Think[box]

Do – Create – Produce

Addressing the market demand for education

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Design in Management
Executive Summary

As the employment market continues to evolve, there is an increasing demand for graduates entering the market to be able to do, create, and produce with minimal training from the employer. Given this shift in the market place, the educational system has an opportunity to capitalizing on this demand by offering a new model that will provide students with the necessary skills required to meet this demand. By creating an environment where students from different perspectives will collaborate on real world projects, while being guided through design the process, students will be equipped with both the necessary skills and experience to do, create, and produce in a world of evolving expectations.

The elements of this model include a project submission and selection process, an application process, an initial training period, and a period for working on the project while receiving ongoing guidance from professionals and educators. The students will have the opportunity to do, create, and learn in a multidisciplinary, collaborative environment. The outcome of this group work will be ideas and products that can be implemented and utilized by businesses and the greater community.

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Design Brief
History of Innovation and Interdisciplinary Study at CWRU
Problem Statement

Extant academic systems have become adept and effective at conveying knowledge to students. Students leave academia with a rich knowledge base, as well as the ability to think according to a chosen discipline. However, there is currently no academic vehicle focused on teaching students to:

- innovate,
- communicate with experts from various disciplines, and
- apply knowledge and skills to real-world, practical situations.

Design Problem

Segmentation inherent in institutionalized educational structure inhibits effective interdisciplinary communication. Individuals from different disciplines, and having various areas of expertise, are not incentivized to collaborate. Traditional methods are not conducive to creativity and innovation, nor do they afford sufficient opportunity to apply knowledge to real-world problems. The traditional system forces early consequential decisions that segment individuals into specializations. And, as a result of their traditional academic training, experts lack the tools with which to communicate effectively in an interdisciplinary setting. Additionally, the time commitment necessary to attain such an education presents a high opportunity cost associated with pursuing a traditional education that preempts students from learning through other beneficial avenues. This trade-off contributes to the compartmentalization of the learning experience, and presents a formidable barrier to innovation, entrepreneurship, and systemic change.

Think[Box] presents an opportunity to create an environment that can cultivate partnership between stakeholders from different backgrounds who are not naturally driven to collaborate with each other. However, any structure forcing a consolidated whole does so at the cost of the integrity of the interests of those involved. This difficulty inherent in developing a catch-all solution that can sublimely address the disparate interests, incentives, and perspectives of such a wide variety of individuals and disciplines is itself an impediment to the progression away from outmoded institutions. Thus, our core issue is not in finding a way to merge divergent interests together, but to create a fundamental foundation of understanding, so that they can effectively communicate and act collaboratively. But, as effective communication is an emergent phenomenon, TB’s primary problem is in creating a structure that incentivizes and facilitates collaboration and interdisciplinary communication.

KEY COMPONENTS

▲ INNOVATION
New problems require new solutions, and new ways of thinking.

▲ CROSS-DISCIPLINARY COMMUNICATION
People with different backgrounds can provide novel perspectives to existing ideas.

▲ PRACTICAL APPLICATION
Focusing on real-world issues creates a foundation of experience and skills.
**Comparable Programs**

There have been a variety of attempts to shift the focus of the educational system in areas such as entrepreneurship, innovation, and educational content. Such attempts include Co-op programs, interdisciplinary programs, and collaborative laboratories/projects. The following are examples of each.

The University of Cincinnati in conjunction with several corporate sponsors created the live well collaborative, which is a non-profit independent structure that is designed to offer real life business experience and jobs for students and faculty. The relationship between the businesses and the program is very similar to that of a consultancy firm and a client (fee for service). A challenge is posed to University researchers, professors and students on a product or service; they then spend 10 to 14 weeks tackling the issue. The businesses also provide strategic leadership and management.

The Mayo Clinic created the clinical innovation lab, Sparc, in an attempt to design and improve the “patient experience.” Following the example of designers, the clinic’s doctors, nurses, and other staff interview, shadow, and observe patients. Information thus gathered is used to determine patients’ needs, brainstorm, and prototype. Sparc recruits input from all participants in the hospital setting to design improvements, and has the advantage of being on-site. People contributing to Sparc, however, are all trained in essentially the same discipline; they are doctors, nurses, and hospital staff. Thus, Sparc fails to integrate perspectives from different disciplines that may contribute to a more complete solution.

The Fusion program, at Case Western Reserve University, brings MBA, JD, and PhD students together into one classroom. Students work together on projects, with the goal of learning to commercialize scientific inventions—from early discovery, to proof of concept, to final products. Students learn to analyze a life-science business opportunity from a multi-disciplinary perspective. They construct business models considering potential market impacts, competitive environments, and ethical and social implications. The Fusion program takes a step in the right direction, in that it brings together students having disparate backgrounds. But full collaboration is still not achieved, as students are divided up by discipline and assigned tasks in their respective areas of expertise.

Cooperative education programs, such as that provided by the University of Waterloo, aim to fill a void in traditional education; that is, students are not afforded the opportunity to apply knowledge and skills to practical situations. Co-op is an educational model that integrates academic studies with relevant work experience. Co-op students alternate terms of school and work in their field of study. Work terms are usually four months long. Students graduate in the same number of study terms as a non-co-op student, with up to two years of work experience.
Central Hypothesis

▲ WHAT IS THINK[BOX]?

The goal for the proposed Think[box] program is to merge theory and practice. Think[box] will shift the focus of education from knowledge and thought to doing, creating, and producing.

Think[box] will be a place—both physical and virtual—where students collaborate in interdisciplinary groups to solve problems and produce practicable solutions. Students will gain perspectives from different fields and learn to approach problems using skills outside of their chosen disciplines.

Think[box] will combine the education of theory with the practice of practical applicable skills, in order to create students who can create new ideas, produce novel designs, and do unthinkable projects.

A New Model for Education

What Happens at Think[box]?

A student’s experience begins by going through an application process that looks beyond G.P.A.s and degree requirements. And after some initial training in communication skills and design, work at Think[box] will focus exclusively on doing, creating, and producing, as students complete projects and receive ongoing guidance specifically tailored to their project’s needs.
Application and Admittance

Students will be admitted to the Think[box] program based on criteria that often is not taken into account by traditional academic programs, which may require prospective students to have a certain degree. Think[box]’s emphasis on interdisciplinary collaboration demands consideration of nontraditional criteria when admitting prospective students. This is because one may gain valuable experience through avenues other than attaining an academic degree. Such an individual may possess all of the qualities necessary to contribute to, and excel in, the Think[box] program. As such the application process should allow for consideration of past experience, degrees attained, skills and aptitudes, and other relevant criteria. It is important, however, that students bring backgrounds or skill sets to the table that will be valuable to their groups.

Initial Training

The program will begin with a period of initial training. The initial training will consist of lectures and guided group exercises. Although the role of lectures should be minimized, some lectures will be necessary to introduce students to design principles, communication techniques, and other skills relevant to the Think[box] process. Additionally, students will be divided into groups and be led through guided exercises. The purpose of these exercises is to begin building the skills that students will utilize to solve problems and complete projects later in the program. For example, groups may be presented with a contrived problem, and guided through the development of a creative solution according to the design process. There may be separate exercises to cultivate interdisciplinary communication skills.

Projects and Ongoing Guidance

Once the initial training period is concluded, students will be assigned to work on specific long-term projects. Students will choose projects based on interest. If a project appeals to a student, she must write a perspective paper in order to be considered for membership in the group that will work on that project. A perspective paper is a brief explanation of the student’s take on the problem, and her proposed approach to the solution. The purpose of these papers is to assist the faculty and administration in forming groups of students with diverse viewpoints, who will contribute interesting and valuable perspectives to the group’s solution. Importantly, perspective papers will be anonymous, and will not disclose the students’ background. This way, students’ backgrounds will not be allowed to overshadow the distinctive nature of their approaches to a problem.

Project groups should be comprised of members having various backgrounds, each able bring a valuable perspective to the team’s solution. A team member who is trained in the social sciences may, for example, influence a group’s solution to
better account for the way in which it will interact with humans. Concurrent with work on the projects, students will interact with faculty, and experts in a variety of fields.

Faculty will provide ongoing guidance to the groups. This will initially take the form of general guidance—essentially a continuation of the initial training, in which skills are learned and practiced. Ongoing guidance will eventually become tailored to the specific needs and issues of particular groups. Determining these needs will be facilitated by periodic reviews of the groups’ progress. Upon commencing work on projects, groups will form a plan, detailing milestones they hope to accomplish and a proposed timeline for reaching these milestones. Milestones will be continuously updated as groups come to better understand the problems they face, and deviation from proposed milestones may assist faculty in tailoring the ongoing guidance they provide.

Students will also have access to an array of experts across many disciplines. These could include professors, entrepreneurs, professionals, etc. Groups will meet with experts of their choice, but must do so at least a prescribed number of times and must choose experts from a variety of fields. Additionally, time may be scheduled for experts to lecture on topics that are relevant to multiple groups. Faculty may also recommend that groups meet with certain experts. Interaction with a diverse group of experts will expose students to perspectives and knowledge that students can integrate into their solutions. A list of available experts will be made available online, which will provide biographical information about each expert. This biographical information should include the expert’s area of expertise, an explanation of her current research or activity, as well as past accomplishments.

What’s Behind the Scenes?

Project Selection

The project selection process will identify projects that are conducive to the program’s educational goals. Problems should be sufficiently intricate to challenge students, and afford them the opportunity to take advantage of the interdisciplinary approach as well as the design process.

At the program’s inception, faculty will simply select projects. There will be few students, working on only two or three projects, so a more elaborate process is not warranted. As the program grows to support more students and projects, the selection process will become more complex and inclusive.

Projects may be submitted by anyone: businesses in the community, entrepreneurs, NGOs, students, faculty. All ideas are welcome, and can be submitted via an online service along with a description of the problem. The faculty and administration will perform an initial filter to dispose of submissions that clearly do not comport with the goals of the program (for example, a company looking to save money by having Think[box] students work on its accounting). The remaining projects will be displayed online, where students can review and comment on them.

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<th>Think[box] Problems Should:</th>
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<tr>
<td>▲ Be amiable to achievable goals and milestones</td>
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<tr>
<td>▲ Have commercial potential or utility</td>
</tr>
<tr>
<td>▲ Be novel, and</td>
</tr>
<tr>
<td>▲ Be Feasible</td>
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Periodically, there will be time scheduled for open forums. These forums will be open to the public for everyone to attend. The forums will provide an opportunity for those who submitted projects to give presentations explaining and pitching their propositions to students. Those in attendance will be able to ask questions and make comments, which will help to flesh out the ideas and address concerns. Videos of the forums will also be made available online.

**Think[Box] Timeline**

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<tr>
<th>Prior Semester</th>
<th>3 Weeks</th>
<th>9 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Evidence</strong></td>
<td>Classroom</td>
<td>Glennan Building</td>
</tr>
<tr>
<td><strong>Customer Activity</strong></td>
<td>Website info/ Brochure</td>
<td>Sign up for class (in session)</td>
</tr>
<tr>
<td><strong>On stage Visible Activity</strong></td>
<td>Attend ThinkBox training</td>
<td>Kick off meeting, start paper</td>
</tr>
<tr>
<td><strong>Backstage Activity</strong></td>
<td>Present more info on projects &amp; answer questions</td>
<td>Present students in projects, focus on mentorship &amp; support</td>
</tr>
<tr>
<td><strong>Supporting Operation</strong></td>
<td>Use of Critical Thinking</td>
<td>Provide list of Experts</td>
</tr>
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Think[Box] Nodes
- PBL, Law, Blog, Eng Blog, Honor site, field visits
- Project planning and milestones
- ThinkBox training
- Feedback from mentors and experts
- Quarterly reviews (links to grades)
- Final project presentations (including certificate)

Think[Box] Building
- Registration system
- Work space and training/mentorship system
- Process certificate
Physical Structure: Nodes

Think[box]’s physical layout will reflect its emphasis on bringing together multiple disciplines. It will consist of a central hub, and nodes distributed throughout the university. The central hub will house one or more lecture halls, a number of studios, a computer lab, and prototyping equipment. The nodes will be located in buildings belonging to various university faculties, such as engineering, social sciences, and business. Students may work on projects at the nodes, and utilize the resources available at the different locations. Additionally, the nodes will provide convenient locations for the various experts involved with the program to collaborate with students. This structure will help to foster the inclusive atmosphere that will characterize Think[box].

Culture

A description of the Think[box] program’s proposed structure does not well convey one of its most important elements—culture. The Think[box] program will foster a culture of creativity, and cross-disciplinary understanding. Think[box] will create an atmosphere in which all specializations are valued, especially those not intuitively related to a given problem. Students will learn to appreciate the knowledge and skills appurtenant to all disciplines, and become adept at utilizing various specializations when solving problems. The Think[box] culture will create an environment that nurtures new ideas. Students will learn to analyze and flesh out new ideas, and garner value from them, even if they are eventually rejected. Think[box] should also encourage healthy competition, both among students and among groups. A constructively competitive atmosphere will drive students to excellence without pitting them against each other. Think[box] will provide incentives that encourage groups to be involved and assist with the issues of other groups, while striving to design valuable solutions to their own problems.

Evolution

The objective is for Think[box] to eventually become a graduate or professional program, awarding a degree. It is not, however, realistic or wise to launch Think[box] as a full degree-awarding program. It must start small; it must be given time to mature, prove itself, and gain a following. Think[box] will begin humbly, as a certificate program. The certificate program will take one year to complete, and will be a truncated version of the full degree program. Modifications will be necessary due to the certificate program’s shorter length, as well as the anticipated low initial enrollment.

First, the initial applicant pool will consist of students already enrolled at Case Western Reserve University and the Cleveland Institute of Art. The selection process will not be rigorous, as Think[box] will be trying to attract applicants. Although Think[box], during its trial period, will not require many students in order to be tested and developed, an opening group of ten to twenty students will create a realistic testing environment and give faculty an opportunity to learn how to run the program. Because there will be a limited number of students at the beginning, Think[box] will not be able to support a large number of projects. The full project selection process, proposed above, will thus not be necessary in the beginning. It is anticipated that Think[box] will need two to four projects in its first year, depending on enrollment. Before the program begins, faculty will solicit and select projects that are appropriate for Think[box]. As the program matures and attracts enough students to support more projects, the project selection process will evolve to include aspects of the full process envisioned for the degree program.
Available projects will be displayed on Think[box]'s website for incoming students to view. Students will be required to draft perspective papers for each of the available projects, due approximately two weeks into the program, during the initial training period. The certificate program’s initial training period will last for three to four weeks. This schedule will allow students sufficient time to contemplate the various projects, as well as afford faculty the time to create groups based on the perspective papers. Following the initial training period, the remainder of the year-long program will—to the extent possible—resemble the project work and ongoing guidance period, described above. Adjustments may have to be made because of a limited number of available experts, and the shorter time period.
Budget Narrative

Launching Think[box] as a certificate program will not be resource intensive, but will require some expenditure to support its operations. Human resources will represent the bulk of the cost. It is expected that Think[box] will need 2-3 faculty, and 1-3 administrative personnel. Additionally, Think[box] will need to compensate the experts it has retained to consult with the project groups. Initially, 10-15 experts should be made available. Physical space will also be necessary for lectures and group work. One lecture hall and 2-3 work studios should be satisfactory in the beginning. Think[box] already has a wide variety of equipment available, including:

- a 3D Printer
- Laser Cutter
- Circuit Board Router
- Large Format Printer
- Laminator, and
- Other scientific and technical equipment.

The Think[box] space will, ideally, be outfitted with additional supplies, computer equipment, and prototyping equipment, including:

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<thead>
<tr>
<th>Item</th>
<th>Details\Qt</th>
<th>Est. Cost</th>
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</thead>
<tbody>
<tr>
<td>Computers</td>
<td>5 high performance computers</td>
<td>$8,000</td>
</tr>
<tr>
<td>Equipment</td>
<td>Photocopiers, printers and print-shop materials</td>
<td>$50,000</td>
</tr>
<tr>
<td>Software</td>
<td>License for Adobe, Pro E, Auto Cad, MS Office, etc.</td>
<td>$30,000</td>
</tr>
<tr>
<td>Supplies</td>
<td>Whiteboards, General Office Supplies\ Year</td>
<td>$10,000</td>
</tr>
<tr>
<td>Total</td>
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<td>$98,000</td>
</tr>
</tbody>
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Think[box] will also require other non-fixed costs that may be linked or incorporated into other University expenses including:

- Faculty
- Administrative staff
- Promotional and Advertising costs
- Event and guest lecturer expenses
- Building maintenance costs
- Project specific costs (legal filings, project materials, travel, etc)
Risks

There are three categories of risk associated with Think[box]: the risk of inaction, the risk of implementation, and the risk of success.

Inaction

There is an approaching shift in the way academic institutions operate. While academia has, for some time, been adept at conveying knowledge to students, there is now an emerging movement, focused on training students to innovate. Students are becoming increasingly aware that their educations are not providing them sufficient opportunity to practice their skills, and are often accompanied by burdensome debt. Businesses are becoming less willing to bear the cost of training graduates to function in a real-world environment. Universities are preparing to upset the 200 year old model upon which academia has been based: Harvard, Stanford, and Northwestern University are examples of schools that are experimenting with programs that challenge the traditional academic culture. Case Western Reserve University can choose to be either a leader in implementing this type of hands-on, progressive program, or a latecomer. Simply put, the risk of falling behind is real, and Case must position itself strategically in a changing world.

Implementation

Academic institutions have been relatively stagnant in their operations for some time. We can expect any attempts to change the current system to be met with resistance. Faculty buy-in is imperative to Think[box]’s success. Placing nodes around campus will create a sense of inclusiveness, such that no disciplines are alienated. Arousing student interest at the program’s inception will also be challenging. Without enough students, Think[box] will not be sustainable—both from a financial and an operational point of view. Think[box] should cast a wide net when marketing to students to ensure maximum participation. Additionally, quality projects are essential. Before Think[box] establishes a reputation, soliciting project ideas that meet Think[box]’s strict criteria may be difficult. Here also, Think[box] should reach out to a wide variety of project sources.

Success

Think[box], if successful, may be accompanied by fast growth, which would be a challenge to maintain. A large number of new students would necessitate significant additions to Think[box]’s physical resources and administrative body. Also, there is a danger of compromising the quality of projects in order to maintain a project pool large enough to support the program’s growth. Administrators should be mindful of this risk, and plan to admit future classes, the sizes of which allow for sustainable growth. Success could create tension among other faculties. Think[box] may demand significant funds from the university, to the detriment of other departments. Because Think[box] depends on cooperation and collaboration from experts at different faculties, resentment towards Think[box] would be harmful to its operation.
Getting to the Solution:

Thinking Outside the Box

Preliminary research involved a survey of similar programs that have been instituted at other institutions, and Case Western Reserve University's history of academic innovation. Discussions with students and university administrators also helped us to understand the motivations of parties that Think[box] would tailor to.

In order to figure out just what something like Think[box] might look like, our design team decided to literally take no idea off the table. Our team considered what Think[box] might look like as a research lab. Our team pondered what Think[box] might look like as a farm. Our team envisioned what Think[box] might look like as an incubator, as well as numerous other models. This eclectic collection of possibilities helped us flesh out the details that ultimately led to our proposed solution. By analyzing the cultures, structures, and incentives built into these models, we were able to garner a clear idea of which characteristics Think[box] should exhibit.
Appendix

Design Brief

Organization & Its History

1. Organizational Profile

   The brainchild of Richard Buchanon, John Ruhl, Gary Wnek and others, Think[box] (TB) aims to establish a physical and cultural focal point on Case Western’s campus that will:

   • Provide an educational environment that fosters collaboration, creativity, and invention.
   • Provide comprehensive resources for innovation and value creation.
   • Create an engine for entrepreneurial growth within our community by identifying and nurturing the talents and expertise of CWRU students, faculty, and staff, as well as those of the surrounding community.

   TB exists thanks to the generous donations of investors like Joseph B. Richey and A. Malachi Mixon III ($5 million) and Barry Romich ($1 million). Mixon hopes to “be a part of helping the next generation of young people with vision take some risks and generate some companies and a new birth for Cleveland.” Romich simply wants “today's undergraduates to have a place to go to build things.”

   It is not surprising that program like TB would take root at Case Western. The University has a long track record of fostering innovation and promoting interdisciplinary study. Founded as a classical university in 1826, Western Reserve College (WRU) was soon known as a stand-out institution that also embraced the natural sciences. By the end of the 19th Century, the Case School of Applied Sciences—which later came to be known as the Case Institute of Technology (CIT)—had taken root next door to WRU’s campus.

   As the 20th Century rolled forward, WRU continued to grow. CIT was the first engineering school to establish a division of Humanities and Arts Sciences. In 1967, the two schools officially merged to create Case Western as we now know it. Since then, the university has continued its dedication to blazing trails. Immediately after its formation, it created an Office for Interdisciplinary Programs and Centers. 1968 saw the creation of the first ABET accredited computer engineering program. In 1980, the Weatherhead School of Management was born. To this day, Weatherhead is well-regarded for its novel approach to business. Case Western has also initiated several interdepartmental initiatives and innovative programs, including the STEP program, the FUSION law and business concentration certificate, an office of interdisciplinary affairs to lead dual degrees and research, and continues to innovate with the proposed creation of TB.

Market Position

There have been a variety of attempts to address the problems of the educational system in areas such as entrepreneurship, innovation, and educational content. Such attempts include Co-op programs, interdisciplinary programs, and collaborative laboratories/projects. The following are examples of each.

   The University of Cincinnati in conjunction with several corporate sponsors created the live well collaborative, which is a non-profit independent structure that is
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Current Situation

Organization. Thus far, activities regarding TB have centered around initial planning and formulation. The Tri-Chairs of the program proposal, Richard Buchanan (WSOM), John Ruhl (CAS), Gary Wnek (CSE), have put together a strategic planning committee assembled from faculty and administration from different department and schools. The committee has had several development meetings discussing the core goals and scope contemplated for the program. As a part of their initial discussions, the committee conducted an interest survey among university faculty, researchers, and administrators, as well as among several interested local businesspersons. A current listing of the committee members may be found in the Appendix: TB Strategic Planning Committee Members.

Fundraising. While long term sustainability is still an issue the committee is dealing with, TB has secured significant short term funding through several donations and investments. Among others, Barry Romich donated $1 million to establish the PrentkeRomichCollaboratory, and Invacare Corp.’s A Malachi Mixon III and Joseph B. Richey II invested $5 million to Case Western’s entrepreneurship and innovation programs. While some of the funds were donated with earmarked purpose, TB
retains significant freedom in choosing how to best apply funds to the program.

Facilities. The committee has secured several spaces in and around the CWRU campus for use in the TB program. The current locations are generally centered throughout the CWRU Engineering and Science Quadrangle (including WSOM Design Studio, Sears Lab, Reinberger Lab, Virtual Worlds @ Lab Olin 412) with the main building located at the already existing Lincoln Storage Facility. The Lincoln Storage Facility space is not fully furnished, but the Glennan Building 209 is currently a temporary home for a tinkering and prototyping space dubbed the Lincoln storage space. Glennan Building 209 is not fully “furnished”, but a glimmer of what will be in Lincoln Storage and is currently ready for touring. The space is relatively small (~3000 ft.²), but it will be well-equipped with rapid-prototyping and fabrication equipment.

Moving Forward. The committee has not set in stone any policy or determination of scope, goals, purpose, structure, actions or curriculum, or eligibility of participation. Still in the midst of initial planning, the committee is open to new ideas both internally, and from around the CWRU and local business community. In fact, a recent design competition permitted interested students to submit their visions for TB’s future. Overall, the current position of the TB project is in amalgamating, developing, and evaluating the core values, scope and purposes of the program.

2. Problem Statement

Segmentation inherent in institutionalized educational structure inhibits effective interdisciplinary communication. Individuals from different disciplines, and having various areas of expertise, are not incentivized to collaborate. Traditional methods are not conducive to creativity and innovation, nor do they afford sufficient opportunity to apply knowledge to real world problems. The traditional system forces early consequential decisions that segment individuals into specializations. And, as a result of their traditional academic training, experts lack the tools with which to communicate effectively in an interdisciplinary setting. Additionally, the time commitment necessary to attain such an education presents a high opportunity cost associated with pursuing a traditional education that preempts students from learning through other beneficial avenues. This trade-off contributes to the compartmentalization of the learning experience, and presents a formidable barrier to innovation, entrepreneurship, and systemic change.

Think[Box] presents an opportunity to create an environment that can cultivate partnership between stakeholders from different backgrounds who are not naturally driven to collaborate with each other. However, any structure forcing a consolidated whole does so at the cost of the integrity of the interests of those involved. This difficulty inherent in developing a catch-all solution that can sublimely address the disparate interests, incentives, and perspectives of such a wide variety of individuals and disciplines is itself an impediment to the progression away from outmoded institutions. Thus, our core issue is not in finding a way to merge divergent interests together, but to create a fundamental foundation of understanding, so that they can effectively communicate and act collaboratively. But, as effective communication is an emergent phenomenon, TB’s primary problem is in creating a structure that incentivizes and facilitates collaboration and interdisciplinary communication.
3. Goals and Objectives

A Renaissance man is a person who is skilled in multiple fields or disciplines, and who has a broad base of knowledge. The term is largely based on various scholars of the European Renaissance, the quintessential renaissance man of this period being Leonardo Da Vinci. Da Vinci was a master of disciplines including art, engineering, math, anatomy, and pursued many other disciplines as well. Expertise in a variety of fields allowed him to conceive of more complete solutions to problems, by combining the perspectives of multiple disciplines. Other renaissance men throughout history include Aristotle, Plato, Confucius, Isaac Newton, Benjamin Franklin, and many others.

As modern education has developed, however, the Renaissance man has faded into the background. With the rise of the industrial revolution and the rapid development of technical fields, it became increasingly difficult for a single person to gain an in-depth understanding of all the various disciplines. The answer to this problem was to train experts and specialist in various fields that could offer a deeper understanding of a given subject. However, with the rise of specialties, part of the Renaissance man was lost. Modern society has come to rely more heavily on technically trained experts, such as engineers and scientists, to solve problems in their own fields. Thus, the perspectives and expertise of disciplines not intuitively related to a given problem are neglected in pursuit of its solution.

Whatever form TB eventually takes, it must create value for stakeholders and participants who are not all involved with the program for the same reasons. Our core goal for TB is to create a learning environment that presents students with opportunities not previously afforded by educational institutions. We seek to create opportunities, not only by addressing what is taught at TB, but the methods by which learning takes place. TB will teach students to navigate the creative process of solving problems as part of an interdisciplinary team. Skills will be developed through collaborative work on problems faced by businesses associated with TB, and through the conception and development of entrepreneurial ventures within TB.

One example of how such a program might interpret a problem involves identifying where its scope extends beyond the traditional boundaries of any single discipline. Projects involving collaboration and integration between highly specialized fields—for example nuclear physicists and construction managers collaborating to design a nuclear power plant—would benefit from tools and guidance that create effective communication and understanding.

A second method of interpretation involves a different type of synergy, wherein specialists in disciplines not intuitively related to a problem can add value by contributing their unique perspectives to the solution. For example, the design of a control room in a power plant has typically been accomplished by engineers. This practice led to designs primarily motivated by mechanical concerns, and that failed to account for the necessary human interaction. By recruiting psychologists’ expertise, control room designs have been improved, resulting in more efficient control by human operators.

A goal for TB is to interpose both of these interpretive methods in conjunction. TB aims to create not only the tools for experts to collaborate efficiently, but also to create individuals well adapted to recognize the nature of a problem and how it is best approached by an interdisciplinary team.

TB’s success depends on participants other than students, and so any solution must
tailor to their concerns as well. TB must create value for businesses, faculty, prospective students, and the University. We seek to design a system attracts individuals with a variety of educational backgrounds, and having different professional goals. It should secure for participants an interest in the projects in which they participate; reduce the opportunity cost of pursuing a university degree; reward businesses for their participation and submission of projects; facilitate interdisciplinary collaboration; and it must preserve the integrity of individual departments within the university. TB also must be recognized and accepted by the academic community. Accreditation by other universities is essential if the TB degree is to be perceived as valuable.

Benefits / Who Will Benefit

TB has the potential to support multiple benefactors. The most obvious benefit is to the students, who will learn valuable skills, and gain practical experience in an environment that mitigates the risk of engaging in real-world activities. Faculty and the university administration gain a reputational benefit from their involvement with a progressive program. Businesses enjoy the fruits of TB’s collaborative approach by working with students to create innovative solutions. Businesses also give back to the community through their involvement, in that they are providing an essential ingredient to the TB education. TB benefits the Cleveland community not only by assisting local businesses, but by incentivizing students to remain in Cleveland after graduating. Students may choose to continue the pursuit of ventures that they worked on, and in which they earned a stake, while at TB.

Constraints

Academic institutions have been relatively stagnant in their operations for some time. We can expect any attempts to change the current system to be met with resistance. As well, individuals with particular specializations may have difficulty appreciating the value of input from other disciplines. This and other barriers to communication and collaboration may serve as obstacles to TB as envisioned. Constrains involving budgets, space, and time will also have to be considered.

Risks

TB would require proper funding in its early stages. Difficulty attaining funding poses a significant risk to the success of the program. There is also a significant risk of low enrollment in TB; a sufficient number of students with various backgrounds is necessary to the concept’s success. Finally, there is a risk that the TB degree will not receive accreditation from other institutions.

4. Schedule of Work

<table>
<thead>
<tr>
<th>Milestones</th>
<th>W 1</th>
<th>W 2</th>
<th>W 3</th>
<th>W 4</th>
<th>W 5</th>
<th>W 6</th>
<th>W 7</th>
<th>W 8</th>
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<tbody>
<tr>
<td>Develop the framework for cooperation between stakeholders</td>
<td>Org Structure, Incentives, communication, academic rec. Future interests,</td>
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<td>Developing a methodology to evaluate progress</td>
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<td>Identify available resources - Financial/physical</td>
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<td>Identify possible sources of funding (Internal, External)</td>
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<td>Identify community and business partners (External)</td>
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<td>Identify internal stakeholders (Faculty, Students, Admin)</td>
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<td>Develop a outreach campaign to promote the program</td>
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5. Budget Estimate for the Project

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<thead>
<tr>
<th>Line</th>
<th>Details</th>
<th>Relative Cost (darker = greater cost)</th>
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<tbody>
<tr>
<td>Misc.</td>
<td>Transportation, supplies, bills,</td>
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<tr>
<td>Reachout Campaign</td>
<td>Design and quotations</td>
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<tr>
<td>Work Space Design</td>
<td>Arch, IT,</td>
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<tr>
<td>Feasibility Study</td>
<td>Use of available resources, funding, sustainability, setup</td>
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<tr>
<td>Research</td>
<td>Primary and Secondary: Students, faculty, admin, businesses, alumni, local govt., entrepreneurs</td>
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History of Innovation and Interdisciplinary Study at CWRU

Case Western Reserve University’s tradition of interdisciplinary study extends as far back as the early 19th century. Western Reserve College was founding in 1826 as a classical university, but quickly became noticed as a stand-out institution which embraced the natural sciences as well. During a post-civil-war economic boom in 1880, WRC, in an effort to capture students engaged in industrial development, uprooted from Hudson, OH to Cleveland and changed its name to Western Reserve University. At the same time, the Case School of Applied Sciences was founded through the bequest of Leonard Case Jr., who required that the new CSAS’s campus should be adjacent to WRC’s new location.

By 1916, WRU had grown to include a male and female undergraduate college, a medical, law, dental, library, pharmacy school, and a school of applied social science. In 1947, after the Second World War, CSAS reabsorbed several affiliated city facilities, including the Adelbert, Mather, and Cleveland Colleges, and renamed itself the Case Institute of Technology. Expanding drastically in 1948, CIT became the first engineering school to establish a division of Humanities and Social Science. 1949 saw the beginnings of a merger between the two schools, and by 1960 the schools shared health services, athletics facilities, as well as their geology and astronomy departments. In an effort to grow its campus, and improve the local community, WRU also began its involvement in business and social development with the foundation of the University Circle Development Fund. After a formal agreement to merge in 1964, Case Western Reserve University was founded in 1967. Merging the business departments of the two schools led to the foundation of the Weatherhead School of Management, formally renamed in 1980.

Pulling from the diverse resources resulting from the merger of the different schools, CWRU has been a constant educational innovator. It was the first university to found an ABET accredited computer engineering program in 1968, and was a pioneer in the early development of the early internet in the formation of ARPANET and the Free-net computer systems. Case’s tradition of economic and social development continued with the University Circle Development Fund rebranding as University Circle Inc. in 1970, which works toward amassing additional property for the university, as well as development of residential, retail and commercial projects. After its formal establishment in 1967, CWRU created an Office of Interdisciplinary Programs and Centers, which has worked to create areas of study that bridge the gap between various traditional educational disciplines.

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1 History of Case Western Reserve University, Case W. Reserve Univ., http://www.case.edu(stage/about/history.html October 19, 2011.
2 Id.
4 Id.
5 History of Case Western Reserve Univ.
6 Cramer.