

AC 2009-2381: THE I5 PROGRAM: THE CHALLENGES OF IMPLEMENTING A PROJECT-BASED SUMMER STUDY-ABROAD PROGRAM THAT INTEGRATES TECHNOLOGY AND ENTREPRENEURSHIP IN CHINA

Cynthia Fry, Baylor University

Prof. Fry is the Assistant Dean for Undergraduate Studies of the School of Engineering & Computer Science, and a Senior Lecturer in Computer Science. She is also the Faculty-in-Residence for the Engineering & Computer Science Living-Learning Center. She has Co-Directed the i5 program since its inception.

Gregory Leman, Baylor University

Dr. Leman is a Clinical Professor of Management and Entrepreneurship in the Hankamer School of Business, where he holds the Hankamer Chair of Entrepreneurship. He is also the Director of University Entrepreneurial Initiatives.

The I5 Program: the Challenges of Implementing a Project-Based Summer Study Abroad Program that Integrates Technology and Entrepreneurship in China

Abstract

Leveraging the seemingly conflicted constraints of inflexible degree plans, high-hour degree requirements, and the increasing costs of higher education in the United States, the I5 program (Immersion Into International Interdisciplinary Innovation) has built a summer program in China adeptly able to provide to undergraduate engineering, computer science, and business students a distinctive opportunity for a meaningful study abroad experience in a relatively short amount of time, while earning six hours of credit that will count toward their respective degree plans.

At the heart of this experience is a series of technology-based projects provided by local or multi-national companies located in China. Each project is assigned a team of American and Chinese students, each representing either a technical or business-related discipline, working under the direction of a Team Leader. The Team Leaders spend the first six weeks working for their respective companies, and are then joined by their teams for the second six weeks of the summer to implement the scope of work and project plan developed by the Team Leader.

This paper will address the challenges faced in the expansion of the I5 program to include high-quality summer internships, to help develop meaningful technology-based projects, to expand the network of Chinese partner institutions, and to expand the network of local and multi-national company partners.

Executive Summary

Over a five-year period, the i5 in China summer program in technology entrepreneurship has evolved to a design that is now proven to be sustainable, and to meet the widely ranging needs of undergraduate engineering and entrepreneurship students as well as providing unique leadership opportunities for MBA candidates. While these needs may be addressed by many programs in the US, this program does so in a highly culturally immersive China context. It is these experiences, skills, and opportunities that have been deemed necessary to prepare graduates for the rapidly globalizing and highly technical world they are entering according to industry and the Accreditation Board for Engineering & Technology (ABET). Success factors include:

- The transition to an experiential learning curriculum that cross-cultural, multidisciplinary student teams employ in assessing new ventures and internal growth opportunities presented by startup or established firms,
- The inclusion of an executive education style workshop attended by sponsor firm personnel, and

- Raising the level of work-product accountability through venture capital panel reviews.

A highly efficient, globally relevant educational experience aligned with the graduating students' needs which is now attracting wider participation and resources has resulted. It is reviewed in detail so others can adapt and adopt its elements as needed to enhance their own efforts. In particular, innovations that are expected to enhance international entrepreneurship programming include the merging of MBA internships with undergraduate team leadership, the use of these combined teams outputs to deliver opportunity assessments that companies abroad value and will thus pay for, and the demonstration of highly efficient learning possible in summer programs that will draw more participants than possible with full semester programs.

Introduction

Mega-trends of the 21st century include pervasive globalization and accelerating pace of technological advancement, putting perhaps the greatest set of strains on the world's capacity for growth ever encountered in history. These growing pains include some of the knottiest problems imaginable, for example:

- Sustainable development of energy,
- Supply of potable water, and
- Access to whole ranges of technology by populations previously disconnected.

These growing concerns cause some to look forward with a mix of optimism and pessimism, and one thing is clear: ***technology entrepreneurs currently have more opportunity to create value with new technologies on a global scale than at any other time.***

These realities have been well-documented by others, so we only note here one outcome – the emergence of a new paradigm for startup-ventures which are “born global¹”. Presutti et al. conclude that born-global ventures represent the final stage of development for serial entrepreneurs and point to the development of a global network as an important factor in the readiness of the individual entrepreneur for a successful born-global launch.²

Whether or not a series of ventures is needed to prepare an individual for such a career-capping event, this model can serve as a guiding paradigm as educators design and execute educational experiences that will accelerate the preparation of graduates for a world in which highly technical, truly global ventures and opportunities abound.

At Baylor University, three distinct student constituencies have been considered in developing Technology Entrepreneurship programming in general, and the i5 China Program in particular. The program's goal is that each of these groups builds the knowledge, form the networks, and demonstrate the skills needed to effectively contribute to such ventures.

In serving the needs of upper level undergraduates in both Entrepreneurship and Engineering disciplines as well as those of the MBA candidates seeking entrepreneurship concentrations, a single summer abroad program (i5) has been designed, tested and proven to synergistically meet their disparate educational objectives. In this paper we will delineate those varied priorities, review the i5 Program design evolution to its current form, summarize the resulting impacts from several constituent perspectives, and finally comment on the implications of our findings.

Student constituencies: key challenges in gaining skills for global, high-tech ventures

Engineering and Computer Science students

Pressure for change in engineering education to include collaboration, communication, business analysis, and multi-cultural effectiveness is widespread, and well documented. In our previous paper to NCIIA (Bradley et al³.) for example, the challenges of finding ways to insert separate courses in engineering economics, technical and professional writing, professional speaking, entrepreneurship and global awareness into these degree plans is shown to be insurmountable given the very scant elective space.

A surprising and encouraging result, however, is that by combining topics into a very multi-disciplinary, two-course sequence that substitutes for required, traditional courses in economics and technical writing stand-alone courses, engineering students actually achieve higher performance in both economic analysis and in technical writing. We hypothesize that this is because all their work is tied to relevant projects that bring in a full range of entrepreneurial, global issues to which they would otherwise have had no exposure, and about which the students are clearly energized. While very encouraging, the success in introducing entrepreneurship, technical and professional writing and speaking skills and some global awareness into the engineering curriculum without paying any penalties in terms of performance on traditional topics does not fully prepare the engineering graduate for entry into a global environment in which she may be teamed up with technical and business colleagues from major manufacturing sites in China, for example.

The i5 program aims to fill this gap in hands-on learning by offering it to these undergraduate engineers as an alternative to the second half of the two-course sequence, Technology Entrepreneurship (ENT 4340 at Baylor University). By taking this course in China during the summer, they receive the same experiential, project based learning by performing an opportunity assessment for a new or growing venture as they would do on campus, and do so for a China-based firm, teamed with both Chinese and American students.

To assure this opportunity, the model for i5 includes the assignment of student teams to work on a China-based, technology-enabled new product or new venture. The ideal team size is five, so student capacity is tied directly to successful project development each year. This framework enables the i5 program to meet the needs of engineering students to gain and demonstrate analysis, writing and presentation skills by performing technology venture opportunity assessment in a multinational environment, while adding

only one summer session and not affecting their overall timeline to graduate or total hours needed.

Entrepreneurship Undergraduate students

The “born-global” trend discussed earlier epitomizes the challenges of the inexperienced, usually non-technically skilled undergraduate entrepreneurship student: if he wants to be engaged in world-changing ventures he will need to understand how to collaborate effectively both across disciplinary barriers as well as cultural ones, and learning experiences that allow him to do so while in school are not abundant.

As the engineering education “world” increasingly embraces the integration of entrepreneurship into its courses and curriculum, of course this opens up (at least theoretically) new teaming opportunities. Realizing this potential means that courses need to be offered that bring these sets of students together, and in many cases this is not yet the norm on campus. It is the authors’ observations from discussions with colleagues at many other institutions that while many business-plan-based and other capstone course experiences do emphasize teamwork, real-world connection to an operating business or even a student-lead startup on campus, few connect to high-tech ventures or corporations typical of a first job spot. Even fewer undergraduates have a chance to work in a global context.

The Technology Entrepreneurship specialty within the Entrepreneurship major at Baylor University addresses this gap in part by seeking project sponsors for the on-campus offering of Technology Entrepreneurship capstone course whose ventures are in fact “born global.” Examples include two assessments completed in Spring 2008 for Exousia Corporation from Houston with partnerships and operations in several China cities, and one performed in Fall 2007 for a US owned company located in Suzhou, China. But the experience of performing a project with Chinese teammates while living in China for six weeks as a participant in the i5 Program is, of course, a much more immersive and impacting experience in global technology entrepreneurship.

The final presentations being delivered to a team of executives from the sponsoring company composed of not only business-wise but technically savvy leaders – and knowing that they seek useful answers for decisions they will make – drives their preparation and learning to real-world levels. When i5 presentations are delivered to faculty and sponsors, and a panel of VC and Angel investors from Shanghai is also present, giving the entrepreneurship undergraduates a unique opportunity to test their skills in venture assessment and business “story” delivery. They leave the program knowing they have demonstrated their readiness for a born-global venture or global corporate innovation environment.

MBA Candidates

MBA candidates are many times acquiring a graduate degree to add formal business training to already well established technical skills, or have returned to school from

business experiences which fully inform them of the trends and demands our technologically, globally advancing world places upon them. For these participants in i5 the needs are thus quite different from either undergraduate population – they seek advanced opportunities to apply their newly-honed business skills and they seek an edge in connecting to opportunities for employment. A classic MBA approach is to find an internship in the specialization arena of choice – finance, health care administration, entrepreneurship, etc. - and try to then land a permanent job at the internship firm.

Opting to join the i5 program as an intern for the first six weeks in a China-located company, and then lead a mixed team of mostly undergraduate through completion of the project over the next six weeks, delivering the report and presentation to the sponsor at the end of the whole twelve weeks has the advantages of a very clear leadership role, obvious differentiation in level of cross-cultural experience and great networking opportunities on the ground in China. Offsetting these advantages, it does not necessarily give each intern the chance to select the type of company or industry he or she will work in, because the process of developing projects that are available at just the right time is a fluid one, and must be so if we are going to work on truly relevant opportunities rather than older, shelved ideas that do not have much current interest at the firms.

The MBA candidates' commitments to join happen earlier than finalization of the slate of projects. Of course if a candidate's employment interests do not include connection in China, then the networking will not prove as useful as being in the location they are seeking, but most recognize that China's growth and role in the global economy is such that the learning will never be wasted. As the i5 design evolved to where all projects are undertaken in a two-phase manner (on-site internship phase + in-classroom team completion phase) the MBA and program needs have come into strong overlap: the program needs strong project leadership and the MBA's gain high degree of proven skills in providing it.

Program Design Evolution from 2007 (pilot) to 2008 (current design)

Baylor University's collaboration between the School of Engineering and Computer Science and the Hankamer School of Business to create a technology entrepreneurship experience in international setting dates back to 2003. The location for its first two summer abroad programs was Maastricht, the Netherlands, and was centered on projects developed by the Baylor students themselves. Transition to a China location, to corporation-sponsored projects, and to a cross-cultural student mix has been discussed previously, particularly in terms of impact on engineering education challenges.⁴ That transition put the i5 Program into a position to offer a truly global, technology entrepreneurship educational experience that is centered in the realities entrepreneurs and "intra-preneurs" face.

Basic Program Statistics

The following chart gives a summary of the type and number of participants in the i5 program in its two-year history:

<u>University</u>	2007				2008			
	ENGR	Bus/Rel	Male	Female	ENGR	Bus/Rel	Male	Female
Baylor University	9	8	12	5	2	9	8	3
Thunderbird	0	2	2	0	0	1	1	0
USST	0	20	10	10	0	15	5	10
American University					0	4	4	0
Sun Yat-Sen University					0	5	3	2

Key Issues and Restructuring

The key issues identified in the pilot year experience (2007) drove design adjustments and program additions that have proven to effectively address the entrepreneurship educational needs of all three student constituencies discussed above and fit the constraints of partnering Chinese businesses and Universities. The critical adjustments made include restructuring the timetable, moving to a more “tactile” experiential learning format for the curriculum materials, unifying the project scopes to a single, overall opportunity assessment with common deliverables, and by adding venture capital panel reviews to the project evaluations.

Restructuring the timetable for i5 from a six-week summer session for which team members and team leaders arrive in country simultaneously to a phased program, with the following framework:

- A four-day workshop in May attended by student (MBA) leaders and company liaison / project leaders for all the projects, followed by
- A five-week internship during which the student leaders are on-site at the sponsoring companies, and then finally
- The six-week summer session attended by the mixed team of American and Chinese students who are teamed with each leader.

During the workshop, the entire entrepreneurial assessment process is experienced by sponsor and student, assuring that the actual project / opportunity to be assessed is clearly defined, and also that the whole range of assessment components is mutually understood. Getting “on the same page” is virtually unavoidable in this intensive kickoff experience.

During the internship phase, many strategic and internal capability issues can be probed and understood that teams in the 2007 program format did not have any way to access, making some of their inputs based on insufficient information. Finally because the student leaders have such extensive opportunities to learn, assess and plan before the other four to six members of their teams arrive for the final phase, they are able to get the teams deployed in a matter of a few days rather than spending the much of the first two weeks sorting out the project definition.

A second fundamental adjustment in design was the shift from a classical textbook teaching model to the use of a proven, practitioner-based curriculum, called the

“SuperCoach® Entrepreneurial Training” (SET) curriculum, developed by Sharon Ballard of Enable Ventures, Inc., for use in the San Diego State Connect program and since adopted for use in numerous other programs⁵. While all the same topics are covered in the course as in the original format, the key difference is that the students encounter them in a much applied manner, and in the order that over fifteen years of coaching entrepreneurial teams has shown to be most effective.

Teaching innovation, particularly to Chinese students who had no previous grid for many of the concepts in addition to learning in a second language, proved to be much more effective with the hands-on tools SET employs. In addition, the technology students, both American and Chinese, found that these tools made the material very accessible, resulting in a clear advantage in connecting entrepreneurship education across both cultural and disciplinary boundaries. Instead of learning the concepts and then trying to apply them to specific projects, the students create their own examples of applied learning, and then are ready to discuss more general principles behind the tools. As they see other examples created by their peers on other projects and give them feedback, the general principles become clear to the whole class, even though very little time is devoted to conveying them in a classic professor-dispensing-knowledge format.

A smaller but essential design adjustment is that instead of allowing companies to focus their project on one particular issue important to a successful launch, we insisted on having the teams all look comprehensively at the entire set of issues that are important to any tech-based venture. While there may be bigger gaps to fill in one or more areas, such as marketing or customer feedback, we required the teams to perform an assessment of the whole venture story because without doing so, the work will be out of context and likely based on faulty assumptions. Further it assures that the sponsoring company grants the team access to all the needed background information, and secondly receives output which they do not have to reshape in order to use – it is a “pitch” supported by a full business plan that all fits together into one compelling story.

In addition to benefiting students and project sponsors in terms of comprehensiveness and accuracy of the assessments, this format makes the program more scalable because each team follows a similar process, lowering individual coaching time by faculty. The 2008 teams produced a higher standard of outputs and required only about 20% of the individualized faculty coaching needed in the 2007 experience. The common set of project deliverables now possible due to this consistent project scoping included four versions of the same “story”: a thirty-second elevator pitch, a fifteen minute presentation of the opportunity, a fully vetted written business plan, and pro-forma financials for the first five years of operation.

Finally, the program adopted a review process for assessing the teams’ effectiveness that includes an independent panel of local venture capitalists and angels. A premise of the design is that even internal ventures funded with internal monies need to have a story compelling enough to pique the interest of independent financial investors. The feedback this panel gives is useful not only to the student teams, but also to the company sponsors as they see other savvy investors react to the business story they themselves plan to fund.

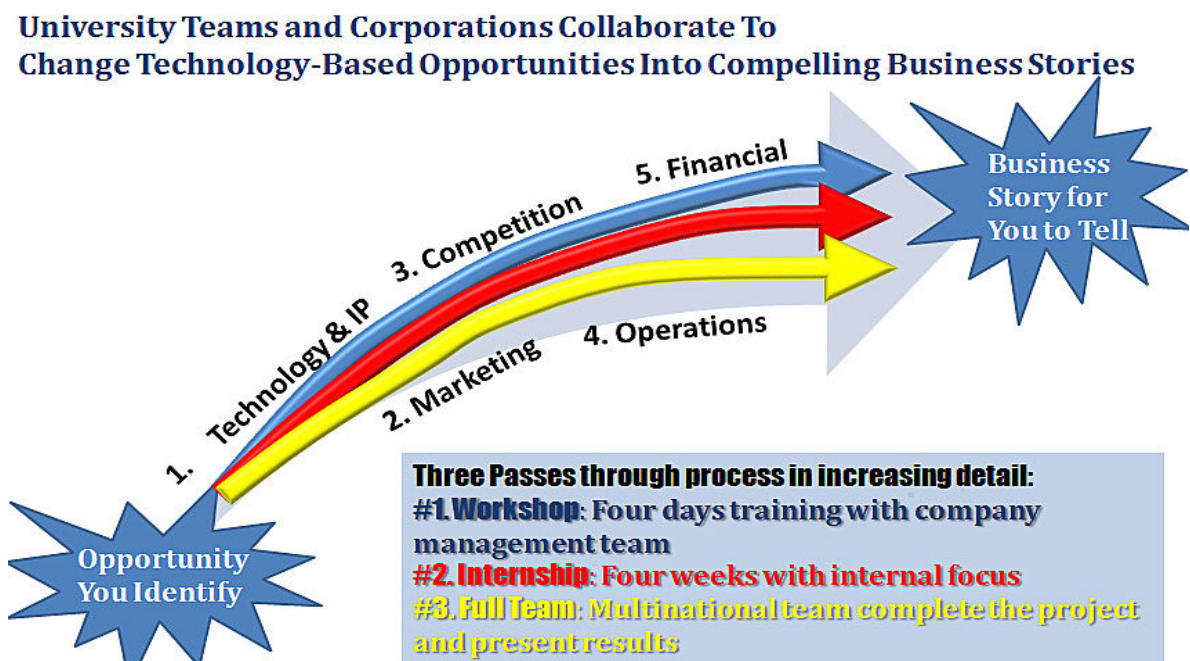
And of course it is a very educational process to have to defend an assessment to financial professionals who by much practice can uncover the holes and issues that have been glossed over in the business plan. In one case, a sponsoring firm received unsolicited offers for funding its growth into the new business the students assessed and presented to them.

Summary of Improvements/Outcomes for the 2008 Program:

To summarize, the i5 Program design was adjusted in 2008 with the following adjustments:

- Teaching an assessment process that is much more hands-on.
- Making that assessment process more comprehensive and consistent from project to project.
- Adding higher level of accountability in evaluating the teams' outputs.
- Increasing the English communication and comprehension filter for potential participants, both in everyday communication and also in discipline-specific vocabularies.
- Adding the internship piece for the MBA/team leaders to give them a value-add to their experience with a unique six-week program scope definition and plan, working with their companies, and developing a deeper understanding of the complexity of doing business in China.
- Modifying the overall schedule to give students more time to process what they had learned, while improving the quality of the cultural experiences in which they participated.

The overall design of the program is depicted in the graphic below, which is used to communicate the structure and outputs achieved to prospective corporate participants:



Results stemming from the design changes

In addition to the direct benefits to participants already discussed, several broader impacts were achieved. The first of these is a step forward in addressing the greatest single challenge to creating and running a program that is so dependent on having real-world entrepreneurial opportunities with which to engage students – developing the needed stream of projects. The magnitude of this challenge is exacerbated by the fact that our university counterparts in China have not previously utilized student work in this way. As a result, neither the professors who need to recruit projects nor the companies who can be highly benefited started out with any expectation that student work can be truly valuable to the firms or entrepreneurs. Thus much of the project development has required significant time in country each year on the part of the US faculty.

With the inclusion of a four-day workshop on the entrepreneurial process that companies who participate can send one to three persons, the i5 program has created a value proposition that fits more naturally into their experience and for which our project fee makes sense. In 2007, there were no China-based companies who had been willing to pay the program fee, although US-based participants (with operations in China) found our fee structure quite reasonable. In contrast, all participating companies in 2008 were willing and able to pay the fees needed to bring an intern over to China and cover their living costs for the extra six weeks.

This change in perception was underscored by a venture capitalist from Shanghai in private conversation when he recommended that i5 be positioned as an “opportunity assessment service” offered via partnering Science Parks rather than as an educational program, so that companies who need this help will be better able to understand what i5 delivers. Gaining a clear statement of value that our colleagues in China can communicate to companies there who in fact are highly motivated to become more innovative and entrepreneurial will pay major dividends in making ongoing operation of the program sustainable.

A second value equation perception issue is one that affects our MBA students. On one hand they see the obvious reality that China is looming as an economic force that will likely affect them in any employment scenario over the course of their careers, but it is also the case that a traditional internship with a major US company can give them a more direct path to launching that same career.

A gratifying result of the new levels of leadership our interns (most of them were MBA candidates) were able to demonstrate over the twelve weeks of engagement with their sponsoring firms is that half the companies made job offers to the interns on the spot after receiving the team outputs and viewing their presentations. In addition, two MBA candidates who were not among the interns (participated only as team members in the six-week project completion phase) have made plans to return to China after graduation to pursue opportunities they developed on their own through networking while in-country. This is especially important to the program because it allows us to confidently

recruit the highest level of candidates and be sure we are not putting them at any disadvantage in the short term in order to have a long-term edge.

Feedback from our undergraduate technology students in 2007 was mixed. Most of the less-than-elated responses focused on the fact that they did not get to use their technical skills and thus felt like they were not given a good chance to contribute as much as the business students. In 2008 one impact of the applied tools employed on our new curriculum is that the technical merits behind each business proposal were required to be fully evaluated. Product development roadmaps that included R&D, technology licensing into and out of the firms were among the expanded, more comprehensive requirements.

Consequently, in the 2007 design, it was up to each team to determine how to evaluate these issues, and often the technical team members did not have the applied background to interject these concepts, and they were thus often glossed over instead of thoroughly evaluated. By giving the teams the needed tools to answer the question of how they will develop and sustain a truly differentiated advantage via their technology base in much greater detail, the engineering students' status was elevated and the program's intended interdependence of the teams was accomplished. Feedback from the technical students this year ranged from "How can words describe such an awesome experience?" to "Please let me know if you need me to promote i5 to any engineering students!"

External validation is always essential. With the changes made and momentum generated over the past year, i5 has been able to expand its range of participating universities both in the US and in China – American University in Washington, D.C., reviewed the program in 2007 and enrolled four undergraduate business students in the 2008 program. Thunderbird University in Phoenix has enrolled MBA's both years. In addition, our initial partnership with University of Shanghai for Science and Technology grew to include the Lingnan (University) College in Guangzhou in 2008.

In addition, funds donated by Hewlett Packard Corporation enabled i5 to offer scholarships to several of the 2008 participants. The evolved design is thus proving to create a value proposition that resonates with its student and partner constituencies and is expected to consequently attract stronger students, connect more easily with input-desiring technically innovative ventures, and become much more efficiently manageable as an ongoing program in China.

Conclusions and Implications – “So What?”

Reaching the stage of stable design and clearly demonstrated value to all its key constituents is the equivalent of cash-flow break-even for a start-up venture – i5 has become established and is growing in its circle of participants. But beyond its own sustainability and direct impact on the learning of students who join us in the summers of 2009 and beyond, it is hoped that the experiences and educational program model features reviewed here can have a wider impact by encouraging others who have some of

the same challenges in preparing graduates for the global, technology-rich world of the 21st century.

We hope that the innovations that allow very inflexibly full degree plans like engineering to integrate entrepreneurship and global awareness even for students who do not have the option of adding an extra semester or year can be picked up and improved upon. The concept of tying undergraduate experiential learning to graduate level internships and project leadership roles in a way that both have a chance to gain and demonstrate capabilities that can accelerate their preparation to make distinctive contributions to new ventures and corporate innovations alike is one we expect others will also be able to adopt. And we intend for the immersive summer abroad model itself to be adopted as a means of delivering a high-intensity cross-cultural experience that irreversibly opens students' eyes to the opportunities they have for creating value on the global stage to be useful in enabling higher levels of participation than is possible when a full semester of year abroad is required.

If considering an undertaking as seemingly daunting as adapting the i5 model in China, however, there are several lessons learned that should be considered:

- Build on the strengths of your institution – if your institution does not have a well-defined study abroad program, China may not be the best choice for a first destination.
- If an existing relationship between your institution and one in China does not currently exist, plan on spending a considerable amount of time developing a relationship with your colleagues. Guanxi, the personal connection between two people that is deeper than relationship or connection, and is essential to the Chinese business culture, is critical to a successful cooperative program in China.
- The move to a more interactive method of delivering the material via the coaching philosophy has made a significant impact in the ability of our Chinese students to develop an understanding of the concepts and then to integrate these concepts into their team's project.
- Going through the material three times was especially beneficial to the team leaders and their company counterparts. Through that process they had a chance to develop a baseline understanding of their project as well as forge a well-grounded working relationship throughout the summer.

In short, we believe that i5 has proven to deliver a high degree of student learning impact in an efficient manner that others can adapt to their own situations and constraints to reach the same goals of graduating “plug and play” innovators for the 21st century.

Acknowledgements

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