5-2010

Development of an Outcomes-Based Undergraduate Curriculum in Homeland Security

James D. Ramsay
Embry-Riddle Aeronautical University, ramsa301@erau.edu

Daniel A. Cutrer
Embry-Riddle Aeronautical University, cutre0b1@erau.edu

Robert Raffel
Embry-Riddle Aeronautical University

Development of an Outcomes-Based Undergraduate Curriculum in Homeland Security

Jim Ramsay, Daniel Cutrer, and Robert Raffel

INTRODUCTION

The homeland security construct has become a large, complex, and dynamic enterprise, consisting of multiple professions, skill sets, and expertise. Homeland security is large in that it consists of several public sector agencies, organizations, and many hundreds of thousands of employees. Homeland security is complex in that it includes dozens, if not hundreds of job descriptions which count a plethora of duties, skills, and behaviors among their employees. Finally, homeland security is dynamic in the sense that it is a process, not an end point; a process which requires constant innovation and undergoes unrelenting evolution. These forces operate from strategic to tactical levels in order to meet often asymmetric and irregular threats (natural, man-made, or technological).

As the current homeland security workforce ages, there exists an anticipated need throughout the U.S. for competent, educated homeland security professionals, in both public and private sectors. Hence, there has been both opportunity and pressure in higher education to quickly develop degree programs that will produce the next generation of homeland security practitioners.[1] In addition, the commitment by the U.S. to continue development in the areas of homeland defense and homeland security is expected to continue.[2] It is estimated that over 300 programs now exist which claim to offer some sort of homeland security education; that is, either an associate's degree, an undergraduate degree, a graduate degree, or a certificate.[3] This is in stark contrast to the known thirty-five dedicated undergraduate homeland security programs that existed in 2007.[4] As rate of rapid growth continues, academic program development has to date produced irregular and inconsistent core curricula.

Given the scope of the homeland security enterprise, it is perhaps understandable that standardized core curricula are either absent or inconsistent. However, the issue of inconsistent core curricula exists, at least in part, due to the fact that no professional association has been established that can offer a vetted or even published set of program-level student learning outcomes (i.e., those outcomes that describe the curriculum in terms of knowledge, skills and abilities that students acquire at the program level), that can guide or provide model curricula to emergent homeland security programs.[5] Nor is there an organization that has itself been recognized or certified by either the United States Department of Education (USDoE) or the Council for Higher Education Accreditation (CHEA) to perform accreditation for academic homeland security programs. Although this study is not a defense of whether accreditation should or should not occur in academic homeland security, the authors point out that when accreditation does exist in professional curricula such as medicine, law, engineering, nursing or dietetics, etc., program-level accreditation provides a de facto template for emergent programs to model their own core curriculum development.

As a professional practice, homeland security is a complex and dynamic enterprise. It follows that academic homeland security must stay abreast of the nuances, complexities, and changes that describe and constitute the homeland security construct. The first organization to attempt to identify, collect, and examine academic programs for shared

research and discussion was the Homeland Security and Defense Education Consortium, or HSDEC. Since HSDEC's inception, growth in the academic field of homeland security programs has been phenomenal. As interesting as such growth may be, it leads to particular challenges. These challenges are largely the same as those faced by all other occupations that have matured into proper professions. Namely, what does it mean to be a homeland security professional? Who can or cannot be a homeland security professional? Can one become certified to practice homeland security? What is the knowledge base of the practice? Who regulates this knowledge base?

Over time, answering such questions will be critical if homeland security is to become more than a job description or more than simply an occupation. This study aimed to address a subset of these questions; namely, what are the student learning outcomes that should describe an undergraduate degree in homeland security? Although there are undoubtedly other ways of addressing the validity of homeland security curricula, student learning outcomes are solid indicators of the knowledge, skills and abilities that students bring to the discipline, and add value to the discussion.

Purpose of the Study

Recognizing the simultaneous lack of guidance from professional associations and accrediting bodies in homeland security, the challenges facing all new homeland security programs are what core academic areas should be included in an undergraduate curriculum, and what student learning outcomes should students be able to demonstrate upon completion of the program? The twofold purpose of this study was to develop and test a consensus set of core academic areas that could be used to represent the breadth of the homeland security enterprise in an undergraduate curriculum.[6] Second, the study aimed to develop and examine both a consensus set of educational objectives and program-level student learning outcomes for an undergraduate curriculum in homeland security. What follows is a brief description of HSDEC as the nation's first attempt to systematically consider and address the challenges facing homeland security program development. The next section describes program-level accreditation and outcomes-based education as it exists in higher education, followed by the methodology and results including the core academic areas of homeland security and a complete set of the resultant student learning outcomes.

The Homeland Security and Defense Consortium (HSDEC)[7]

In the summer of 2003, U.S. Northern Command (USNORTHCOM) was faced with the prospect of hiring a workforce capable of successfully carrying out its recently designated homeland defense and security mission set. The Command quickly realized that personnel with the required knowledge and skill sets were not readily available in either the military or civilian communities. The challenge of meeting the demand led to the establishment of the Homeland Security/Defense Education Consortium, or HSDEC. Though initially intended to enhance academic program development and consequently provide more options to command personnel, the organization summarily took on the broader role of promoting education, research, and cooperation to support the national homeland security/homeland defense (HS/HD) mission.

Taking the lead in advancing education in the civilian community was unique to the Department of Defense (DoD), but justified. DoD has historically met such challenges by

educating its own personnel and allies to improve performance against a common enemy. USNORTHCOM partners potentially include first responders, Title 32 National Guard forces, federal agencies, and a host of other partners from government and private communities. This diverse partnership is especially pertinent given the somewhat bifurcated mission of NORTHCOM to provide for defense of the homeland and support to civil authorities. The consortium developed a long-term view that interoperability between these potential partners would be enhanced through common understanding of each other's roles, responsibilities, and capabilities. Overall, the USNORTHCOM effort encouraged multiple paths, goals, and topics ranging from substance to technique. Although not necessarily DoD-centric, the recognition of valid research areas within the ambit of homeland security and homeland defense helped produce the beginnings of a robust research initiative and professional association.

Academic membership in the HSDEC grew very rapidly. In just four years, the number of affiliated organizations exceeded 250 universities, colleges, and other interested agencies. Expansion was supported by engaging in a variety of functions to include holding conferences with themes focusing on national and regional issues, developing a newsletter with pertinent HS/HD education information, and establishing a very successful internship program.

In 2007 the HSDEC leadership decided that the organization had grown beyond the originally intended scope of the Department of Defense and that it would be more appropriate as a member-run organization similar to other discipline-specific associations such as the American Society of Safety Engineers, the International Association of Intelligence Education, etc. HSDEC ceased to exist in November 2008, converting to HSDECA, the Homeland Security and Defense Education Consortium Association. HSDECA in turn set its initial sights on becoming a professional membership association for homeland security professionals and began work on developing an accreditation function for academic homeland security. The role of the HSDEC in establishing a homeland security and defense academic community was an important step. HSDEC recognized that guidance and a coordinating body might be useful to the subsequent development of academic homeland security, and it stepped in to fill this void until the community could organize effectively. Program-level accreditation and the role it played in this study are discussed below:

What is Program-Level Accreditation?

Program accreditation (also known as specialized accreditation) is both a structure and a process that demonstrates a measure of public accountability that graduates have mastered a baseline set of knowledge and skills in order to function as required in specific professional venues. It is a measure of quality assurance that a program is teaching what it should be, and that graduates have the discipline-specific outcomes (knowledge, skills, behaviors) required by practitioners. According to CHEA, "Accreditation is a process of external quality review used by higher education to scrutinize colleges, universities, and educational programs for quality assurance and quality improvement."[8] Ultimately, not only do organizations that accredit these academic programs provide outcomes that all academic programs seeking accreditation must demonstrate and therefore all students in those programs acquire, they also provide guidance to academic institutions that develop and maintain degree programs in these disciplines.[9]

While there are social, regulatory and economic pressures that may contribute to the demand for program accreditation within a discipline, there can also be pressure within the discipline to move toward program accreditation as a mechanism to further define itself or to protect its scope of professional operations. For example, just as there are legal requirements for physicians or lawyers to be licensed or dieticians to be registered in order to practice, these same professions actively set, maintain, and disseminate their own student outcomes. Programs that cannot demonstrate that their programs offer the prescribed outcomes do not become accredited and, consequently, such graduates can not become licensed to practice.

Accreditation has evolved over time. Early on, accreditation was process oriented and typically required academic programs to offer a given set of topics in a prescribed sequence. The presumption was that students passing such classes had indeed mastered the knowledge or skill set required in their profession. While a process orientation had a certain appeal and convenience, problems associated with such an assumption included the need for academic programs to continuously offer classes that were (at least superficially) tied or matched to professional requirements, and the simple observation that passing grades did not always equate to a mastered skill. Outcomes-based education offered solutions to this problem and will be discussed in more detail below.

Over the last ten years, academic accreditation has evolved and has moved away from a rigid dependence on process orientation (i.e., a required list of courses) and instead has moved toward a set of outcomes that represent behaviors, skills, and knowledge practitioners need to possess in order to function in their profession. Such outcomes-based requirements require institutions or academic programs to demonstrate that their graduates have an appropriate set of knowledge, skills, and behaviors required by the profession when completing their course of study. As such, programs are incentivized to work in closer partnership with their professional counterparts and to concentrate on teaching/evaluating their students in areas that matter to practitioners and employers. This is not to suggest that higher education has abandoned more holistic or comprehensive education ideals or that outcomes-based education reduces to “training” and avoids true “education.” In many areas of homeland security, for example, the ability to engage in critical thinking, to analyze and to express oneself concisely, both verbally and in writing, are important, if not critical aspects of the homeland security educational experience. The presumption with such outcomes-based accreditation in higher education is that it constitutes a powerful means of ensuring degree integrity and quality.

In higher education, accreditation occurs at both the institutional (college or university) level, as well as at the level of individual programs (aka specialized accreditation). Institutions can be accredited by organizations recognized by the U.S. Department of Education (USDoE), or the Council on Higher Education Accreditation (CHEA) which incorporates the regional accrediting bodies such as North Central Association of Colleges and Schools. Academic programs can also be accredited by an organization, such as the Accreditation Board for Engineering and Technology or ABET. Enhancing the reliability and credibility of the accreditation process, accrediting bodies such as ABET are themselves often recognized by either the USDoE or by CHEA. For example, ABET is recognized as an accrediting body by CHEA.

However, not all programs in higher education pursue or maintain accreditation. For example, even though ABET has accreditation criteria for bachelors degrees in

occupational safety and health, only a relatively small number (eleven) of the 188 programs possess ABET accreditation.[10] Further, although most accrediting bodies manage and adjudicate accreditation procedures and decisions, they neither develop nor maintain the program-level outcomes that define or characterize a field or profession. This is usually done by consensus inside professional associations that represent a given field. As an example, the Education Standards Committee in the American Society of Safety Engineers (ASSE) develops and maintains the ABET criteria for academic safety programs.

In several disciplines, modern accreditation requires a program to demonstrate that they have achieved a defensible level of integrity, outcomes-based performance, and continuous quality improvement.[11] The rationale behind continuous quality improvement as it occurs in program accreditation is to revisit the educational standards and outcomes used in program accreditation often enough so as to be reflective and responsive to changes in the field. Additionally, the nature of outcomes-based accreditation is to suggest that outcomes are not inviolable. They are in fact subject to change as the field changes, or as best practices evolve, or the body of knowledge changes.[12]

Among other components, and although it varies across disciplines, outcomes-based program-level accreditation typically requires each academic program to demonstrate at least six goals. Each program needs to demonstrate:

1. How their program meets the mission of their college and university.
2. How their students achieve the educational objectives set by the program.
3. How the needs of the program's constituents are reflected in the program and how the program meets those needs.[13]
4. That all students are exposed to the required program level outcomes, and that a reasonable percentage accomplishes them.
5. The program possesses adequately trained and qualified faculty, resources, and institutional support.[14]
6. The program has a mechanism to gather data from students, advisory boards, and other constituents in order to engage in self reflection and continuous quality improvement.

In this fashion accreditation serves to guide the curricular development of a program over time (as well as provide a template for newly developing programs), which requires programs to have a mechanism in place whereby they consistently monitor the needs of their constituents, assures degree integrity, and helps to delegitimize "diploma mills." Although not the only method to achieve these goals, specialized accreditation constitutes a time-tested and generally accepted methodology to help ensure the validity of a degree. Indeed, outcomes-based program accreditation preserves, protects, and disseminates the intellectual core of any profession that undergoes the process. By *any* profession, the authors seek to underscore the efficacy of an accreditation process to disciplines across the spectrum of intellectual endeavor. One need not to become an engineer, for example, to benefit from the focus, methodology and intellectual quality that accreditation brings to the process of developing a curriculum.

Outcomes-based Education in Curriculum Development

The field of education has long recognized the principles and theories of outcomes-based education (OBE), which emphasize result-oriented thinking. Outcomes-based education, or as it is sometimes called, standards-based or performance-based education, is not new. OBE has been referred to as standards-based education, since it essentially creates specific, concrete, measurable standards in an integrated curriculum framework. These standards then apply across the curriculum of a degree program. Traditional curricula may have been more subject-based in the past; however, the transition to more competencies-based approaches is beginning to take place within the university sector as a whole.[15] In the last ten years, academic accreditation has evolved and has moved away from a rigid process orientation (i.e., a required list of courses) and instead has moved toward a set of outcomes that represent behaviors, skills, and knowledge practitioners need to possess in order to function in their profession.[16] As such, outcome-based programs are incentivized to work in closer partnership with their professional constituents and to concentrate on teaching/evaluating their students on things that matter to practitioners. The presumption with such outcomes-based accreditation in higher education is that it is a powerful means of ensuring degree integrity and quality.[17]

One study that examined the future directions of higher education showed that core competencies are being used to redefine and shape outcomes-based curricula across many academic degree programs in recent decades[18]. While developing a core competency model for a graduate degree program, Judith Calhoun and others found that educators across diverse disciplines agree that competency- or outcomes-based education can improve individual performance, enhance communication and coordination across courses, and provide an impetus for curriculum development.[19] According to Jack Lohmann, universities and colleges throughout the United States are increasingly being required by accreditation organizations to demonstrate that they have appropriate self-regulating processes in place to assure that they are achieving their stated missions and goals.[20]

Based on the review of current literature discussed above, we felt that the educational concept of OBE can be a valuable tool in the training of undergraduates in the field of homeland security, because it focuses on the outcome of the education (what knowledge, skills, and abilities the graduates have earned) rather than on the input to the education. In order to develop measurable program-level outcomes in a homeland security undergraduate degree, our study examined the model used by the Accrediting Board for Engineering and Technology (ABET), the largest, most established accrediting body in the U.S, as an exemplar.

Recognizing the need to teach graduates the knowledge, skills, and abilities that are tied to program-level outcomes, ABET adopted the new set of standards in 1996, called *Engineering Criteria 2000*,[21] which shifted the basis for accreditation from inputs (such as what is taught) to outputs (what is learned). In 2002, ABET commissioned a study to assess whether the implementation of its new evaluation criteria , known as EC2000, had the intended effect of implementing an outcomes-based education methodology that led to improved student learning outcomes. As the first national study of an OBE accreditation model, the ABET EC2000 report indicated clearly that the implementation of the outcomes-based accreditation criteria had a positive, substantial, impact on engineering programs, student experiences, and student learning.[22]

This ABET report provides empirical data that validates the success of implementing outcomes-based curricula for an engineering degree program. Likewise, we believe the development of a homeland security degree program can benefit equally from incorporation of OBE into its curricula and subsequent accreditation standards. Hence, our study posits that there should be baseline standards for an academic homeland security curriculum, and that these standards should be based on measurable, outcomes-based, program-level requirements.

Several studies have addressed the issue of graduate preparedness for entering the workplace.[23] These studies show that employers are increasingly looking for transferable knowledge and skills. Transferable in this context means that knowledge, skills and abilities (KSAs) acquired while in the university are, to the largest extent practicable, directly applicable to the needs of the homeland security field. Today's employers in the field of homeland security/homeland defense recognize the value of employees who bring a validated set of KSA to the field of homeland security, and are willing to reward those skills with higher starting pay.[24]

Quality education demands a process of continuous improvement by systematically and collectively evaluating and refining the system, practices, and culture of educational institutions in order to meet the needs of the customers and constituents. This is certainly true in the dynamic field of academic homeland security, where missions, policies, and doctrines are subject to change as new threats emerge and successive administrations grapple with asymmetric terrorism and natural disasters. As a pedagogical tool, outcomes-based education can be used to reshape accreditation and certification across the discipline of academic homeland security, making certain that graduates of a homeland security program are equipped with the KSA to deal with emergent threats.

METHODOLOGY

In the absence of a vetted and published set of accreditation outcomes concentrated on the practice of homeland security and maintained by an association that represents the homeland security profession, the authors determined that an expert panel could be used to develop a robust set of student learning outcomes. A panel of subject matter experts (SME) was formed by contacting eight homeland security professionals with extensive educational and professional credentials across a wide range of topic areas including emergency management, homeland security law and policy, terrorism studies, critical infrastructure and risk analysis, state and federal law enforcement, strategic planning, military planning and operations, and homeland defense. The eight panelists represented a cross-section of expertise and experience in a variety of areas involving homeland security. Some offered multiple areas of expertise, such as the Circuit Court judge who spent thirty-seven years as a JAG Officer in the Navy before retiring as a Captain, O-6, and was able to provide valuable comments in areas involving both civilian-centered criminal justice and issues pertaining primarily to the military. Together, the eight panelists combined to have 120 years of experience in homeland security. (See Appendix 1 for a short biographical sketch of each panelist.)

The Delphi Technique[25] was employed as the means to develop consensus among the SME. A web-based survey instrument was used to deliver information and collect responses from the panel. The Delphi Technique presumes each member proceeds from

a common platform and common vocabulary.[26] Hence, the authors provided working definitions for the terms "academic homeland security," "educational objective," "core academic area."[27] Prior to the start of the survey process, an orientation packet consisting of sixteen pages of information was sent to each panelist. The packet was intended to facilitate a common understanding among all panelists. Items included characteristics of the Delphi Technique, how panelists were to use the online survey to submit their opinions, a list of basic accreditation terms and concepts, principles of adult learning and outcomes-based education, and a primer on Bloom's taxonomy to aid in restating their ideas into the format of a student learning outcome.

For the purpose of this study, the following questions were put to the panelists:

1. Given the breadth that exists in the practice of homeland security, what would constitute a set of core academic areas that would capture the essence (for an undergraduate student) the intellectual core of the field and the broad practice areas of the field? (Here, consensus was sought on both the area and the definition of the area).
2. What would constitute a set of educational objectives and overall program outcomes; that is, outcomes common to all undergraduate degree programs in homeland security? (Here consensus was sought on developing the set of objectives and overall outcomes).
3. What would constitute a set of student learning outcomes for each core academic area identified in step 1 above? (Here consensus was sought on developing a set of outcomes under each core area).

The Delphi Technique

To cost-effectively address the above questions using a panel of experts from around the country, the Delphi Technique was adapted to an online (web-based) format from 2007-2008 using a secure web portal that contained the survey items. Panel responses were entered online and the completed survey electronically submitted to the authors for review and evaluation.

Specifically, the web-based Delphi process proceeded in rounds that included several iterations per round. The Delphi process was split into two rounds with round one concentrating on developing consensus on educational objectives and a set of core academic areas, including definitions for each core area. Round two was focused on developing consensus on student learning outcomes. Prior to initiating round one, the panel of SME was emailed a package which provided instructions including how to log on to the secure server, how to submit results, a reminder of how the Delphi process worked, and the focus of each round, the idea that consensus would be determined when six of eight panelists agreed, the precise obligations the panel had for each iteration, and a timeline for completion. Following the first iteration of round one, the instruction note for all subsequent iterations and rounds also included an update and summary of progress to date.

With the objective of providing the SME a place to start, and utilizing the fact that the Delphi Technique accomplishes consensus through a series of iterations, round one presented a starter set of educational objectives and core academic areas of homeland security developed by the researchers. Similarly, and after consensus was reached in round one regarding a working set of core academic areas, round two presented a starter

set of overall student learning outcomes (that is, outcomes not tied to a specific core area such as writing, or research, or oral presentation outcomes, etc.) and a starter set of learning outcomes for each core area. In each round, once submissions from each panelist were received, all suggested comments and changes were integrated into the survey instrument. The survey was then re-sent to each panelist for comment. Thus, and through a series of iterations, consensus was sought and gained. Hence, the Delphi process used in this study consisted of the following three steps:

1. Iteratively develop a consensus on what should constitute a set of educational objectives for an undergraduate program in homeland security.
2. Iteratively develop a consensus on what should constitute a set of core academic areas, and definitions for those areas, that represent broad practices in homeland security.
3. Iteratively develop a consensus on what should constitute a broad set of program-level outcomes for an undergraduate degree in homeland security (both overall outcomes and outcomes for each core academic area).

RESULTS

Recall that this study aimed to produce both educational objectives and student learning outcomes. Educational objectives are considered statements that describe the career and professional accomplishments that the program is preparing its students to achieve and are based on the needs of the constituents. These are typically exemplified by graduates five to ten years after graduation. Core academic areas of homeland security are considered major functional areas of homeland security which correspond to an extant academic discipline.

At the conclusion of the Delphi process, consensus was reached by the panel on three sets of results. First, the panel identified educational objectives (EO) for the program. Second, the panel identified six overall (or general) program-level outcomes (OA); that is, student learning outcomes that are not part of a core academic area. Finally, the panel agreed on eight "core" academic areas, including definitions of each area, within the academic discipline of homeland security, along with student learning outcomes in each area. In addition, two areas of concentration (twelve credits beyond the core) were developed from panel comments about the need to offer some depth to the curriculum. The two concentrations included emergency management and terrorism studies.

Table 1 displays the educational objectives derived from the Delphi Technique, Table 2 the general outcomes, and Table 3 the core academic areas, their definitions and the student learning outcomes for each area.

Table 1: Educational Objectives for an Undergraduate Degree in Homeland Security

EO 1	Instill in our graduates skills, knowledge and abilities appropriate to the profession of homeland security.
EO 2	Infuse each graduate with a desire to be a lifelong learner and to pursue subsequent degrees or other professional certifications appropriate to the profession of homeland security.
EO 3	Instill an appreciation of one's civic duties and responsibilities to society.

General Program Outcomes

General, or overall, program outcomes are those knowledge, skills, and behaviors that all graduates of the homeland security program should achieve and which are not tied to a specific or core academic area. Table 2 lists the eight general outcomes derived from this study.

Table 2: General Program Outcomes (GO) for an Undergraduate Degree in Homeland Security

GO 1	Apply homeland security concepts in a non-academic setting through an internship, cooperative, or supervised experience to include real-world experiences, strategies, and objectives.
GO 2	Gain an understanding of professional ethics and how they apply in the field of homeland security.
GO 3	Demonstrate the capability to utilize and evaluate analytical data applicable to homeland security.
GO 4	Demonstrate the ability to conduct research, compose a research paper, and deliver professional presentations and briefings in order to develop and refine analytical abilities.
GO 5	Identify, describe, and critically evaluate applicable homeland security technologies.
GO 6	Ability to demonstrate effective communication; especially in ways applicable to homeland security (e.g., policy analysis, briefings, strategic or risk communications, etc).
GO 7	Demonstrate the ability to work in teams.
GO 8	Demonstrate knowledge of contemporary or emergent threats, challenges or issues.

Core Academic Areas (CAs) & Student Learning Outcomes

Table 3 summarizes the eight core academic areas comprising undergraduate study in homeland security.

Core Academic Areas and their Associated Student Learning Outcomes		
	Core Area & Definition	**Associated outcomes – Each student will possess a demonstrated ability to or knowledge of:**
CA 1	**Intelligence -** *A systematic process of collection, analysis, and dissemination of information in support of national, state, and/or local policy or strategy.*	1) The intelligence and counter-intelligence concepts, to include the collection, analysis, and dissemination of intelligence data both within the US and internationally. 2) The organization and mission of the federal Intelligence Community, state and local intelligence agencies within the US, private/corporate sector intelligence efforts, and selected components globally. 3) Synthesize fundamental intelligence concepts while understanding their variables, limitations, and shortcomings.
CA 2	**Law & Policy -** *Legal and policy formulations that provide the basic direction of homeland security means and objectives and establish a context for homeland security within the broader purview of national security.*	4) Legal and constitutional principles and their application in the area of Homeland or National Security law and policy. 5) Case law, precedential, and court decisions relating to and having an effect upon homeland security policy and law.
CA 3	**Emergency Management -** *The process of coordinating available resources to deal with emergencies effectively, thereby saving lives, avoiding injury or illness, and minimizing economic losses. This protection process involves four phases that are reinforcing and mutually dependent: preparedness, response, mitigation, and recovery.*	6) Emergency management and response concepts, phases, and procedures across the range of homeland security challenges. 7) Entry-level emergency operations, training and exercises, to include all levels of emergency management exercises.
CA 4	**Risk Analysis -** *A systematic method of identifying the assets (e.g., critical infrastructure and key assets) of a system, the threats (i.e., strategic, political, economic, technological, or cultural) to those assets, and the vulnerability of the system to those threats in such a way as to be able to quantify threats and their consequences to a system for the purpose of developing appropriate countermeasures.*	8) Risk analysis principles, processes, and techniques, in both the public and private sectors. This includes knowledge of an all hazards approach to risk analysis and infrastructure protection. 9) Threat, vulnerability, consequence, and critical infrastructure analysis. 10) Basic industrial security principles.

CA 5	**Critical Infrastructure -** *Systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of these assets.*	11) The evolution and basic principles of critical infrastructure, in both the private and public sectors vital to their community, state or the nation. 12) Identify critical infrastructure and key assets, and apply appropriate counter measures using a risk-based methodology. 13) Compare and contrast private sector and governmental responsibilities in the area of critical infrastructure/key asset identification and protection.
CA 6	**Strategic Planning -** *the process of defining an organization's strategy (a long term plan of action designed to achieve a particular goal or objective) or direction and making decisions on allocating its resources to pursue this strategy, including its capital, its technology and its human resources.*	14) Applicable national strategies and plans, including their history, inter-relationships, similarities and differences. 15) The strategic planning interface between national, state, and local governments. 16) Basic principles underlying strategic planning, and identify these principles as they apply to the national strategy for homeland security.
CA 7	**Terrorism -** *The threat of violence, individual acts of violence, or a campaign of violence designed primarily to instill fear. Terrorism is violence for effect: not only and sometimes not at all for the effect on the actual victims of the terrorists' cause. Fear is the intended effect, not the by-product of terrorism.*	17) The history and basic concepts of global terrorism to include groups, ideologies, and underlying causes. 18) Specific types of terrorism (e.g., state-supported, transnational, domestic, international) including their similarities and differences. 19) The conceptual aspects of counter-terrorism, counter-terrorist activities, and outcomes and be able to identify and describe examples of these concepts.
CA 8	**Environmental Security -** *a process for effectively responding to changing environmental conditions that have the potential to destabilize the political economy or governmental infrastructure of a nation or region which reduces peace and stability and thereby affects US national security.*	20) Basic environmental health principles to include: geochemical cycling, population dynamics, aspects of air, water and land use, food production, environmental economics, and the human impact on the environment. 21) Destabilizing influences and potential security implications from anthropogenic causes, climate change, natural disasters, and hazards.

Table 3: Core Academic Areas and their Associated Student Learning Outcomes

CONCLUSIONS

Using an external advisory panel of eight subject matter experts, this study developed the intellectual infrastructure for an undergraduate degree in homeland security. Specifically, the study achieved a consensus set of educational objectives, overall program outcomes, core academic areas, and twenty-one student learning outcomes distributed across the core areas. Consensus was accomplished using an online Delphi

Technique and a secure web portal to receive respondent submissions. The results demonstrate the utility of an online Delphi process in identifying a set of core academic areas that an institution might consider in developing a homeland security curriculum.

The results further provide a baseline from which the same technique – albeit comprising larger sets of SMEs aligned on a national scale and representative of a larger professional cross section of the homeland security enterprise – might identify core academic areas applicable to the field on a national level. In turn, the results provide a basis for a set of master course outlines from which a core curriculum in homeland security can be designed. In addition, the results provide a basis for areas of concentration within the homeland security program as well as a mechanism for the continuous quality improvement of a homeland security curriculum.

Interestingly, these results have some degree of convergent validity as seen from the Winegar study in 2008,[28] which was conducted nearly a year later. In a national survey of homeland security programs, Scott Winegar identified thirty main topics taught in homeland security programs. He went on to identify the relative frequency with which homeland security programs offered each topic. Not surprisingly, terrorism was the most frequently cited topic taught, followed by emergency management, strategic planning, risk analysis, and intelligence. Our current study also identified as core academic areas environmental security and homeland security law and policy which were not explicitly identified by Winegar.[29] Although the Winegar study employed a larger sample size, it seems reasonable to include homeland security law and policy as a core academic area. The SMEs used in the current study were specifically tasked to identify core academic areas, whereas the Winegar study surveyed what already existed in academia, and did not query SMEs about what they thought should or should not be core areas in homeland security curricula.

For this project, the panelists concentrated on the knowledge, skills and abilities they believe are essential to entering generalists in the practice of homeland security. However, they did not offer suggestions on the learning level undergraduate students should acquire, as this was not included in the tasking. For example, outcomes can be integrated into curricula at very basic levels (e.g., using Bloom's taxonomy this would be "to understand, recognize, or demonstrate") or at more complex levels (e.g., a more advanced learning level would be "to evaluate, analyze, or synthesize"); and should students acquire a given outcome at the relatively low level of "understanding" or "demonstrate" versus at a relatively higher level, such as "evaluate" or "analyze"? Hence at the conclusion of the Delphi Process, the authors met to decide the learning level for each outcome identified. For example, Student Learning Outcome 21 under Core Area 8 above states:

> 21. Destabilizing influences and potential security implications from anthropogenic causes, climate change, natural disasters, and hazards.

To be used as a student learning outcome in an undergraduate academic setting, it might be better stated as:

> 21. Students demonstrate the ability to describe and identify destabilizing influences and potential security implications from anthropogenic causes, climate change, natural disasters, and hazards.

Moving Forward

Security threats to the U.S. are complex and ever-changing. Consequently, academic homeland security will struggle for some time about which outcomes should be taught to best prepare graduates. Similarly, whether or not there's a common identity or definition of the enterprise will also take time to sort out. Though research presented here and the Winegar study suggest that there is no minimum set of outcomes common to all academic homeland security curricula (at least to the extent observed in medicine, law, engineering, etc. curricula), there does appear to be some degree of consistency across programs regarding the major topics taught even without the influence of accreditation. As such, we suggest that researchers/educators, policy makers, employers, and practitioners of homeland security work together to improve the body of knowledge with basic and applied research, and to identify best practices that have built-in flexibility enabling them to adapt to the characteristics of the environments in which homeland security occurs.

The degree to which the core areas identified in this study (and hopefully other subsequent studies) are applicable to U.S. national security strategies and the elements of national power might further define both the academic as well as the homeland security disciplines. Given the relatively small number of panelists, and the fact that their collective expertise, though impressive, did not reflect all operational areas of homeland security, what remains to be demonstrated is the degree to which these outcomes/core areas possess construct validity; that is the degree to which the outcomes identified really are representative of the skills, knowledge and behaviors practitioners need to have to function appropriately.

Ultimately, for academic homeland security to mature we would observe that there needs to be some mechanism that would identify and vet the outcomes and best practices needed by employers of homeland security graduates, and which should be taught in academic programs.[30] A less structured approach to homeland security education seems at best to be inefficient, and at worst dangerous. In addition, this set of outcomes would not represent the entire curriculum, but rather a minimum set of outcomes which would allow each program the flexibility to specialize its curriculum according to the desires/talents of its faculty and needs of its constituents. We would further argue that it is critical to obligate homeland security programs to engage in some sort of continuous quality improvement process that would cause programs to partner with employers, practitioners, and other constituents so that best practices and changes in the body of knowledge over time are reflected and integrated into the curriculum.

We acknowledge that there remain several empirical questions that might guide future work on homeland security program development. For example, at what point in the evolution of the homeland security enterprise could one derive a core set of student learning outcomes that can guide academic program development? What should that core set of outcomes be and are these similar to those identified in this study? Who should manage them and how should they be vetted? How often should they be reviewed, updated, modified? Should accreditation exist and if so, should it be mandatory for all homeland security programs? If so, how best would this be accomplished? Should the Federal government mandate it through legislation (e.g., the OSHA model for performance-based safety standards) or should states regulate the practice of homeland security via licensing at the state level (e.g., the engineer model)?

Addressing these questions is difficult for any profession, let alone an emergent one as complex and dynamic as homeland security. In part, this study is an attempt, not to necessarily provide definitive answers to the above issues, but rather to frame an ongoing dialogue through developing and asking the proper questions.

Jim Ramsay is professor and coordinator of the Homeland Security Program at Embry-Riddle Aeronautical University and currently serves as the accreditation coordinator for the Homeland Security Defense Education Consortium Association. He is a charter member of the Academics Practice Specialty within the American Society of Safety Engineers (ASSE), and is also the chair of the ASSE Educational Standards Committee. Dr. Ramsay earned his Ph.D. in Industrial Engineering and Preventive Medicine from the University of Wisconsin. Dr. Ramsay may be contacted at ramsa301@erau.edu.

Daniel Cutrer is an assistant professor of homeland security at Embry-Riddle Aeronautical University. Mr. Cutrer has over thirty years of service in the United States Coast Guard; his final assignment was as the Commanding Officer of the Aviation Technical Training Center where the service trains all of its aircraft mechanics, technicians, and rescue swimmers. He has taught homeland security courses at the ERAU main campus in Daytona Beach for the last four years, and is currently in the last stages of the dissertation phase for a Doctor of Philosophy in Business Administration (specialization in Homeland Security).

Robert Raffel is an associate professor in the Homeland Security Program at Embry-Riddle Aeronautical University. Prior to teaching, he worked as senior director of public safety for the Greater Orlando Aviation Authority (GOAA), as a program manager with the Office of Civil Aviation Security with the Federal Aviation Administration (FAA), and as FAA's federal security manager to the Orlando International Airport. Mr. Raffel earned his Bachelor of Arts degree at New York University and his J.D. at the University Of Maryland School Of Law.

APPENDIX

Composition and Short Biosketch of the Delphi Panel of Subject Matter Experts (SME)

Panelist # 1 is an active-duty colonel in the U.S. Army National Guard. She served as commander, U.S. Army Mobilization Augmentation Command, and has held positions as the National Guard/Reserve advisor to the president of the National Defense University (NDU). She also served as the director of the Joint Reserve Affairs Center of the National Defense University. Prior assignments included senior guard advisor to the Pentagon's Joint Staff J4, and commanding officer of the 40th Forward Support Battalion, 40th Infantry Division. She is currently serving her second tour in Iraq.

Panelist # 2 is the director of support for headquarters, Ohio Air National Guard, coordinating policy, guidance, and strategic planning for the 5,000-plus member Ohio Air National Guard. In addition to twenty years of service as a traditional guardsman, he has served in full-time staff positions with the National Guard Bureau, Joint Chiefs of Staff, U.S. European Command, and Office of the Secretary of Defense (OSD).

Panelist # 3 is a Planner II with the Volusia County, Florida Division of Emergency Management. Prior experience in the U.S. Army, and as an emergency management consultant includes emergency preparedness and response; physical, operational and travel security; and crisis communications. He has developed and written state-mandated Comprehensive Emergency Management Plans and Domestic Terrorist Incident Response Plans, which included detailed table-top and full-scale exercises.

Panelist # 4 serves as the associate judge, Prince George's County, Maryland Circuit Court, 7th Judicial Circuit. With thirty-seven years in the Naval Reserve, he is a retired U.S. Navy captain and served as a senior reserve military judge and judge of Military Court of Criminal Appeals. He is also a fleet professor (National Security Decision Making) at the U.S. Naval War College.

Panelist # 5 was the deputy director of the Central Florida High Intensity Drug Trafficking Area (CFHIDTA). He worked for the U.S. Department of Homeland Security from 2002 to 2006, serving as the assistant federal security director of law enforcement for the Orlando, Sanford, Daytona, and Melbourne International Airports, and acted as the chairman of the Transportation Committee including rail, aviation, seaport, and trucking modes. He also served over twenty years in the Drug Enforcement Administration (DEA) and retired from that organization as special agent in charge (SAC) of the Orlando Field Office.

Panelist # 6 is a director in the Strategy, Forces and Resources Division of the Institute for Defense Analyses (IDA). He is the principal author of the DOD's Homeland Defense and Civil Support (HD&CS) Planning Scenario, a comprehensive approach to identifying and providing technology and system solutions for homeland defense. His prior experience was in the U.S. Navy and included serving as military assistant to the secretary of defense and special assistant to the director of central intelligence.

Panelist # 7 is an internationally recognized specialist in the study of terrorism. He has authored and co-authored a number of texts on the subject and is a leading expert on the subject of Red Teams. He has also worked as a consultant for the firm of Booz Allen Hamilton. He is a professor emeritus at the University of Oklahoma, and is currently the Lawrence J. Chastang Distinguished Professor of Terrorism Studies and a university professor and fellow in the Office of Global Perspectives at the University of Central Florida.

Panelist # 8 is a senior executive service-level member of the Transportation Security Administration (TSA). She has been instrumental in establishing baseline security standards and implementing risk reduction methodologies associated with modal transportation. Much of her work has involved the establishment of cooperative measures with industry. Prior positions included work in the Federal Aviation Administration (FAA) as a security policy analyst and as an independent contractor for the Immigration and Naturalization Service.

[1] "Homeland Security Education Directory," *HS Today* (2007): 4, 5, http://hstoday.us/images/stories/directories_images/hst_2007_fall_edu_dir.pdf?hpMyAdmin=19c47a3f42ft55517c52:E1-E24.

[2] Scott Winegar, "Developing the Bench: Building an Effective Homeland Security Undergraduate Program" (master's thesis, Naval Postgraduate School, 2008), 1.

[3] John Rollins and Joseph Rowan, "The Homeland Security Academic Environment: a Review of Current Activities and Issues for Consideration" (Homeland Security and Defense Education Consortium (2007), 11, http://www.hsdec.org/downloads/springsym07/Rollins2.pdf.

[4] Winegar, "Developing the Bench," 4.

[5] Ibid.

[6] The authors fully appreciate that homeland security is an ill-defined discipline. Indeed, it's precisely this amorphous and poorly defined structure that led to this study. The main question facing academics was what to teach undergraduates wanting to enter the field of homeland security. The authors are not suggesting that there is one intellectual center of gravity to homeland security, or even that the collective set of core areas/outcomes resulting from this study presents a complete picture of the discipline. Rather, that with no other curricular guidance, this was a more responsible way to start than guessing.

[7] HSDEC has an unpublished history. The authors acknowledge the extensive contributions to this section by Dr. Stan Supinski, director of the University and Agency Partnership Initiative, Naval Postgraduate School, Center for Homeland Defense and Security, who is widely attributed with starting and building HSDEC.

[8] Council for Higher Education Accreditation, "The Fundamentals of Accreditation" (September 2002), www.chea.org/pdf/fund_accred_20ques_02.pdf.

[9] Judith S. Eaton, "An overview of U.S. accreditation," *The Chronicle of Higher Education Almanac, 2005-2006* LII, No. 1 (2006): 3-11.

[10] Dennis Hudson, American Society of Safety Engineers (ASSE), personal communication with authors, March 25, 2010.

[11] Accrediting Board for Engineering and Technology (ABET), *The Basics: Accreditation Assures Quality* (2010), http://www.abet.org/the_basics.shtml; Liaison Committee on Medical Education (LCME), *Functions and Structure of a Medical School: Standards for Accreditation of Medical Education Programs Leading to the M.D. Degree* (LCME, June 2008), http://www.lcme.org/functions2008jun.pdf; American Bar Association, *2009-2010 Standards and Rules of Procedure for Approval of Law Schools* (2010), http://www.abanet.org/legaled/standards/standards.html.

[12] The periodicity of outcomes modification is assumed to vary across disciplines as well and the authors are not aware of standardized time periods employed by one discipline or another wherein outcomes are reviewed. However, surely logic would dictate that for complex fields that are by nature dynamic and changing, such reviews would likely be consistent. In homeland security for example, the quadrennial defense review occurs every four years by law. To leverage existing knowledge of the field, and to create a logical and systematic basis for such reviews, the authors suggest that reviews of homeland security accreditation outcomes could be coupled to both the quadrennial homeland security and quadrennial defense reviews.

[13] In an accreditation sense, program constituents are those who are either directly, or sometimes indirectly, affected by the academic program. For example, constituents are commonly considered those who would employ graduates. In addition, constituents are also those who contribute to or otherwise influence the intellectual core of the profession. In the case of academic homeland security programs, constituents would include elements from both the public (e.g., TSA or the FBI or the military) sector as well as elements from the private sector such as consulting firms, security firms, and emergency management organizations.

[14] As far as the authors are aware, there is no uniform code published that dictates what program-level accreditation attempts to accomplish from one field to another. However, examples do exist from various

accrediting organizations such as ABET. This list was extracted from what is generally accomplished during ABET accreditation visits.

[15] G. Edgren, "Developing a Competence-Based Core Curriculum in Biomedical Laboratory Science: a Delphi Study,' *Medical Teacher* 28, No. 5 (2006): 409-417, doi:10.1080/01421590600711146.

[16] G. McNeir, "Outcome-based education: Clearinghouse on Educational Policy and Management," *ERIC Digest* 85 (1993), http://eric.uoregon.edu/publications/digests/digest085.html.

[17] R. Harden, J. Crosby, and M. Davis, "An Introduction to Outcome-Based Education: AMEE Guide No. 14," *Medical Teacher* 21, No. 1 (1999): 7-14, doi:10.1080/01421599979969.

[18] J. Lambrecht, "Business Education Delphi Study of Future Directions for the Field," *Delta Pi Epsilon Journal* XLIX, No. 1 (Winter 2007): 15-25.

[19] Judith G. Calhoun, K. Ramiah, E.M. Weist, and S.M. Shortell, "Development of a Core Competency Model for the Master of Public Health Degree," *American Journal of Public Health* 98, No. 9 (2008): 1598-1607, doi: 10.2105/AJPH.2007.117978.

[20] Jack R. Lohmann, *Designing, Developing, and Implementing an Outcomes-Based Assessment Program for Engineering Education* (2001), http://www.inee.org/events/icee1999/proceedings/papers/244/244.htm.

[21] ABET, *The Basics: Accreditation Assures Quality;* National Academy of Engineering (NAE), *The Engineer of 2020: Visions of Engineering in the New Century* (Washington DC: National Academies Press, 2004).

[22] ABET, *Engineering Change: A Study of the Impact of EC2000* (2006), http://www.abet.org/Linked%20DocumentsUPDATE/White%20Papers/Engineering%20Change.pdf; R. Collins, Engineering Graduate Preparedness for the Workplace: Employer Assessments of Outcome Based Education," UMI No. 3339098 (Dissertation and Theses ProQuest Information and Learning Company, 2008).

[23] A. Lizzio and K. Wilson, "Action Learning in Higher Education: An Investigation of its Potential to Develop Professional Capability," *Studies in Higher Education* 29, No. 4 (2004): 469-488, doi:10.1080/0307507042000236371; A. Lizzio, K. Wilson, and R. Simons, "University Students' Perceptions of the Learning Environment and Academic Outcomes: Implications for Theory and Practice," *Studies in Higher Education* 27, No. 1 (2002): 27-52, doi:10.1080/03075070120099359; O. Rompelman, "Practical Training and Internships in Engineering Education: Educational Goals and Assessment," *European Journal of Engineering Education* 27, No. 2 (2002): 173-180, doi:10.1080/03043790210129621.

[24] C. Marks, "Professional Competencies for the Master's Level Emergency Manager," *Federal Emergency Management Agency Higher Education Project* (Emmitsburg, MD: Emergency Management Institute, 2002).

[25] Chitu Okoli and Suzanne D. Pawlowski, "The Delphi Method as a Research Tool: An Example, Design Considerations, and Applications," *Information & Management Journal* 42 (2004): 15-29.

[26] Harold A. Linstone and Murray Turoff, eds., *The Delphi Method: Techniques and Applications* (New Jersey Institute of Technology, 2007), http://www.is.njit.edu/pubs/delphibook/index.html.

[27] To start the Delphi Process with the panelists, the term "homeland security" was defined as it appears on page three of the October 2007 National Strategy for Homeland Security as *"a concerted national effort to prevent terrorist attacks within the United States, reduce America's vulnerability to terrorism, and minimize the damage and recover from attacks that do occur* In subsequent rounds of the survey process, the term "homeland security" was modified by the panelists and defined as follows: *"Homeland security may be described as the term generally used to refer to the broad national effort by all levels of government - federal, state, local and tribal - to protect the people, and the territories of the United States from all threats and hazards both foreign and domestic."* Note that on December 17, 2003, HSPD-7 defined, *"The terms 'protect' and 'secure' mean reducing the vulnerability of critical infrastructure or key resources in order to deter, mitigate, or neutralize terrorist attacks."* The term "protect" is used as synonymous with "reduce vulnerability" more broadly than just infrastructure in the new *Strategy*.

Educational objectives are considered statements that describe the career and professional accomplishments that the program is preparing its students to achieve over time and are based on the

needs of the constituents and capabilities of the faculty. Educational objectives are typically exemplified by graduates five to ten years after graduation. In this study, the term "Core Academic Areas" of Homeland Security are considered major functional areas of homeland security which correspond to an extant academic discipline.

[28] Winegar, "Developing the Bench," 43.

[29] Ibid.

[30] Were academic accreditation to occur, likely criteria would include student learning outcomes for all three degree levels; that is, the associates, undergraduate, and graduate degrees. Ultimately, certificates, minors, and sundry other forms of homeland security education may also be vetted through a similar accreditation process as well. As described above, HSDECA replaced HSDEC as the leading association representing homeland security educators. As of this writing, HSDECA has reported that they are in the process of seeking recognition from the USDoE to conduct program-level accreditation at all three degree levels. The authors are unaware of any other professional association attempting to build an accreditation structure or process.