Philosophy.

Table 6  
Academic Program Self-Assessment  
Assessment Methods

This table includes one row of the broader Academic Program Self-Assessment rubric that has been in place within DF. (The rubric is printed in its entirety in Appendix A.) In conjunction with your colleagues, identify which description (i.e., Level 0, 1, 2, or 3) best matches the current state of cadet learning outcomes within your academic major or minor.

<b>Elements</b>	<b>Question(s) To Think About</b>	<b>Level 0</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>
Assessment Methods	Is my department making efforts to assess each of the cadet learning outcomes in the major? To what extent are we relying on direct vs. indirect measures?	No efforts are being made to assess cadet learning outcomes.	The department is beginning to assess at least some cadet learning outcomes. However, assessment efforts rely completely on indirect measures of learning (e.g., cadet feedback, surveys, focus groups, etc.).	Assessment of cadet learning outcomes is underway but not fully implemented. At least one of the outcomes incorporates the use of direct measures of learning (e.g., exams, papers, projects, portfolios, etc.).	Department is fully engaged in assessing each of the cadet learning outcomes. Direct measures of learning (e.g., exams, papers, projects, portfolios, etc.) are used and are supplemented by indirect measures (e.g., cadet feedback, surveys, focus groups, etc.), as appropriate.

Table 7: SUMMARY OF ASSESSMENT METHODS, BY ACADEMIC MAJOR

Method	Aero Eng	Ast Eng	Bio	Beh Sci	Chem	Civ Eng	Comp Sci	Comp Eng	Econ	Elec Eng	Engl	Env Eng	FAS	Geo	Hist	Mgt	Math	Mech Eng	Met	MSS	OR	Phys	Phil	Pol Sci	Space	Sys Eng
Direct - Embedded																										
Objective Exam																										
Problem Sets																										
Essay Exam																										
Writing																										
Oral																										
Poster																										
Other Performance																										
Performance Outside Dept																										
Direct - Summative																										
Standardized Exam																										
Locally-Developed Exam																										
Capstone Experience																										
Portfolio																										
Direct - Grad Performance																										
Archival Data																										
Stakeholder Feedback																										
Supervisor Interview / Survey																										
Indirect																										
Journals / Reflections																										
Course Feedback																										
Cadet Survey																										
Focus Groups																										
Graduate Interview / Survey																										

Because this page changes frequently, it is for internal USAFA use only. It shows the current set of assessment methods used within each academic majors.

## Chapter 6 – Making Sense of Assessment Results

At this point in the assessment process, your program has presumably collected data related to how well cadets are achieving your programmatic cadet learning outcomes. However, your work is still far from done. In fact, it is now time to tackle some of the most important, most rewarding, and – in some cases – most overlooked aspects of the assessment process: making sense of the data. This chapter is written to provide some practical guidance regarding this important sense-making activity. The first part of the chapter focuses on compiling the various sources of data that are available to your program. The second part of the chapter focuses on reporting the data in a form that is easily interpretable. Finally, the third part of the chapter provides some tips on how to make sense of the data as they specifically pertain to cadets' achievement of your programmatic learning outcomes.

### Compiling the Available Data

If your program is like most, you do not suffer from a lack of information about cadets' learning. In fact, a quick review of the *Summary of Assessment Methods, by Academic Major* (see Table 7, page 49) indicates that the vast majority of programs have access to many, many different sources of assessment data. One key to success, then, is to compile all of the data and report them in a format that you and your departmental colleagues can digest. How can this be done?

A good first step is to get all of the relevant assessment data pertaining to each of your outcomes together in one place. This is a relatively simple step, but it is very important, particularly given that assessment data relevant to any given outcome may come from a variety of different sources. Some may come from course-embedded tests and assignments distributed across your academic classes. Others may come from institutional-level tests or surveys. Still more may come from interviews or focus groups conducted with your graduates. In order to make sense of these disparate pieces of data, it will first be necessary to gather the relevant data into one place.

As indicated above, one common source of assessment data is the collection of tests and assignments embedded within academic courses. Those data can be incredibly valuable, as they most accurately reflect the work that cadets are doing in your program's courses. In addition, data that come from embedded assessments are relatively easy to collect. Cadets are already doing the work; faculty members are already evaluating it; and your curriculum map will help you know where to look for the

information. However, given that the data will still be coming from multiple course directors and instructors, a primary challenge may be compiling the data at the conclusion of each semester.

Currently, our academic departments use a variety of processes to compile course-embedded assessment data. Here are some notable examples of this process in use around DF:

- In the Department of Behavioral Sciences and Leadership (DFBL), all course directors are required to write an end-of-course assessment report. To ensure consistency across courses, these reports follow a standard template in which course directors must summarize the assessment data collected in their course. Those reports are submitted and reviewed by the “Discipline Lead” overseeing each course.
- In the Department of Chemistry, course directors are expected to include assessment results within larger Course Diaries. Each diary includes a variety of information about the course, to include a course description, a list of textbooks, and the number of cadets enrolled in the course. In addition, diaries also include the programmatic outcomes assessed in the course, the results of those assessments, and a narrative from the Course Director identifying recommendations for course improvement.
- The Department of Management (DFM) uses a LOSA<sup>11</sup> system to compile their assessment results. At the beginning of each semester, course directors are required to articulate which of the management major’s learning objectives they are covering and/or assessing in their courses. At the end of the semester, course directors present the results of their assessments and offer suggestions for improvement at a department-wide meeting.

Realistically, the best way to collect assessment data from academic courses varies from program to program. You are encouraged to find a method that works best (and is most sustainable) within your particular departmental culture. However, regardless of the details of how the assessment data are reported, it is likely that the information collected will be largely the same across all programs. Typical information you may wish your course directors to provide are summarized in the generic “Course Reporting Template” shown on page 52. Please feel free to adopt this form for your own program’s use or modify it in a way that makes sense for your particular situation.

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<sup>11</sup> LOSA = Learning Objectives Statement of Assessment

## SAMPLE COURSE REPORTING TEMPLATE

Course: \_\_\_\_\_

Course Director: \_\_\_\_\_

Semester: \_\_\_\_\_

Programmatic Cadet Learning Outcome #1: \_\_\_\_\_

- How was this cadet learning outcome developed in this course? (For example, what readings, lessons, activities, etc. were built into the course to help cadets achieve this outcome?)
- How was this cadet learning outcome assessed in this course? Please provide examples of exam questions, assignment prompts, etc.
- What were the results? Please summarize the assessment data collected in this course.
- How do the assessment results compare to your expectations? Are cadets achieving this outcome as you expected, or are they falling short in one or more areas?
- If appropriate, what would you recommend be done to improve cadet accomplishment of this outcome?

Programmatic Cadet Learning Outcome #2: \_\_\_\_\_

- How was this cadet learning outcome developed in this course? (For example, what readings, lessons, activities, etc. were built into the course to help cadets achieve this outcome?)
- How was this cadet learning outcome assessed in this course? Please provide examples of exam questions, assignment prompts, etc.
- What were the results? Please summarize the assessment data collected in this course.
- How do the assessment results compare to your expectations? Are cadets achieving this outcome as you expected, or are they falling short in one or more areas?
- If appropriate, what would you recommend be done to improve cadet accomplishment of this outcome?

Etc.

Of course, some of the assessment data pertaining to cadet accomplishment of your programmatic outcomes will not come from course-embedded tests and assignments. Assessment data can also come from a variety of other sources. For instance, several of the majors in our Engineering Division rely heavily on the Fundamentals of Engineering exam as a source of assessment data. Other programs rely on institutional surveys (e.g., the National Survey of Student Engagement) or focus groups to provide information about cadets' accomplishment of their learning outcomes. Obviously, your program will want to make good use of these data sources as well. This can be done by adapting the questions on the Course Reporting Template for use outside of a normal course. An example is shown in the Sample Assessment Data Reporting Template below:

SAMPLE ASSESSMENT DATA REPORTING TEMPLATE	
Name of POC:	_____
Semester:	_____
Programmatic Cadet Learning Outcome #1:	_____
	<ul style="list-style-type: none"><li>• How was this cadet learning outcome assessed? What assessment method(s) was used?</li><li>• What were the results? Please summarize the assessment data collected.</li><li>• How do the assessment results compare to our expectations? Are cadets achieving this outcome as we expect, or are they falling short in one or more areas?</li><li>• If appropriate, what would you recommend be done to improve cadet accomplishment of this outcome?</li></ul>

### Summarizing the Results

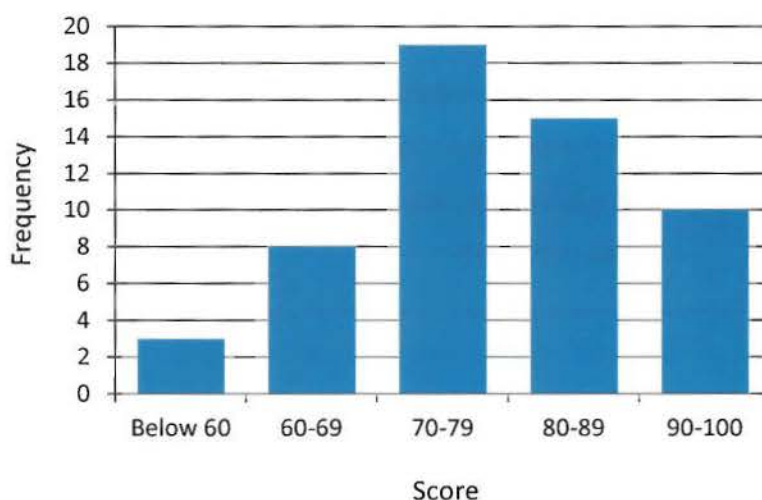
While compiling assessment data from various sources is valuable, the mere compilation of that information is not sufficient. You will also want to ensure that those data are summarized in a form that will be useful to you<sup>12</sup>. This section includes three broad tips to get you pointed in the right direction.

*Tip #1: Consider using tables or graphs to summarize your results.* Piles and piles of assessment data can be difficult to digest. Therefore, it is important that someone summarize the data from each assessment in a format that accurately conveys the key results. This can be done in a variety of ways, many of which you probably learned in an introductory statistics course at some point in your academic career. These include (but are certainly not limited to):

- Providing frequency counts, such as the number of cadets scoring at different levels on a particular test or assignment. These counts can be presented in the form of either a table or a simple graph. For instance, the table in the left panel below shows the hypothetical distribution of scores that cadets may have on a specific portion of a classroom exam. The panel on the right represents the same data in graphical form.

Frequency of Scores on a Specific Portion of a Classroom Exam

<u>Score</u>	<u>Frequency</u>
90-100	10
80-89	15
70-79	19
60-69	8
Below 60	3



<sup>12</sup> One of the biggest challenges that many beginners to assessment might face is having a huge collection of assessment data and not knowing exactly what to do with it. If you find yourself in this situation, rest assured that you are not alone. This section is written to provide some tips on how you can proceed. Your colleagues within DF can also provide assistance in helping you move forward.

- Reporting average scores, a strategy that is particularly useful if a single number does a reasonably good job of summarizing your data<sup>13</sup>. Reporting averages can also be useful if you wish to compare the performance of different subgroups of cadets. For instance, the graph below compares the average scores of cadets in different class years on a hypothetical attitude scale.

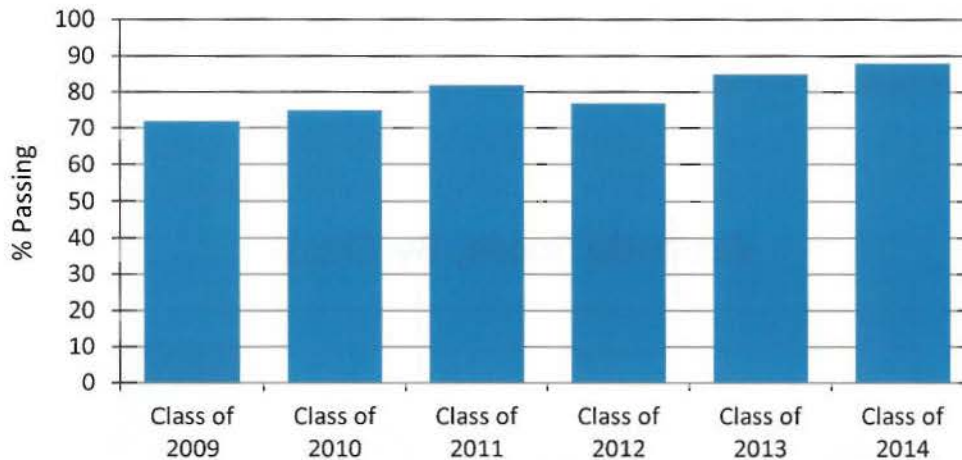


- Reporting the percentage of cadets who score above a certain threshold. Imagine, for instance, that your program administers a standardized test to first-class cadets at the end of each Spring semester. One strategy could be to report the percentage of cadets who pass the test (where the criteria for passing would need to be clearly defined) each year, as shown in the graph below.

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<sup>13</sup> If your data approximate a normal distribution, for example, an arithmetic mean can do a good job of summarizing the central tendency of your data with a single number.

## Pass Rate, by Year



- Reporting summaries of qualitative data. Some of the data you collect may not be quantitative in nature. For example, your program may gain a great deal of information from examining cadets' written feedback, their responses to interview questions, or their comments in focus groups. None of that information will necessarily come in the form of numbers, yet you will still want to find a way to summarize it in an easy-to-digest form. One way to do that is to perform a thematic analysis, where you sort cadets' responses into categories based on the content. For instance, if you were to ask cadets what experiences have been most beneficial in their development of a particular outcome, you may find that their responses fall into categories like the following:
  - Category 1: Core Courses
  - Category 2: Majors' Courses
  - Category 3: Your Program's Capstone Experience
  - Category 4: Research Experiences
  - Category 5: Extracurricular Experiences (e.g., clubs, teams, etc.)

After sorting cadets' comments into these different categories, you may also find it helpful to tally the number of comments that fall within each one. For instance, if most of your cadets indicated that research experiences have been beneficial, but relatively few indicate that majors' courses have been beneficial, you may wish to examine what happens in those research experiences and determine if it is possible to export some of those best practices to those majors' courses where those practices don't already exist.

*Tip #2: Have something to compare your results to.* By itself, a given assessment result may not be terribly informative. For instance, imagine that your cadets have an average score of 75% on a particular test, or imagine that 60% of your cadets scored “proficient” or above on a particular assignment. Are these results something that you can celebrate? Are they merely satisfactory? Or are they cause for concern? Unfortunately, you don’t know unless you also have some standard you can use for comparison. A key part of making sense of assessment data is to make it clear what that standard is. Here is a sampling of some standards you might use in making sense of the data in your program.

- Comparisons between different groups of cadets. Imagine that you and your colleagues are trying to determine the extent to which cadets retain the knowledge from a particular course. One way to approach this question would be to give first-class cadets a standardized test (such as ETS’ Major Field Test) that includes questions related to that course and then examine cadets’ performance on those specific questions. In addition, it would be wise to compare the scores on those questions for those cadets who have taken the course in question with those cadets who have not. If the course had a lasting impact on cadets’ knowledge, you would expect that cadets who have taken the course would score significantly higher than those who have not done so. On the other hand, if cadets have forgotten much of what they had learned in the course, then you might find that cadets who have taken the course perform no better than those who haven’t.
- Comparisons over time. If your program is in the habit of collecting data using the same assessment instrument from semester-to-semester or year-to-year, it is possible to compare cadets’ current scores on that instrument to cadets’ scores in previous administrations of the instrument. For instance, imagine that you are trying to cultivate scientific thinking among cadets in your program, and you are in the habit of administering a measure of scientific reasoning to first-class cadets each year before they graduate. You could easily track cadets’ performance from year to year, taking note of what changes in your program seem to lead to upward or downward shifts. As you learn more and more about how to develop this type of thinking in your cadets, one would hope that scores on this measure would gradually rise over time.
- Comparisons between cadets and students at peer institutions. While many of the assessment instruments in use at USAFA are generated internally, there are some that are commercially available for use at other schools. In those cases, you may find it beneficial to compare the

scores of cadets in your program to the scores of students at other institutions. An obvious example of this involves our cadets' responses on the National Survey of Student Engagement (NSSE), a survey that we administer at USAFA every three years<sup>14</sup>. The NSSE is given at hundreds of colleges and universities nationwide each year, to include at dozens of other highly selective undergraduate institutions and each of the other military service academies. As a result, in addition to examining our institutional results (broken out by academic major), it is also beneficial to compare our results with the results from institutions that are similar to us. Of course, we would like it if our cadets gave responses on the NSSE that were as favorable as, or more favorable than, responses given by students at peer institutions. However, in cases where they don't, those data could provide a clue as to where we may need to improve our processes.

- Comparisons with what we want or expect. Even if you've created an assessment instrument in-house (meaning that it doesn't have norms from other institutions) and you're using it for the first time (meaning that you lack historical norms as well), it is still beneficial to have a standard against which you can compare your results. In these cases, that standard is likely to come from your professional judgment and the judgment of your program's faculty members. For instance, given the emphasis your department has placed on improving cadet writing, you might expect that 80% of your cadets will achieve at a proficient level on a particular writing assignment. If cadets' performance meets that standard, then you can celebrate. However, if cadets fall short of that expectation, it might be a cue for your program to take another look at what you're doing to improve cadet writing and whether there are ways to do it better.

*Tip #3: Stay focused on your cadet learning outcomes.* This last tip may seem obvious, but it is important enough that it is still worth emphasizing. The key is to think about why you and your colleagues are collecting assessment data in the first place. You shouldn't be collecting data just for the sake of collecting assessment data. Instead, the purpose of that data collection is to inform you and your peers about the degree to which cadets are progressing toward successful accomplishment of your stated outcomes. Therefore, the data you collect will be useful only to the extent that they provide meaningful information about your cadets' outcome achievement. Furthermore, any time you spend examining those data ought to focus on what the data tell you about cadets' achievement of the outcomes.

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<sup>14</sup> The most recent administration of the NSSE was in May of 2014.

Let's consider a specific example that may be salient in your program. Many departments closely monitor the grades earned by cadets in each of their classes, paying particular attention to historical trends and whether current grades are consistent with those historical norms. This practice may be quite helpful administratively, but it is not likely to provide very much useful information about how well cadets are progressing toward your programmatic learning outcomes. The reason is threefold:

- Many departments use grades as an indicator of cadets' relative performance (i.e., compared to their peers) in the course. The students who perform best receive A's, the students who perform at a good level receive B's, students who perform more poorly receive C's, etc. However, grades may not say very much about cadets' absolute performance (i.e., against some consistent standard). The exception is obviously in those cases where departments consistently require particular graded events from semester to semester and have processes in place to evaluate cadets' performance on those graded events consistently as well. In those cases, one could argue that a "B" earned during one semester means a level of absolute performance that is comparable to a "B" earned during a different semester.
- Many academic courses are aligned with multiple cadet learning outcomes, and grades in those courses reflect cadets' accomplishment of those outcomes simultaneously. For instance, if a particular course is designed to develop both cadets' research skills and their writing skills, then cadets' grades will likely reflect how well they conduct research *and* how well they write. In such cases, a grade of "B" could mean multiple things. Cadets could be outstanding researchers but only mediocre writers; they could be mediocre researchers but outstanding writers; or they could be good (but not outstanding) at both skills. Without disaggregating the course grades into these two components, it would be impossible to know how cadets are doing in each specific area.
- Often, grades are influenced by things that having nothing to do with outcome achievement at all. As one example, many departments have a policy whereby cadets receive a reduced grade on assignments that are submitted late. Therefore, it is possible for a cadet to be an outstanding writer but receive a poor grade on a paper because he failed to turn his assignments in on time. As a result, merely looking at the cadets' grades wouldn't provide you with accurate information about their writing skills specifically.

Rather than examining course grades as a source of information about outcome achievement, a different approach appears necessary. One strategy would be to examine more specific aspects of

cadets' performance. For instance, if writing is indeed one of your programmatic outcomes, perhaps your instructors could evaluate cadets' papers (or at least a sample of cadets' papers) specifically for how well they are written. Cadets would still receive overall grades that may reflect other aspects of their performance (e.g., quality of research, timeliness of submission, etc.), but the data that would be passed forward for assessment purposes would focus more specifically on cadets' writing skills. Those are the data that would be most beneficial when considering the level of cadets' outcome achievement.

#### Reviewing Your Results in Light of the Outcomes

The final step in making sense of the data you've collected is to have someone (or, preferably, a group of people) review the data pertaining to each of the programmatic learning outcomes. That may mean asking the entire faculty to review the data, perhaps at a faculty offsite. Alternatively, it could mean engaging the members of the department's Curriculum Committee. Or it could mean creating several "outcome committees" for your academic program, with each committee dedicated to reviewing and evaluating the assessment data pertaining to one particular learning outcome. As with many aspects of the assessment process, there is no single right structure for reviewing assessment data. The key is simply to have something that fits within the culture of your department or program.

Even though the structure that reviews assessment data may vary from program to program, it is likely that the task of this group will largely be the same. Specifically, they are likely to ask the questions included in the "Sample Outcome Reporting Template," included on page 61. For each outcome, they will want to review how that outcome is developed within your academic program; provide a summary of how that outcome was assessed; offer a summary of the major assessment results; interpret what the results mean within the context of your expectations; and – if applicable – make recommendations for changes in departmental processes that could improve cadets' achievement in the future.

In the name of documenting your assessment processes, I would urge your program to create written records of your outcome reviews. Those reviews will help you keep track of assessment results from semester to semester, and they will also be very helpful as USAFA builds their case for institutional accreditation during the next review of the Higher Learning Commission.

## SAMPLE OUTCOME REPORTING TEMPLATE

Programmatic Learning Outcome:

Curriculum Map: What courses are aligned with this outcome in our curriculum map? What happens in those courses to help cadets develop this learning outcome?

Assessment Data: What data do we have that provide information about how well cadets are achieving this outcome? Where / When / How was each set of data collected?

Results: Summarize the assessment data pertaining to this outcome.

Interpretation: What do the results mean? How do they compare with our expectations?

Suggestions / Implications: Based upon our findings, what could / should be done to improve cadets' accomplishment of this outcome?

Of course, while accreditation is important, it is not the most important reason for engaging in a systematic review of your assessment data. A far more important reason is that the assessment process allows you and your department to make data-informed improvements within your department or program. To maximize the chances of having a positive impact, here are some general tips I encourage you to use when making sense of assessment data and/or generating your outcome reports<sup>15</sup>.

- Get lots of people involved in making sense of the data. If making sense of the data is the job of one person or a very small group, it is likely that many of your faculty will feel disconnected from the process and less-than-fully invested in the results. If a larger number of people have a chance to review the data, they will be more apt to own the results and also more apt to act upon them.
- Be transparent with the data. Faculty members are unlikely to trust conclusions if they don't know where they come from. Be clear about where the data came from and how you arrived at your conclusions. This will make any calls for change much easier for faculty to comprehend.
- Don't be afraid to use informed judgment. Assessment results are far more than numbers on a page. They are part of a narrative about your cadets' learning, and making sense of them – particularly when they come from multiple sources – requires thoughtful interpretation on the part of your faculty members. Thankfully, you and your faculty colleagues are better equipped than anyone else to interpret the data within the context of your program. They should feel empowered to offer informed commentary on the assessment results.
- Keep it simple. Sometimes, assessment results really are complex, and they take a great deal of time, energy, and space to explain. More often than not, however, the most important conclusions are those that are relatively straightforward. This means that outcome reports may actually be fairly brief. That will make them markedly easier to write, and it will also make it more likely that people in your department will read and act on them.
- Keep your eyes on the prize. Throughout the assessment process, it is important to remember why you are doing this in the first place. Our primary driver is the improvement of cadet learning. Your interpretations of assessment data, like the data themselves, will be useful to the extent that it leads to improvements in what your cadets know and are able to do. This is a point that I will expand on in the final chapter of this *Handbook*.

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<sup>15</sup> These tips are based on information in an Assessment Workbook written by the Office of Institutional Effectiveness at Ball State University. That handbook is available online at: <http://cms.bsu.edu/about/administrativeoffices/effectiveness/assessmentresources/workbook>.

This chapter ends with the fourth dimension (“Making Sense of Assessment Results”) of the Academic Program Self-Assessment. That dimension is shown in Table 8 on page 64.

Table 8

## Departmental Self-Assessment

## Making Sense of Assessment Results

This table includes one row of the broader Academic Program Self-Assessment rubric that has been in place within DF. (The rubric is printed in its entirety in Appendix A.) In conjunction with your colleagues, identify which description (i.e., Level 0, 1, 2, or 3) best matches the current state of cadet learning outcomes within your academic major or minor.

<b>Elements</b>	<b>Question(s) To Think About</b>	<b>Level 0</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>
Making Sense of the Results	Has my department established processes for compiling and making sense of assessment results for each learning outcome?	No efforts are being made to compile or make sense of assessment results.	Assessment results are compiled from relevant sources (e.g., in the form of course diaries or course director memoranda), but no one reviews the compilation as a way to better understand how well cadets are achieving the learning outcomes.	Assessment results are compiled from relevant sources, and the department has begun to create a process whereby faculty review those results for a better understanding of how well cadets are achieving at least one learning outcome.	Assessment results are compiled from relevant sources, and the department has established a process whereby faculty review those results for a better understanding of how well cadets are achieving each of the learning outcomes.

## Chapter 7 – Using Assessment for Improvement

Just over ten years ago, George Kuh, then the Director of Indiana University’s Center for Postsecondary Research, led an ambitious effort (called “Documenting Effective Educational Practices” or “DEEP”) to identify and characterize some of America’s highest-performing colleges and universities. Kuh’s research team examined both graduation rates and institutional scores on the National Survey of Student Engagement, ultimately identifying 20 institutions that scored higher than one would expect based on the demographic characteristics of their student bodies. His team then visited each of the 20 high-performing campuses, interviewed faculty and students, and did their best to describe the characteristics that made these institutions so effective. In brief, his team discovered that the 20 colleges and universities in the study had six significant things in common<sup>16</sup>.

1. All of the DEEP schools have a clearly-articulated mission that guides how / why things are done on their campuses.
2. All of the DEEP schools have an “unshakeable focus on student learning.” (Kuh, Kinzie, Schuh, & Whitt, 2005, p. 65)
3. All of the DEEP schools use their distinctive campus environments to improve student learning.
4. All of the DEEP schools provide students with “clear pathways” to success (Kuh et al., 2005, p. 109).
5. All of the DEEP schools have a sense of “positive restlessness” that drives them to continuously improve (Kuh et al., 2005, p. 146).
6. All of the DEEP schools involve faculty and staff from across the institution in promoting student success.

All of the characteristics described above are worthy of emulating, and – thankfully – many of them are already be in place here at USAFA. For the purposes of this chapter of the *Assessment Handbook*, however, I would call your attention to Characteristic #5 about “positive restlessness” and continuous improvement. Kuh et al. (2005) discovered that faculty and staff at high-performing institutions are confident in who they are and what they are trying to accomplish, but they are constantly searching for ways to get better. Said one faculty member interviewed for the study, “We talk about what needs to be fixed all the time. This is very much a part of our culture” (p. 146). They are restless, not in a cynical or complaining way, but in a positive way that catalyzes them to continuously improve.

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<sup>16</sup> The complete summary of the DEEP project is available in Kuh, Kinzie, Schuh, & Whitt (2005).

It is in the spirit of positive restlessness that I have written this *Assessment Handbook*, and it is that same spirit that I would encourage you to adopt as you proceed with the assessment work going on in your academic program. There is no doubt that faculty and staff in your program are doing terrific things, both in and out of the classroom. There is also no doubt that the cadets are benefitting substantially from their efforts. However, it is almost certainly the case that there are things that you and your colleagues could do to help cadets learn even better than they are currently. As such, I encourage you to use the assessment processes described in this *Handbook* as tools, both to identify those aspects of cadet learning that are most in need of improvement and to help your department figure out how to put needed improvements into place.

### A Quick Review of Where We've Been

In Part II of this *Handbook*, you've worked through four very important steps of the assessment process. Specifically, you've learned how to:

- Create cadet learning outcomes for your academic program (Chapter 3);
- Build a map between your curriculum and those stated learning outcomes (Chapter 4);
- Select assessment methods that will provide you with credible information about how well cadets are achieving those outcomes (Chapter 5); and
- Institute processes for making sense of your assessment results (Chapter 6).

Once you've completed these first four steps, it is time to use what you've learned from your assessment results to improve the quality of cadet learning within your academic program. That is, it is time to implement the changes that you and your departmental colleagues recommended in your outcome reporting process (see p. 61). As you move forward, I would urge you to closely monitor those changes to see if they worked. If they did, it is once again time to celebrate. If they didn't, it will be a clue that still more changes may be necessary.

### A Case Study

To illustrate the entire assessment process, consider a hypothetical academic department that is new to the process of conducting assessment. Based on the guidance provided in this *Handbook*, faculty and staff in that department may proceed as follows:

- First, faculty and staff may get together to decide on suitable learning outcomes for their major. Based on discussions within the department, consultation with Air Force constituencies, and input from a professional organization in their discipline, let's assume that one of the outcomes they settle on can be written as follows:

*"As a result of being in this program, cadets will write effective research papers."*

- Second, faculty and staff may build a curriculum map, such that they identify a number of required courses within their major that will provide cadets with substantial instruction in how to write effective research papers. For the sake of this example, let's assume that there are three such courses, one each at the 200, 300, and 400 levels. This means that cadets in the program will receive substantial instruction (as well, as substantial practice and feedback, I presume) on writing effective research papers at least once each year.
- Third, department members will need to identify assessment methods that can inform them about how well cadets are achieving the outcome of writing effective research papers.
  - In this example, one of the most obvious sources of assessment data may be the papers that cadets write in the courses shown in the curriculum map. Therefore, the department may ask instructors in those courses to grade the papers using a rubric that is applied across all departmental courses. Course directors could then summarize the results using the Course Reporting Template on p. 52.<sup>17</sup>
  - The department may decide to supplement the direct measures of cadet learning with indirect measures as well. So, they may ask cadets to comment in end-of-course feedback and in focus groups about what aspects of their courses are most helpful in learning to write effective research papers and what aspects are most in need of improvement. A POC may be asked to summarize those results using the Assessment Data Reporting Template shown on page 53.
  - Finally, the department may choose to solicit feedback from Air Force supervisors about their graduates' research and writing skills. This feedback can assist department members in learning how well cadets are applying their research and writing skills once

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<sup>17</sup> In some departments, it may not be tenable to have all faculty grade cadet papers using an agreed-upon rubric. In those cases, another approach would be to have faculty members grade cadet papers as they normally would, but then save out a random sample of the papers for review by a departmental assessment committee at the end of the semester. The committee could review those papers using a common rubric and score each paper using criteria directly relevant to the outcome. The aggregated results could then be summarized using the Assessment Data Reporting Template shown on page 47.

they are officers on active duty. As was the case with the feedback from cadets, a POC may be asked to summarize this supervisors' feedback using the Assessment Data Reporting Template shown on page 53.

- Fourth, the program will need to establish a process for reviewing and making sense of the assessment data collected from their different sources. For instance, faculty may form an "outcome committee" dedicated specifically to examining the outcome of writing effective research papers. That committee would be responsible for reviewing the summaries submitted by course directors, as well as the data from end-of-course feedback, focus groups, and Air Force supervisors. They may be asked to summarize their analyses using the Outcome Reporting Template shown on page 61. Note that, in addition to summarizing the data, this template also asks for their recommendations about what could / should be done to improve cadets' accomplishment of the outcome.
- Assume for a moment that the outcome committee discovers that, while cadets are very good at summarizing information from a single source, they have difficulty synthesizing research material from multiple sources. Based on this observation, a reasonable suggestion for improvement would be to provide cadets with additional assistance, practice, and feedback on this skill. Perhaps that could be done by inserting an additional lesson into the relevant 200-level course about how to synthesize material from different sources. Perhaps it could be done by adding an extra assignment in one of the required courses where cadets must practice synthesizing material from multiple sources. Or perhaps it could be done by building stronger connections between a specific course and the resources available at the USAFA Writing Center. The committee will be charged with recommending the best course of action given the unique context of their program, but the key is to turn the assessment data into action. And, regardless of what action faculty decide to take, it is a good idea to document what was done and when any changes were implemented. That way, as additional assessment data are collected in the future, it will be possible to determine the extent to which the change had the desired effect.

One possible way to record the action taken to improve cadets' outcome accomplishment would be to use the Sample Outcome Improvement Template, printed on page 70.

- Implicit in this discussion is that the program will indeed engage in follow-up assessment to examine whether any changes were effective. So, faculty members will want to continue

examining cadets' ability to write effective research papers to see if the outcome committee's recommended changes helped solve the original problem. To emphasize the importance of this follow-on assessment, the last item on the Sample Outcome Improvement Template asks department members specifically to identify how and when the follow-on assessment will be taking place. In addition, the idea of follow-on assessment is included in the fifth (and final) dimension ("Using Assessment for Improvement") of the Academic Program Self-Assessment, shown in Table 9 on page 72. The rubric is provided in its entirety in Appendix A.

## SAMPLE OUTCOME IMPROVEMENT TEMPLATE

Date:

Programmatic Learning Outcome:

Rationale: What element(s) of the outcome is most in need of improvement? What assessment evidence do we have showing that improvement is indeed necessary?

Description of Change(s): What change(s) will we be implementing to improve cadets' achievement of this learning outcome? When will the change(s) be taking effect? Why do we anticipate that the changes will be effective?

Follow-On Assessment Plan: How will we reassess this outcome to determine if the change described above had a beneficial impact on cadets' accomplishment of the outcome? When will that follow-on assessment take place?

### Document, Document, Document

I conclude this *Handbook* with one final urging: **Please keep records of all the great assessment work you do in your department.** This includes copies of your cadet learning outcomes, curriculum maps, summaries of your assessment data, as well as records of changes that you make in response to your results. There are multiple reasons for this, the most important of which is to maintain continuity in your academic program. The Air Force Academy has such frequent turnover in our faculty and staff that it is easy for departmental best practices to be swept away if they are not clearly documented. Therefore, please keep track of what you've done. And, when new faculty join your program, I encourage you to share with them what you've done as well. That way, your good work has the best possible chance of living on.

Of course, there is institutional incentive for you to keep good records as well. Recall that USAFA will be expected to populate an electronic "evidence file" that documents how we meet the criteria for continued Higher Learning Commission accreditation. As such, members of our Institutional Accreditation Team will be asking for your program to provide evidence that it is successfully applying the various steps of assessment described in this *Handbook*. Obviously, that will be much easier for you to do if you are in the habit of keeping those records for yourselves already.

Finally, I encourage you to share your assessment documentation on our Departmental Assessment network SharePoint site: <https://eis.usafa.edu/academics/dean/dfe/DFED/dan/default.aspx>. The "Departmental Assessment Plans" directory contains separate folders for each department / program to share their assessment-related materials. By keeping your folder up-to-date, you will help your colleagues in around USAFA stay in touch with what you are doing, and it will also allow all of us to learn from each other's collective experience. As programmatic assessment programs continue to mature, we can also use the material on the SharePoint site to make updates to this *Assessment Handbook*. That way, this *Handbook* becomes a living document that best meets the needs of our ever-improving Air Force Academy.

Table 9

## Academic Program Self-Assessment

## Using Assessment for Improvement

This table includes one row of the broader Academic Program Self-Assessment rubric that has been in place within DF. (The rubric is printed in its entirety in Appendix A.) In conjunction with your colleagues, identify which description (i.e., Level 0, 1, 2, or 3) best matches the current state of cadet learning outcomes within your academic major or minor.

Elements	Question(s) To Think About	Level 0	Level 1	Level 2	Level 3
Using Assessment for Improvement	Does my department regularly use assessment results for the purposes of improving the major? Is the department in the habit of conducting follow-up assessments to ensure that the improvements actually worked?	Assessment results have not been used for the purposes of improving the major.	There is at least one documented example in which assessment results have been used for the purposes of improving the major.	Assessment results are regularly used for the purposes of improving the major. However, the department is not in the habit of performing follow-up assessments to ensure that the improvements actually worked.	Assessment results are regularly used for the purposes of improving the major. The department is also in the habit of performing follow-up assessments to ensure that the improvements actually worked.

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Appendix A: Academic Program Self-Assessment

Department: \_\_\_\_\_

Major: \_\_\_\_\_

Directions: For each row in the rubric, indicate the level (0, 1, 2, or 3) that most accurately describes the current state of your academic program.

Elements	Question(s) To Think About	Level 0	Level 1	Level 2	Level 3
Cadet Learning Outcomes	Has my department written cadet learning outcomes for this major in a way that allows for meaningful assessment?	Cadet learning outcomes have not been written for this major.	Cadet learning outcomes have been written for this major. However, they are not written in terms of what students will know or be able to do as a result of being in the major.	Cadet learning outcomes have been written in terms of what cadets will know or be able to do as a result of being in the major. However, modest improvements are needed because one of the following is true: 1. Outcomes are not actionable (i.e., they don't include an action verb). 2. Outcomes are not clear and understandable to faculty and cadets.	Cadet learning outcomes have been written for this major in a way that allows for meaningful assessment. 1. Outcomes are written in terms of what cadets will know or be able to do as a result of being in the major. 2. Outcomes are actionable (i.e., they include action verbs). 3. Outcomes are clear and understandable to both faculty and cadets.
Curriculum Map (Note: A "curriculum map" is a matrix that shows which courses in your major are aligned with which of your learning outcomes.)	Has my department developed a curriculum map showing clear linkages between cadet learning outcomes and the learning experiences (to include coursework) in the major?	No curriculum map has been developed.	A curriculum map has been developed. However, significant improvements are needed because of one or both of the following: 1. There are one or more required courses that do not map to any outcomes. 2. There are one or more outcomes that are not addressed in the curriculum.	A curriculum map has been developed, showing clear linkages between most cadet learning outcomes and the learning experiences (to include coursework) provided in the major. However, modest improvements are needed because one or more outcomes lack adequate coverage.	A curriculum map has been developed, showing clear linkages between all cadet learning outcomes and the learning experiences (to include coursework) in the major.
Assessment Methods	Is my department making efforts to assess each of the cadet learning outcomes in the major? To what extent are we relying on direct vs. indirect measures?	No efforts are being made to assess cadet learning outcomes.	The department is beginning to assess at least some cadet learning outcomes. However, assessment efforts rely completely on indirect measures of learning (e.g., cadet feedback, surveys, focus groups, etc.).	Assessment of cadet learning outcomes is underway but not fully implemented. At least one of the outcomes incorporates the use of direct measures of learning (e.g., exams, papers, projects, portfolios, etc.).	Department is fully engaged in assessing each of the cadet learning outcomes. Direct measures of learning (e.g., exams, papers, projects, portfolios, etc.) are used and are supplemented by indirect measures (e.g., cadet feedback, surveys, focus groups, etc.), as appropriate.
Making Sense of the Results	Has my department established processes for compiling and making sense of assessment results for each learning outcome?	No efforts are being made to compile or make sense of assessment results.	Assessment results are compiled from relevant sources (e.g., in the form of course diaries or course director memoranda), but no one reviews the compilation as a way to better understand how well cadets are achieving the learning outcomes.	Assessment results are compiled from relevant sources, and the department has begun to create a process whereby faculty review those results for a better understanding of how well cadets are achieving at least one learning outcome.	Assessment results are compiled from relevant sources, and the department has established a process whereby faculty review those results for a better understanding of how well cadets are achieving each of the learning outcomes.
Making Sense of the Data	Has my department established processes for compiling and making sense of assessment data for each learning outcome?	No efforts are being made to compile or make sense of assessment data.	Assessment data are compiled from relevant sources (e.g., in the form of course diaries or course director memoranda), but no one reviews the compilation as a way to better understand how well cadets are achieving the learning outcomes.	Assessment data are compiled from relevant sources, and the department has begun to create a process whereby faculty review those data for a better understanding of how well cadets are achieving least one learning outcome.	Assessment data are compiled from relevant sources, and the department has established a process whereby faculty review those data for a better understanding of how well cadets are achieving each of the learning outcomes.
Using Assessment for Improvement	Does my department regularly use assessment results for the purposes of improving the major? Is the department in the habit of conducting follow-up assessments to ensure that the improvements actually worked?	Assessment results have not been used for the purposes of improving the major.	There is at least one documented example in which assessment results have been used for the purposes of improving the major.	Assessment results are regularly used for the purposes of improving the major. However, the department is not in the habit of performing follow-up assessments to ensure that the improvements actually worked.	Assessment results are regularly used for the purposes of improving the major. The department is also in the habit of performing follow-up assessments to ensure that the improvements actually worked.

## Appendix B: Cadet Learning Outcomes, by Academic Program

This Appendix is for USAFA internal use only. If you have questions about the cadet learning outcomes in a particular program, please contact the author at [steven.jones@usafa.edu](mailto:steven.jones@usafa.edu).