



Hacking for Defense[®] Educators Guide

1 IH4D Educators Guide v.8



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Dear Educator:

Welcome to Hacking for Defense® (H4D). This unique and forward-thinking educational model engages teams of university students to solve some of the nation's toughest national security and defense problems using Lean LaunchPad® principles. The H4D Educators Guide enables you, the educator, to adapt H4D to your university and curriculum as appropriate for a successful program.

H4D began as a full semester course at Stanford University in 2016 to test whether graduate students could tackle some of the toughest government problems and, in doing so, create vibrant and diverse ecosystems where government, academia, and industry build partnerships around problems, prototypes, and solutions. From this experiment, the not-for-profit Common Mission Project was created. Common Mission Project is a U.S. 501(c)(3) that supports the H4D curriculum for a nationwide partnership with the National Security Innovation Network (NSIN). With more than 80 U.S. government organizations and agencies acting as problem sponsors, H4D has sourced more than 500 – and growing – national security and defense problems.

We have learned a lot since the inception of H4D. In the spirit of Lean LaunchPad, we at Common Mission Project continually test our hypotheses, get out of the building to ask questions, and continuously iterate on the best possible H4D class. This Educators Guide is the result of our work to improve H4D for university classrooms continuously.

The H4D Educators Guide is designed to familiarize you, the educator, with the H4D university course, as well as introduce the objectives of the course, commonly used terms, a sample syllabus, important timelines, and the H4D ecosystem. We also include tips we have learned since offering the first class in 2016 and highlight Common Mission Project guidelines and policies.

H4D is offered at premier private institutions of higher education, large public universities, and small public and private universities at both undergraduate and postgraduate levels. One thing we observed is that the course means different things to different people – it is not just another university module. Rather, the course allows a new generation to contribute to the greater good by hands-on, real-world problem-solving of some of the toughest national security and defense problems we face. H4D pushes students beyond their comfort zones and stretches them intellectually and practically as they navigate the difficulties that naturally arise from working in multidisciplinary teams into an unfamiliar (to many) field at a faster tempo than what is common in most university classes. Government problem sponsors value the course for the perspective and ingenuity the students bring in responding to problems, often finding that input

from the student teams allows them to arrive at a not-yet-thought-of solution. Educators learn new methods of teaching and are exposed to government problems that can expand their research agendas.

We look forward to understanding what H4D means to you as an educator, to your students, and your university. Thank you for joining us as we work to make the world a safer place, one tough problem at a time.

~ Steve Blank, Pete Newell, and Joe Felter



Introduction to the Educators Guide

This guide gives you the necessary information to make H4D a success at your university. The supplemental H4D Reference Guide provides an in-depth look at Lean LaunchPad, the Mission Model Canvas, and a day-to-day teaching guide to support you and your university to run the H4D course.

Upon completion of the H4D Educators Course, you will receive access to a range of supplemental teaching materials to support the H4D curriculum.

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1. Rationale for the Pedagogy

1a. The Flipped Classroom

The “flipped classroom model” introduces students to the material before the scheduled class meeting time. Classroom time deepens the students’ understanding of the student teams’ problem through problem-solving activities and discussions facilitated by the educator. The student team’s “problem” is a scoped national security and/or defense problem statement written by the government problem sponsor and validated by H4D before being sent to the university.

H4D students primarily learn by doing. The course teaches students to apply skills while working on a real-world problem practically. The program does this by 1) teaching Lean LaunchPad theory outside of the classroom (in the form of online lectures, podcasts, articles, blogs, and videos), 2) applying the theory learned to the government problem outside of the classroom, and 3) using class time to present the results of applying theory and concepts to their defense problem. Instruction is in the form of feedback from the teaching team and peers to provide course corrections (either in their understanding of theory or to their problem specifically).

By using the flipped classroom model, student presentations are focused on feedback and discussion, where the student teams can apply the material learned each week to a real-world problem. This in-class discussion draws generalizable learning points from the specifics of each live case. These learning points are summarized and tied together to form the backbone of the pedagogical framework. Meaning, the Lean LaunchPad method draws its general framework from the specific experiences of the students. Discovery (the student team’s weekly interviews) becomes the core learning process in this approach, redefining how we teach entrepreneurship and problem-solving. H4D emphasizes *experiential learning* as the paradigm to engage the students in testing the hypotheses of their business models.

H4D students are not building a business during the class: they are testing hypotheses of a problem and information they learn from beneficiaries (those who either experience and/or benefit from the problem being solved). Their results will inform them and either validate or invalidate their hypotheses. Throughout the course, teams modify their hypotheses based on the discovery conducted. This exercise results in either bringing forward a government sponsor’s needs and industry needs in dual-use cases, or government-use-only cases. After, the student teams can decide if there is a worthwhile business to pursue by testing whether an idea has market value.

H4D replicates the experience of entrepreneurs trying to market an idea while improving national defense and security. As such, students have reported their H4D experience to be intense and chaotic at times but always rewarding. As instructors, you will push them harder than in any other class they take as they grapple with at-pace, real-world problem-solving. The educator's role is to inspire, encourage, and push the student teams. Much of this is derived from the type of feedback given to the students.

1b. Continuous Feedback Loop

H4D enables a *continuous feedback loop* between instructors and students as a way to simulate the intensity of a start-up and encourage and challenge the students to test their own hypotheses verbally.

The continuous feedback loop may be different from the feedback you provide in your teaching currently or provided in the past, but is a crucial part of this course. H4D considers the continuous feedback loop as an open conversation between the teaching and student teams in front of the class. The instructor initiates feedback by asking student teams to elaborate on their methods. The instructor then follows up with questions about why or why not that will contribute to the development of their solution. The discussion is not a one-sided weekly verbal assessment. Instead, the feedback is an interactive discovery of the student team's thinking and a way to guide without being prescriptive or directive.

H4D Feedback Tips:

- Feedback should encourage students to reflect on *what went wrong*, as well as what went right. It is natural for the student teams not to want to admit to failure in front of their peers and professors. However, admitting failure and what was learned from it is **essential** in H4D. Silicon Valley entrepreneurs inspired this type of feedback by the "fail early" ideas.
- Feedback should teach students to critically and honestly self-assess their work before they come into the classroom.
- Feedback should challenge students to confront their assumptions about a problem.
- Feedback should motivate students and push them to achieve.
- Students can and should learn from the other teams. Having open feedback allows students to learn from each other's mistakes and successes.

This feedback is crucial in shaping the students' work for the following week. It is one of the most important aspects of H4D and vital to the success of the student teams. Continuous feedback builds trust between the student teams and the

teaching team where students can experiment, research, fail, and succeed within an encouraging yet honest dialogue. Feedback relies on the subject matter expertise of the teaching team to enable the student teams to move around the Mission Model Canvas as they test their hypotheses.

It should empower student teams to recover quickly from failures and build their confidence so they can pivot, innovate, and create unique solutions.

Feedback should be:










- **Honest, not brutal.** The student teams cannot succeed without honest feedback. If they have missed the point, they need to know. If they pursued a wrong solution pathway, instructors need to redirect them. **They cannot reach a solution without honest feedback.**
- **Timely and immediately useful.** Feedback should be for that week's presentation of the student team's most up-to-date Mission Model Canvas. Feedback should avoid prescribing future possibilities and instead focus on the hypotheses presented.

2. Lean LaunchPad – A Primer

In this section, we provide a brief primer in Lean LaunchPad to familiarize you with the method and its applicability to H4D. As a formal method, Lean LaunchPad consists of three parts:

- The Business Model Canvas (we use an augmented version called the "Mission Model Canvas" used for mission-driven organizations) – to frame hypotheses,
- Customer/Beneficiary (used interchangeably) Development – to test those hypotheses in front of the customers and beneficiaries
- Agile Engineering – to build Minimum Viable Products to maximize learning

The foundation of Lean LaunchPad is evidence-based entrepreneurship. Rather than engaging in months of planning and research, entrepreneurs accept that all they have on day one is a series of untested hypotheses. Instead of creating an intricate business plan, founders in commercial firms summarize their hypotheses in a Business Model Canvas (BMC). Essentially, this is a diagram of all things a new venture will need to do to create value for itself and its customers, a visual framework that lets you look at all nine building blocks of a business. Business strategy and innovation expert Alexander Osterwalder developed this framework to organize new venture hypotheses in a more structured way.

The Business Model Canvas					Designed for:	Designed by:	Date:	Version:
Key Partners 	Key Activities 	Value Propositions 	Customer Relationships 	Customer Segments 				
	Key Resources 		Channels 					
Cost Structure 			Revenue Streams 					

Strategyzer.com

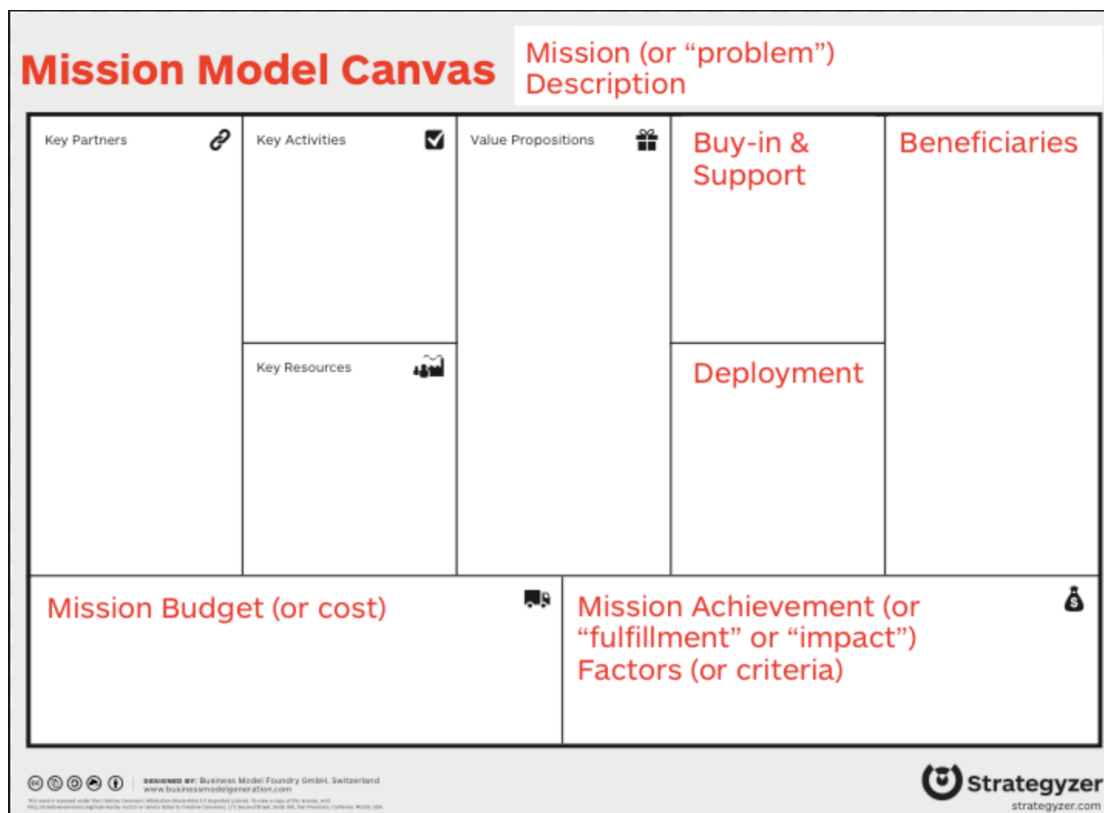
Successful entrepreneurial ventures are driven by the realization that there are no facts “inside the building.” It is imperative to get outside, ask, and learn. This “get out of the building” approach is called *Customer Development* or *Beneficiary Discovery*. It tests hypotheses and collects evidence to prove them right or wrong. Customer Development entails asking potential users, purchasers, and partners for feedback on all elements of the BMC, including product features, pricing, distribution channels, and affordable customer acquisition strategies. The emphasis is on nimbleness and speed. New ventures rapidly assemble Minimum Viable Products (MVPs), which immediately elicit customer feedback. By using customers’ input to test their assumptions, Lean LaunchPads start the cycle again by testing redesigned offerings and making further small adjustments (iterations) or more substantive ones (pivots) from ideas that are not working.

Lean LaunchPad ventures practice “Agile Development,” which originated in the software industry. Agile Development works hand-in-hand with Customer Development. Unlike typical year-long product development cycles that presuppose knowledge of customer/beneficiary problems and product needs, Agile Development eliminates wasted time and resources by developing a product iteratively and incrementally. It is the process by which new ventures create the MVPs they test.

2a. Key Terms and Tools

For this guide, we start with some commonly used terms within H4D: Mission Model Canvas, Minimum Viable Product, Value Proposition Canvas.

Mission Model Canvas (MMC) – The Mission Model Canvas is an augmented version of the Business Model Canvas (BMC) seen above. Lean LaunchPad creators Steve Blank and Alexander Osterwalder augmented the BMC for mission-driven organizations (e.g., government, non-profits), resulting in the Mission Model Canvas. Each component of the MMC contains a series of hypotheses the students will test each week. See the below MMC sample where in red are the boxes changed from the BMC to make the MMC unique.



The Mission Model Canvas is the model students will use throughout the semester to test, augment, or pivot from their various hypotheses. It is a “living” document that student teams will update weekly based on the intervening interviews and discovery conducted. The MMC serves as the basis for weekly student presentations. As students engage with the learning material and undertake beneficiary discovery, they will replace their initial hypotheses within the MMC. They should come to the first week, having fully populated the MMC to the best of their knowledge based on their hypotheses. Students will update their MMC weekly based on beneficiary discovery and newfound data.

Here is an example of how a student team populates an MMC and tests hypotheses.

Mission Model Canvas				
Key Partners <ul style="list-style-type: none"> - Gnip/Twitter - CrowdFlower, Samasource, or Mechanical Turk - Pre-existing social media service and micro-labor aggregators 	Key Activities <ul style="list-style-type: none"> - Categorize social media posts by content for monitoring and tactical purposes. - Understand viral potential of extremist social media posts in real-time. 	Value Proposition <ul style="list-style-type: none"> - Optimize workflow for social media analysts - Expedite categorization of social media content. - Use MechanicalTurk to crowdsource categorization of content. 	Buy-In/Support <ul style="list-style-type: none"> - Individual Analysts - ARCYBER - Continued partnership with crowdsourcing firms, CrowdFlower, Samasource, etc. 	Beneficiaries <p>ARCYBER wants to derive "meaning" from extremist social media presence.</p> <p>Primary: Intelligence analysts receive a better platform.</p>
	Key Resources <ul style="list-style-type: none"> - Access to Twitter firehose (Stanford academic license) - Arabic-speaking crowdsourcing staff. (Standard Arabic is sufficient.) 	<ul style="list-style-type: none"> - Algorithmic virality predictor to bubble up important, time-sensitive threats. - Build on design of now-defunct Palantir Torch to present content in a streamlined manner. 	Deployment <ul style="list-style-type: none"> - Architecture that can support massive concurrent data aggregation and analysis. E.g. Storm/Hadoop. - Testing with analysts 	<ul style="list-style-type: none"> - Moderate Muslim community benefits because extremist media is stunted. - General public benefits from more effective social media monitoring.
Mission Budget/Costs <ul style="list-style-type: none"> - MechanicalTurk or crowdsourcing labor (microtasks) - UI Development/Testing with CYBERCOM/ARCYBER analysts. - Software Development 		Mission Achievement <ul style="list-style-type: none"> - Force multiplier for intelligence analysts: receive cleaner, pre-categorized data, target the most urgent threats to national security in real-time. - Increase throughput to quantify and flag viral extremist content. - Improve the categorization of unstructured social media data points using crowdsourced micro-task labor. 		

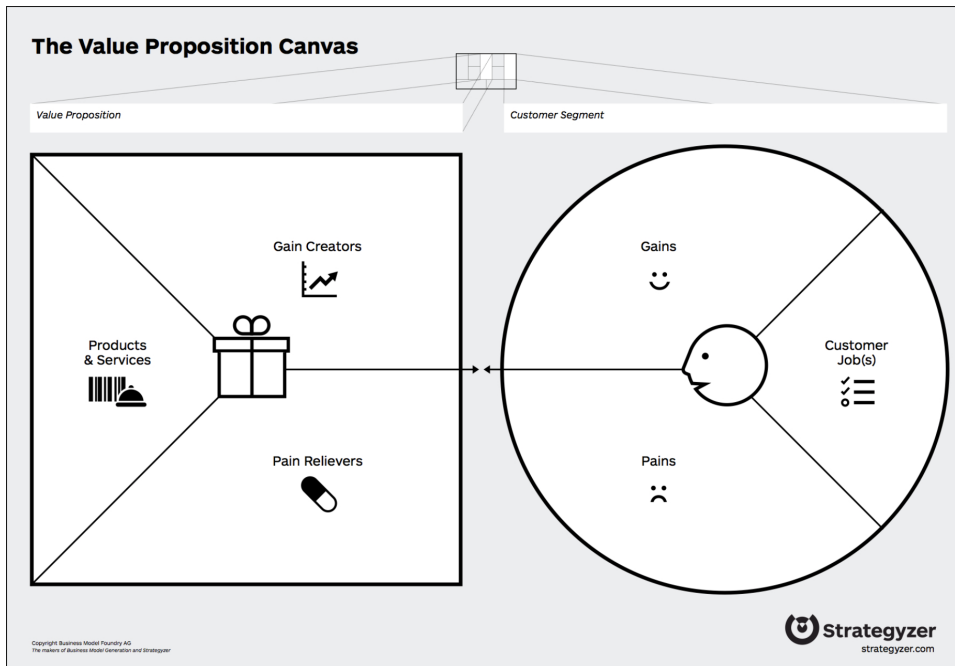
Minimum Viable Product (MVP) – A Minimum Viable Product is the product demonstrated to customers and beneficiaries, whose feedback will further develop and improve it. Often, an MVP can get confused with a prototype. However, an MVP is the minimum data needed to test a hypothesis. An MVP is not a prototype and does not require physical manifestations.

Prototype – An engineering tool created during the first stage of innovation, which is then tweaked based on test results and newfound data/information. Prototypes can be anything that makes a concept come to life: a sketch, a rough physical mockup, concept storyboards, etc.¹

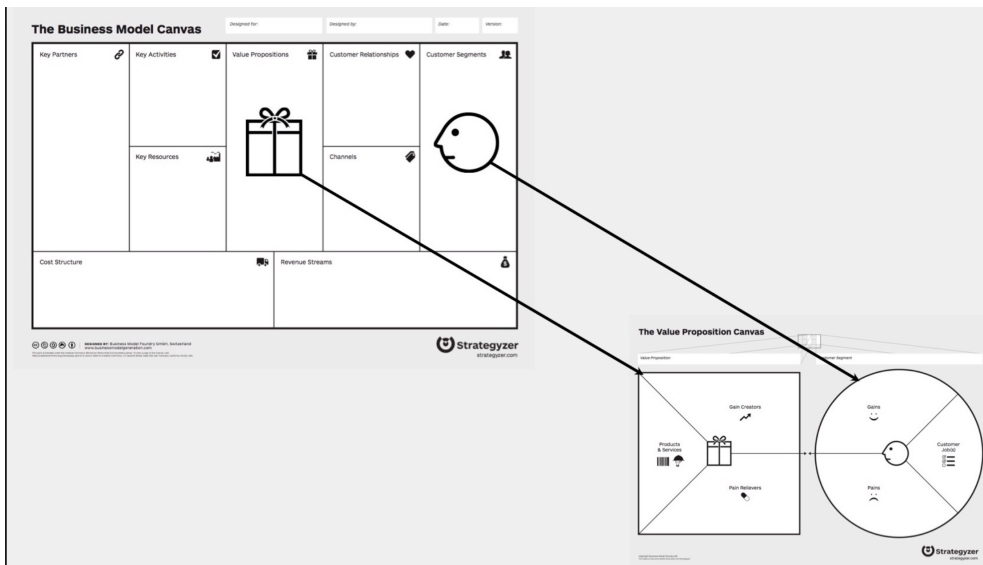
Value Proposition Canvas (VPC) – The Value Proposition Canvas summarizes the entire relationship (pros and cons) that beneficiaries have with a product. Because of the complexity of multiple beneficiaries, and to get greater detail about their pains and gains, Osterwalder added this additional canvas. Of all the nine boxes on the MMC, two important parts of the model are the relationship between the value proposition and the beneficiaries. These two components of the model are so important they are titled *Product/Mission Fit*. This block functions like a plug-in to the

¹ Lockwood, Thomas and Edgar Papke "Innovation by Design" Career Press, New Jersey (2018) p.23

MMC, zooming in on the value proposition to describe the interactions among these beneficiaries and the products/services in more detail.



Here is how a student team can plug the VPC into either the BMC or MMC:



3. H4D Aims and Key Learning Objectives

The objectives of H4D are for student teams to apply Lean LaunchPad principles toward solving a national security and defense problem, develop employment

skills critical to our world's future workforce, and gain hands-on experience of difficult problem-solving.

3a. Aims of H4D

- Create a generation of empowered and skilled university students eager to solve national security and defense problems.
- Build ecosystems around generating real solutions to national security and defense problems.
- Increase student awareness and familiarity with the work of the U.S. Defense and Intelligence Communities.
- Provide hands-on training using Lean LaunchPad methods to solve real-world problems.

3b. Key Learning Objectives

- Demonstrate an understanding of and the ability to apply the H4D method, rooted in Lean LaunchPad principles.
- Develop a strong understanding of the national security and defense domain.
- Develop and apply all of the following future workforce skills:
 - Complex problem-solving
 - Critical thinking
 - Creativity
 - Collaboration and teamwork
 - Judgment and decision-making
 - Cognitive flexibility
 - Negotiation
 - Building professional networks
 - Prototyping
- Develop and apply all of the following research skills:
 - Market research
 - Qualitative interviews
 - Qualitative data analysis
 - "White Paper" drafting
 - Implementing a research plan

3c. Instructor's Objectives

- Provide continuous and constructive feedback to student teams.
- To assess students on the application of Lean LaunchPad principles (not whether they develop a prototype or arrive at a solution).
- Apply the "flipped classroom" model to support students' hands-on, real-world problem-solving.

4. H4D Participants and Partners

H4D comprises the following participants:

- The H4D program team (NSIN H4D program manager, NSIN regional directors, problem sourcing and curation, and university and curriculum support)
- U.S. government partners
- Student teams
- Instructor team
- Government problem sponsors
- Government mentors
- Industry mentors

Each participant has a vital role to play in the success of H4D. What sets H4D apart from other hands-on university courses is the degree and range of feedback and support given from the instructing team, government sponsors, government mentors, and industry mentors. No other university offering across the United States provides this unique combination of participants in supporting students to solve real-world problems consistently.

4a. H4D Teaching Team

The right teaching team is vital to the success of the H4D student teams. The composition of the teaching team is the responsibility of the university, but H4D can provide support as universities set up their teaching team.

Instructors are responsible for teaching the students Lean LaunchPad methods and guiding them through the problem-solving process. H4D allows the teaching team to test the student teams' hypotheses presented each week continually. This testing requires subject matter expertise across either defense and security fields, Lean Startup, or a combination of both. The flipped classroom model requires less in-class lecturing, and instead, the ability of instructors to provide continuous and immediate feedback during student presentations. Instructors teach by speaking to either their methodology, the problem's subject matter, or any questions regarding the learning material. The Educator Course, Educators Guide, and supplemental materials enable those instructors unfamiliar with Lean LaunchPad and a flipped classroom approach to teach the course.

Tip: T.A. support to the instructor team is strongly recommended.

Tip: At times, it may be challenging to get in touch with a student team's government problem sponsor. Should this be the case, please immediately notify your H4D point of contact for program support.

4b. H4D Student Teams

The ideal student team is multidisciplinary, exposing students to different backgrounds and technical ways of thinking as they approach solving their problem. Student teams will develop how to manage their team members who possess different strengths/weaknesses, approaches, and knowledge to their own. This skill is critical and useful, especially for graduates entering the workplace. An example of a desirable student team is one comprised of four to five students from multiple disciplines such as engineering, business, social sciences, and the physical sciences.

The H4D Program Team encourages the university to vet student teams to determine fit as a unit and for the overall course. The government problem sponsors provide access to their own professional/government networks for the students to conduct interviews. Therefore, a degree of maturity and professionalism must be present both in the individual students and as a team. How the university recruits and vets their student teams is managed by the university. The H4D Program Team can provide guidance and support as the universities set up their first H4D course.

Tip: As student team formation begins, instructors need to emphasize the time commitment that H4D demands. Because student teams complete most work outside of scheduled class time, H4D requires more time and commitment than an average module. It would not be an ideal course for a student with two part-time jobs, for example. Not having time for the course will 1) detrimentally impact his/her teammates who are putting their time into the module, 2) put the instructing team, problem sponsors, and the university's reputation at risk by not doing the work, and 3) can jeopardize an entire organization from ever sponsoring a problem again.

Tip: The most successful teams can meet frequently and are the most diverse in terms of talent.

Weekly student blogs

A best practice is to encourage student teams to maintain a weekly blog. The weekly student blog is a way for the students to 1) keep track of and log their beneficiary discovery progress, and 2) allow the teaching team to track their progress and give feedback in between class presentations.

The student contribution to the weekly blog post will include:

- A weekly narrative of the beneficiaries they interviewed
- Hypotheses they tested
- Results they found
- Photos, videos, or other media regarding their meetings and interviews
- Changes to their Mission Model Canvas



team #gARGoyle h4d

Georgetown University Hacking for Defense Team Blog



Final reflections

As the Hacking 4 Defense course draws to a close, we are excited to present our final recommendations to our...



gARGoyle Week 11 Blog

Testing, testing, and more testing, yay! This week team gARGoyle conducted more experiments using the ODD FR AR glasses to...



gARGoyle Week 10 Blog

Interview #1-3 with Glen Thomas, Steve Brain and L. from Imagus! Main takeaways: Installing the FR software- The FR Imagus app...



Week 9 Update

Overview: This week we were able to refine our understanding of the JIDO procurement and deployment process. In addition, through...

Week 8 gARGoyle Blog

Overview: Overall, we were able to determine that desired features such as scanning through vehicle glass and combining many features...

Week 7 blog post

We hope everyone had a great spring break! Excited to share our blog updates below - especially narrowing our focus...

The H4D Program team has several suggestions for how universities can set up their students with the appropriate blogging platform. For example, the National Security Innovation Network can build a site for your class at no cost. Please visit innovatedefense.net/h4d for more information. This discussion should be done by the first class for students to begin their weekly blogs.

4c. Government Problem Sponsors

Government problem sponsors are people in the defense or intelligence community who experience a real-world problem they would like an H4D team to help solve. A problem sponsor provides his/her student team with 1) an initial understanding of the problem (e.g., what the problem consists of, why it matters, and to whom), 2) an initial list of interviewees to help the student team start, and 3) commits to supporting the students by meeting with them (either in person, virtually, or over the phone) for a minimum of one to two hours per week for the duration of the course. We also require sponsors to reply to the students within 36 hours of any communication.

All government problem sponsors must attend and complete H4D's Problem Sponsors Course. This course ensures that problem sponsors understand H4D, their required contribution, and the student teams' requirements and timelines. We require all government problem sponsors to provide the student teams with

no less than 15 names for the first 1-2 weeks of interviews. These names enable the students to build their network with the help of the problem sponsor without wasting valuable time trying to find interviewees.

H4D sources all government problem sponsors. Should any difficulties arise between the problem sponsor and the student team, please notify the H4D Program Team immediately for support.

Tip: Most problems are avoidable by the teaching team checking in with the problem sponsors regularly to give them updates.

Tip: The H4D Program Team recommends the student teams set up a free “Slack” channel and invite their government problem sponsor to join the channel. While we find Slack is the preferred platform for student teams and government problem sponsors to communicate, any commercial communication service that both the students and government problem sponsors are familiar and comfortable works; for example, WhatsApp. This communication platform enables real-time feedback and allows the government problem sponsor to meet his time commitment flexibly and efficiently. The platform also allows the government problem sponsor to keep track of the student team’s progress.

4d. Mentors

The H4D course relies on two types of mentors: government and industry. A **government mentor** is an individual familiar with the problem who is **not the problem sponsor**. The purpose of this mentor is to give a different perspective from how the problem sponsor (who “owns,” but can also experience the problem) may see the problem. This perspective is crucial to mitigate any “solutioneering” the problem sponsor may do (consciously or unconsciously) and serves as an additional resource for the student team’s beneficiary discovery. The government mentor also helps students understand and navigate the defense and security landscape. This government mentor may include helping student teams understand “military speak” and providing necessary background on certain stakeholders.

The second type of mentor is an **industry mentor**. Most industry mentors have experience working with Lean methods and can help students apply the Lean methodology. Input from an industry mentor can range from technical expertise on a student team prototype, to providing feedback on any potential “dual-use” applicability and how that may augment their MMC. While it is important for the student teams to talk to as many people who are as close to the problem as possible, it is equally important they understand how industry addresses similar

or analogous problems. Additionally, it is crucial to know what type of technology exists to support the student teams' development of MVPs.

5. Components of the H4D Course

5a. Characteristics of a Successful H4D Course

- Active communication and leveraging of resources with the H4D Program Team
- Approximately six teams per class, with no more than five students per team
- Multidisciplinary student backgrounds
- Teaching team comprised of 1-3 university instructors, and 1-2 TAs for support
 - Knowledge of national security, defense and/or Lean LaunchPad is helpful
 - Mentors from the university community can be invaluable course resources
- Committed government problem sponsor
- Committed government and industry mentors
- Appropriate match of student team backgrounds with nature of the problem to be solved

5b. Portfolio Assessment

The H4D curriculum was developed using a portfolio-based assessment that accommodates most universities' assessment requirements and enables the students to graduate from their degrees with a portfolio of work to support their employment efforts. Universities can adopt the full portfolio as a means of assessment or pick and choose from the below in a manner that best matches your university requirements.

The portfolio has five components:

- **Mission Model Canvases (MMC)** – At the end of the term, the student teams shall submit all versions (there should be as many as weeks in the university's semester) of their MMCs as one .pdf document, highlighting how the MMCs changed each week and what caused the changes.
- **Influence Map** – This is a one-page graphic charting the decision-makers, gatekeepers, supporters, and saboteurs around a problem. It draws from the student team's beneficiary discovery and the understanding they gain about the degree and location of influence surrounding the problem.

Often, this insight is new and valuable to the government problem sponsor.

- **Minimum Viable Product (MVP)** – This is what the students developed as a result of applying Lean LaunchPad principles over the semester. For some teams, it is an actual prototype, of which, past students formed a company to bring their product to market. For other teams, it is a solution that needs further work by the problem sponsor, or it can be a service or process that addresses/solves the problem. The MVP should accompany a one- to two-page write-up of the product, process, or prototype (if applicable).
- **Research Paper** – This written document combines all work the students did during the semester. It should include the problem statement, the team’s methodology (beneficiary discovery), obstacles faced and how they overcome them, the technical aspects of the problem and potential solution, and a path forward, if applicable. This paper can range from 10-15 pages, and the student team can write it individually or collectively. It is up to the university to decide how best to assess the students in line with its assessment requirements.
- **Record of Interviews** – The students are required to keep a record of everyone they have interviewed. A full semester course should have, on average, 100 interviews (for condensed courses, 40-60 interviews). Student teams should present interviews in a table format to include name, organization, title, date interviewed, and an email address. The “Record of Interviews” helps H4D sustain ecosystems around the problems and build greater bases of support for future H4D courses at the university.

Note: We require a final presentation by each student team to the government problem sponsor for completion of the course.

5c. Sample Syllabus

The sample syllabus below ensures that the fundamental principles of Lean LaunchPad and H4D are taught with enough flexibility for universities and teaching teams to accommodate their curriculum and assessment requirements while maintaining quality and consistency of H4D across universities. The syllabus indicates the topic for the student presentations under “Team Presentations.” The “Online/Pre-Lecture Reading” column indicates what topic areas the students will be required to become familiar with before that week’s presentation.

For example, we require students to read online materials regarding “Customer Discovery” (Customer and Beneficiary are used interchangeably in Lean

LaunchPad) before the first class. During the first class, they present their “First Mission Model Canvas & Beneficiary/Customer Discovery.”

Lesson	Online / Pre-Lecture Reading	Team Presentation
1	Beneficiary Discovery	First Mission Model Canvas & Beneficiary Discovery
2	DoD 101	DoD/IC 101
3	Beneficiaries	Mission Model Canvas
4	Value Proposition	Beneficiaries
5	Product/Mission Fit	Value Proposition
6	Dual Use	Product/Mission Fit
7	Mission Achievement	Dual Use
8	Buy-in and Support	Mission Achievement
9	Deployment	Buy-in & Support
10	Activities, Resources, Key Partners	Deployment
11	Mission Budget & Operating Plan	Activities, Resources, Key Partners
12	Reflections	Mission Budget & Operating Plan
13	Presentation Tips and Best Practices	Lessons Learned: Reflections
14	Final Lessons Learned Presentation	Lessons Learned: Final Presentation

Tip: Having a consistently scheduled class (e.g., Mondays from 9-10:30 am) provides needed structure for the student teams to have enough time to conduct interviews, update their Mission Model Canvases, and weekly student blogs. Less than a week between student team presentations means less beneficiary discovery (interviews), which is vital as teams work toward solutions.

5d. Important Timelines

Notional Timeline:

45 days before registration begins

- University markets H4D and accept student applications for the course

30-90 days before H4D begins

- Problem sets submitted to the university by the H4D program team

Before H4D begins

- Student teams must be formed
- Student teams choose their problem
- University hosts a “Mixer” where problem sponsors, government and industry mentors, and student teams meet for the first time. This event is important as it tests for a good fit between the student teams and problem sponsors.

Example Timeline:

The below timeline is based on a January 2020 Spring semester H4D start and incorporates what has worked well for the universities that currently run H4D. However, if the example below does not work with how your university schedules courses, we recommend sticking to the above general timelines to ensure mentors, educators, and student teams are prepared for H4D.

October	General problem sets shared with the university
Oct 14 – 28	University begins to market H4D course, opens applications <ul style="list-style-type: none"> • Flyers, newsletters, verbal in-class announcements, H4D will run two info sessions
Oct 28 – 31	Registration or application deadline for January 2020
Nov 1 – 8	Department/instructors select students for H4D <ul style="list-style-type: none"> • 5-6 teams of 4 recommended
Nov 8	Students notified of acceptance into H4D
Nov 11 – 15	Mixer held for students to meet and form teams
Nov 15	H4D sends university/instructing team finalized problem sets
Dec 15	University sends students their pre-reading
Jan 2020	H4D begins

5e. Other Course Components

Weekly student presentations - Weekly student presentations are at the core of the flipped classroom approach, allowing student teams to talk through their hypotheses with the support of the instructing team’s feedback. The student teams give the relevant presentation according to the syllabus. The H4D Program Team encourages an open classroom where the government sponsor and mentor and industry mentor are welcome to attend. This participation allows a diverse

range of feedback and provides robust support to the student teams as they grapple with difficult problems.

The weekly presentation time also serves as a chance for students to seek clarification about the learning material. This discussion should occur before the student presentations being.

Tips:

- The H4D Program Team recommends the teaching team require no less than ten interviews per week per student team as part of their beneficiary discovery. With fewer than ten interviews per week, teams will not have enough qualitative data to test their hypotheses.
- While seminar/lecture times vary across universities, the H4D Program Team recommends the weekly student team presentation to be no longer than 10-15 minutes. This short time frame helps the students maintain focus on the most salient insights that originated during their weekly interviews. The teaching team is encouraged to give feedback during the presentation.

6. H4D Policies

6a. Intellectual Property / Open Source Policy

Sharing

A key element of H4D is that we collectively learn by doing. Teams share their beneficiary discovery, the narrative of how their MMC evolved as they got out of the building, the details of the beneficiaries to whom they talked, and their MVPs. They share their weekly presentations with their peers and the public (e.g., their government problem sponsors and mentors).

On a case-by-case basis, the university may mutually agree to accommodate the interests of problem sponsors with some effort to sanitize presentations or restrict public access to certain materials. While the H4D Program Team sets expectations with problem sponsors during the Problem Sponsors Course that all student work for H4D is **UNCLASSIFIED** and potentially accessible by the general public, it is worthwhile to be open and transparent ahead of time with the problem sponsor about the nature of student teams' activities.

Note: Government problem sponsors may ask the students to take down final student team presentations posted on the university's website or the students'

blogs. While this is relatively uncommon, the H4D Program Team recommends working with the problem sponsor to address his concerns. If this occurs, please contact the H4D Program Team immediately for program support.

Intellectual Property

All intellectual property developed during the class (code, hardware, concepts, MVPs, prototypes, etc.) are open source, with the following caveats:

- Individual team members own whatever intellectual property (patents, hardware, algorithms, etc.) they brought to the class with them, and;
- University licensing claims on prior university-sponsored research.

H4D's general IP policy, first and foremost, submits to the discretion of the university's I.P. policy.

6b. IRB

The H4D Program Team encourages universities to review their IRB policies and requirements concerning qualitative interviews.

6c. Security Protocols & Classified Information

It is incumbent upon the government problem sponsor to determine how the student teams' research and class reporting requirements reflect information that may be sensitive to his/her organization (e.g., removing names of interviewees from any document published to the web or any other open source).

Students and university teaching teams cannot sign security agreements. Currently, no student teams may work with classified information during the course. In some cases, a problem sponsor may invite students who maintain appropriate clearances to continue to work on the sponsor's problem *after* the course and not in their capacity as a student. If you, as an educator, feel your students are working on classified information, please contact H4D immediately for program support.

6d. Diversity

H4D, at its core, is an educational course, and as such, is committed to diversity amongst its student teams. No student is excluded based on religion, race, nationality, ethnicity, sexuality, or gender.

7. About the H4D Founders

Steve Blank is an entrepreneur, consulting Associate Professor of Innovation at Stanford University, co-author of the bestselling *The Four Steps to the Epiphany* and *The Startup Owner's Manual*, and one of Silicon Valley's most important thought leaders. He created the methodology popularized by his student Eric Ries, author of *The Lean Startup*. In recent years, Steve has developed and taught innovation methods that are being used widely by the U.S. Department of Defense, the National Science Foundation, and the Department of Energy as well as the U.K. Ministry of Defense. Steve's career has taken him from repairing fighter planes in Thailand during the Vietnam War to intelligence work. Arriving in Silicon Valley in 1978, Steve has been a part of eight technology companies, including a military intelligence systems supplier.

Dr. Joseph Felter is a former Deputy Assistant Secretary of Defense for South and Southeast Asia and holds senior research and teaching appointments at Stanford's Center for International Security and Cooperation (CISAC), the Hoover Institution, and the Management Science and Engineering Department. Joe retired from the U.S. Army in 2012 as a Colonel following a career as a Special Forces officer with service in a variety of special operations and diplomatic assignments, including deployments to Panama, Philippines, Afghanistan, and Iraq. Prior to joining Stanford, Joe led the International Security and Assistance Force (ISAF), Counterinsurgency Advisory and Assistance Team (CAAT) in Afghanistan, reporting directly to General Stanley McChrystal and Gen. David Petraeus, advising them on COIN strategy. He has published widely on the topics of COIN, counterterrorism, and stabilizing conflict areas. Joe is the co-author of *Small Wars, Big Data: How the Empirical Revolutions Can Help Fight and Win Today's Conflicts* (Princeton University Press, 2018). He served as Director of West Point's Combating Terrorism Center, where he was also a member of the Army Science Board. He has testified before the U.S. Senate and House of Representatives, and has appeared regularly on major news networks discussing terrorism, insurgency, and national security issues. Joe is a graduate of the United States Military Academy at West Point and holds an M.A. degree from the Harvard Kennedy School of Government and a Ph.D. from Stanford University.

Pete Newell is a retired U.S. Army Colonel, now CEO of BMNT, an innovation consultancy and early-stage technology incubator that helps solve some of the hardest real-world problems in national security, state and local governments, and beyond. Prior to joining BMNT, Pete served as the Director of the U.S. Army's Rapid Equipping Force (REF). Reporting directly to the senior leadership of the Army, he was charged with rapidly finding, integrating, and employing solutions to emerging problems faced by Soldiers on the battlefield. From 2010 to 2013, Pete led the REF in the investment of over \$1.4B in efforts

designed to counter the effects of improvised explosive devices, reduce small units exposure to suicide bombers and rocket attacks, and to reduce their reliance on long resupply chains. He was responsible for the Army's first deployment of mobile manufacturing labs, as well as the use of smartphones merged with tactical radio networks. During his 32 years in uniform, Pete served as both an enlisted national guardsman and as an active-duty officer. He commanded Infantry units at the platoon through brigade level, while performing special operations, combat, and peace support operations in Panama, Kosovo, Egypt, Kuwait, Iraq, and Afghanistan. He is an Army Ranger who has received numerous awards, including the Silver Star and Presidential Unit Citation. In addition, Pete is a board director for Solace Power, a wireless power technology company, and Common Mission Project, the non-profit arm of BMNT that works to drive mission-driven entrepreneurship through its flagship program, Hacking for Defense®, and similar programs. Pete holds a B.S. from Kansas State University, an M.S. from the U.S. Army Command & General Staff College, an M.S. from the National Defense University, and advanced certificates from the MIT Sloan School and the Stanford Graduate School of Business.

Please visit our website at www.H4D.us