



## Evaluation of the E2 Program NFTE Research Team July 31, 2018

### Overview

During the 2017-2018 school year, NFTE piloted the Entrepreneurship 2 (E2) program in 7 regions across the United States. The pilot involved 21 schools, 21 teachers and 551 students in urban cities spread across the United States. From June 2017 to June 2018, the NFTE Research Team collected and analyzed data on the implementation and impact of the E2 program. The primary purpose of the evaluation was to inform the NFTE Programs team for any revisions and updates to the curriculum and other materials. In addition, the evaluation sought to identify best practices for both teachers and program managers to prepare them for when the program is rolled out broadly.

### Key Findings from the Evaluation

The following key findings illustrate the main learnings and initial impacts of the program.

- Nearly all teachers who responded to the final survey reported being satisfied with the curriculum and the new PBL approach. More than three-quarters of the teachers who responded to the survey said that they are planning to teach the course next year. Students were more critical of the course with a little more than half of the students who responded to the survey reporting that the course met their expectations. Students with prior NFTE experience were more positive about the course. For students overall, the biggest point of constructive feedback was the repetitive nature of curriculum's worksheets and assignments, especially reflections, as well as issues around navigating the Canvas learning management system (LMS).
- The components of the course that students liked the most included working in teams, developing their mindset, experiential activities and working with advisors (for those programs using the advisor model). As one student remarked about working with an advisor:

*In my opinion, the mentors have been the best thing about this course, because with the mentors, at least, they teach you things.*

*In my first session, I was taught how to make the spreadsheet where you can compare a comparative analysis, which is something that wasn't taught in the NFTE curriculum. And it's actually really helpful.*

- The introduction of a new learning management system for E2 provided new opportunities to deliver the NFTE program but also created challenges for teachers used to more traditional, analogue approaches to teaching. Teachers did get used to the system. Almost half of the teachers responding to the end of year survey reported that Canvas had improved “a lot,” and about a third who responded said it improved “slightly.”
- Curriculum pacing and guidance emerged as one of the key pieces of feedback from teachers throughout the year. Almost half of all teachers reported in the end of the year survey that they had skipped or modified the curriculum sequence in some way. There are also multiple outcomes to the E2 program (unit assignments, pitch deck, ESB, competition), a factor that led many teachers unable to complete all of the course’s requirements.
- The data from the E2 dashboards showed that only half of all students took the first quarterly assessment and even fewer for the next 3 quarterly assessments. Many acknowledged that part of the reason was that the material was new and that they had expected it to get easier after this initial year. As one teacher noted about administering assessments:

*Next year, since I already saw the curriculum, I know what, when, where, etc., I can incorporate those quarterly assessments in a timely fashion as it should....*

- NFTE teachers address a variety of student needs that potentially influence student performance in the course. As one teacher said:

*I have students who are second language English learners. I have students who are on the spectrum, autism. I have special learners. And ... So it's all across the spectrum.*

In some cases, this has an impact on assessments as students come to the course with varying levels of reading comprehension. As one teacher expressed:

*I wish my students were doing better [on the assessments], but it's a reading thing. And I know we're covering the material, I know they work with it, but somehow when it's testing time, and they're left alone, the results are not what I hoped for. It's reading, it's a little bit*

*of apathy or just clicking through. And our kids get tested so much here.*

- Certification proved to be of less importance to students and teachers than expected. Only about a quarter of all students in the pilot actually took the test, with a little more than half of them passing. Students who took all 4 quarterly assessments were more likely to pass the test. Students in schools that regularly offer Certiport exams and have a culture of certification were more successful than other students.
- During the E2 pilot year, we did not see growth in entrepreneurial mindset overall. This may be due to a variety of reasons, including it being a pilot year of learning for teachers. In addition, many of the students coming in had taken OYF and thus would have been coming in with higher confidence in entrepreneurship. We will be analyzing results at the end of next year to better understand E2 trends on the EMI as well as compare them to E1 students.
- E2 students' entrepreneurial self-efficacy, or confidence in their ability to start a new business, appears to increase significantly throughout the E2 program, from 69 percent at the beginning to 82 percent at the end of E2. This is a much higher increase than what we see in OYF.
- When asked about their confidence in their future success prior to NFTE compared to after having taken E2, 69 percent state feeling confident prior compared to 83 percent now, a 14 percent increase.

## **Recommendations for Ongoing Program Management**

Recommendations for curriculum and training changes have previously been provided to the Programs team in the interim report and regular fieldnotes. Below are some final thoughts on the management of the program for the FY2019:

- Conduct regular check-ins to ensure that teachers are on task, following the course scope and sequence and address any concerns about completing course deliverables. The course is not light touch and teachers need frequent support during the year.
- Provide guidance to teachers on making any adjustments/changes to the course flow. Monitor assessment completion rates and direct attention to schools with low turnout rates. Ideally, teachers new to E1 and E2 will be paired up with an E2 teacher from this year.

- Ensure that teachers and students are logged into and using Canvas at the start of the school year. Many teachers and students that initially struggled with the LMS ended up not returning to use the tool during the year. Check in periodically during the year to ensure teachers and students are not experiencing any issues with Canvas. Similarly, make sure teachers have Certiport loaded onto the appropriate computers at the mid-point of the year.
- Address student needs early on and provide support accordingly. NFTE programs are in schools and classes that vary considerably. Some are in magnet schools and programs that screen students for academic ability while others are more open and have high numbers of students with special needs and English Language Learners (ELLs). NFTE program staff need to address how these factors may impact student engagement and performance with course requirements and assessments and provide support to teachers.
- Identify the right context for E2. Anecdotally, the research team found that the best context for E2 seemed to be in schools that have existing business academies, pathways or programs. E2 provided a “capstone” course that allowed students to present a final project in front of their peers and a jury. Students in these programs appeared to be more engaged in the material and invested in their projects.

## **Methodology**

The evaluation team carried out a variety of mixed methods data collection throughout the 2017-2018 school year. These included:

### Qualitative Methods

- Conducted three site visits to three cities in the Fall where we observed 13 classes and interviewed 298 students and 9 teachers. This fieldwork accounted for 54 percent of all students and around half of all teachers in the pilot. We followed up with two site visits to two out of the three cities in the Spring where we observed 5 classes and interviewed 40 students and 6 teachers. In the remaining city, we conducted a phone interview in the Spring with a teacher who had the largest number of students in the pilot.
- Attended three professional development calls among the program manager and teachers.
- Observed two teacher course trainings in the summer.
- Interviewed the course program manager twice to gather his perspective of implementation.

The evaluation team used Institutional Review Board approved classroom observation, training and interview/focus group protocols for the qualitative data collection. During

site visits, two researchers attended all interviews and focus groups. One took notes while the other led the interview/focus group. We also wrote reflection memos after each activity. All interviews and focus groups were recorded with permission, transcribed and coded using Dedoose.

### Quantitative Methods

- Surveyed students and teachers three times, once at the beginning of the year, once at the middle of the year and once at the end of the year. There was a greater number of respondents in the middle of the year (60 percent of all pilot teachers and 40 percent of all students responded to the midyear survey) than the end of the year (43 percent of teachers and 17 percent of students). However, most of the pilot regions were well represented throughout the survey administration.
- Surveyed administrators/principals at the beginning of the year and end of the year. While eight of the nine schools were represented in the beginning of the year, we only received one response at the end of the school year.
- Obtained key assessments and performance tasks data as well as data on teacher and student Learning Management System usage, which was also new to the course this year.

The evaluation team used Institutional Review Board approved surveys for the quantitative data collection. All surveys and assessment data were stripped of identifying information and analyzed at the regional and aggregate levels.

## **Appendix I: E2 Evaluation End of Year Survey Analysis**

The NFTE Research Team administered end of year surveys to students, teachers and administrators in the E2 pilot. The response rates were lower for teachers and students than our beginning and mid-year surveys (43 percent for teachers and 17 percent for students) due to various timing constraints. However, the sample size was large enough for us to analyze. We only received one response from an administrator and so omitted this survey from our analysis.

This memo provides key takeaways and detailed analysis of both surveys. To see survey results in a visual report by question, click on the hyperlink in the title of the two survey headings. These survey findings will serve as one source for the final E2 evaluation memo.

### **Key Takeaways**

- Nearly all E2 teachers who responded to the survey found the E2 course to be an overall success: they reported being satisfied with the curriculum and the new PBL approach as well as reported that their students engaged with E2. More than three-quarters said that they are planning to teach the course next year.
- Students who responded to the survey were more critical of the course with about 60 percent reporting feeling satisfied overall and about 54 percent reporting that the course met their expectations. These percentages increased to 65 and 64, respectively, when we looked at only E2 students with prior NFTE experience. For students, the biggest point of constructive feedback was the repetitive nature of worksheets and assignments, especially reflections, as well as issues navigating the Canvas LMS.
- The majority of students said that being in teams was their most favorite part of E2.
- Students found growing their entrepreneurial mindset and PBL/experiential activities as the most exciting parts of E2, followed by working with their advisor (for those who had the advisor model), and interestingly, certification (although this survey sample includes a 100 self-report percent pass rate from students who took the ESB).
- Curriculum pacing and guidance emerged as one of the key teacher feedback. Around 44 percent of teachers skipped/modified the curriculum sequence and provided comments of streamlining some of the curriculum units and making the planning easier on teachers.
- Teachers also gave mixed results about the utility of the professional development touchpoints during the pilot. About 45 percent of teachers found the monthly cohort check-in calls useful and about 50 percent found the online webinars in Canvas useful.
- Both students and teachers reported a nearly 100 percent completion of the E2 pitch deck for their classroom competition.

## Teacher Insights

### Survey Background

- About 43 percent of E2 pilot teachers (9 out of 21) responded to the end of year survey. This is a lower response rate than the mid-year survey, which was 60 percent. While 6 out of the 7 pilot regions were represented, it was difficult to mandate all teachers give feedback at this point. It is likely that the teachers who took the time to respond to the end of year survey were the more engaged teachers in the pilot. Below is a breakdown of respondents by region compared to overall E2.

	Overall E2 Teachers (Percent of Total)	Survey Sample Teachers (Percent of Total)
Bay Area	5 (24%)	1 (22%)
Chicago	4 (19%)	2 (22%)
DC/Baltimore	2 (9%)	1 (11%)
LA	1 (5%)	1 (11%)
TX	1 (5%)	0 (0%)
Philadelphia	4 (19%)	2 (22%)
Florida	4 (19%)	2 (22%)

- Similar to the mid-year survey, the vast majority of these teachers (close to 90 percent) reported teaching OYF alongside E2.

### Overall

- Nearly 90 percent of teachers reported:
  - Feeling satisfied or very satisfied with the E2 program overall.
  - Feeling comfortable or very comfortable with PBL.
  - Satisfied or very satisfied with the E2 curriculum.
  - Their students were engaged or very engaged with E2.
- More than three-quarters report that they are planning to teach the course next year.
- Qualitative feedback on course improvements include:
  - “I would have expectations that E2 isn't the only class that teachers teach, so I wouldn't expect them to commit to so many hours planning. I would have PD around each section of the Pitch Deck/Lean Canvas (some sections can be combined on one PD), I would make sure that the ESB testing platform is also teacher friendly and I would have IT ensure that it's ready for testing at the beginning of the year.”

### Curriculum and Professional Development

- While nearly 90 percent of teachers reported feel satisfied or very satisfied with the E2 course sequencing [Investigation to Flex], about 44 percent said they skipped/modified units. Reasons for doing this included being behind in the curriculum, found some

modules too time consuming, and felt that Financials (Unit 5) made sense to complete before Planning for Business and Operations (Unit 4).

- Close to 80 percent of teachers had used professional development materials/webinars, mostly through Canvas.
- About 45 percent of teachers said they found the monthly cohort check-in calls helpful (22 percent felt neutrally, and 33 percent said they were not helpful).
- About 50 percent of teachers reported finding the online webinars in Canvas helpful (the other 50 percent felt neutrally).
- Qualitative feedback on course curriculum included:
  - “I believe the teachers need more autonomy in executing the curriculum and I also believe that some of the units need to be combined.”
  - “I would like to see more "completed" examples (or solutions) to some of the activities. The curriculum was extensive for the timeframe we had. Some of my students mentioned they found the EM too repetitive.”
  - “I would make the course more teacher-friendly. I would identify the most important modules that will support student learning, the ESB exam, and the pitch deck, and eliminate supplemental fluff modules. I would model PD like the PD that OYF offers.”
  - “The curriculum is packed full of good stuff! However, with all the other demands in a public school I was unable to finish the curriculum. Link Canvas with our gradebook.”
  - “More options for structured tasks on FLEX days. I understand that the days are meant for students to work on their lean canvas or MVP, but some days a change of pace activity option would have been nice, especially if there was not much to add to their canvas or MVP that day.”

### Canvas

- About 45 percent of teachers reported that their experience with Canvas has improved a lot since the beginning of the year; another 33 percent said slightly. The remaining 22 percent did not feel like their experience had improved.

### End of Year Outcomes

- All teachers reported completing a pitch deck with students.
- Out of the 9 classes, 5 (56 percent) administered the ESB at the time of taking the survey. From the remaining 4, 50 percent said that they planned to administer the ESB (and 75 percent had already installed the Console 8 testing engine). 60 percent overall said they found the Console 8 set up process simple or very simple, although these teachers may not be as representative of the teachers who did not administer ESB given Console 8 challenges.

## Student Insights

### Survey Background

- About 17 percent of students in the E2 pilot (94 out of 551) responded to the end of year survey. This is a much lower response rate than our mid-year survey, which was 40 percent, although not unusual given the trend of lower engagement with assessments



and surveys at the end of the year across NFTE. Some of the senior students had also already left school at the point of survey administration. Below is a breakdown of respondents by region compared to overall E2.

- While there are oversampling and undersampling concerns, sample sizes of 100 are considered to have a fairly low margin of error (10 percent). Having said this, given that implementation was not identical in all regions, we should note that Florida pilot students' viewpoints will be amplified in this data.

	Overall E2	Survey Sample
Bay Area	18%	5%
Chicago	34%	17%
DC/Baltimore	5%	0%
LA	7%	22%
TX	2%	10%
Philadelphia	16%	0%
Florida	18%	46%

### Student Demographics

- The majority of students are 11<sup>th</sup> graders (46 percent), followed by 10<sup>th</sup> graders (23 percent) and 12<sup>th</sup> graders (20 percent).
- About 55 percent have never taken NFTE previously.

### Overall

- 60 percent of students reported feeling satisfied or very satisfied with E2 overall. About 31 percent felt neutrally and the remaining 9 percent said dissatisfied or very dissatisfied. [Note: the percentage of students satisfied goes up to 64 percent if we filter to look at students who have taken NFTE previously].
- Similar to the mid-year survey, students said that growing their entrepreneurial mindset (28 percent) and PBL/experiential activities (25 percent) were the most exciting parts of the class. At the end of the course, however, there were increases in other components as well:
  - Working with a coach/advisor on my business idea (16 percent)
  - Earning the ESB certification (15 percent)
  - Opportunity to participate in competitions (7 percent)
  - Developing a Lean Canvas for my business idea (5 percent)
- Based on the qualitative responses:
  - The favorite part of E2 for students appears to be working in a team.
  - The least favorite part of E2 for students appears to be the repetition of worksheets and assignments, especially the reflections, as well as the issues with Canvas LMS.
- About 54 percent of students felt that the course met their expectations [this increases to 64 percent when looking at students who have done NFTE previously]; another 32 percent were not sure; and the remaining 14 percent said it did not:

- For those who felt that the course met their expectations, they said that they learned a lot.
- For students who were not sure, their responses ranged from the NFTE experience being new for them to them expecting to be in a class that was not entrepreneurship (as some of the E2 courses were blended).
- For students who felt that the course did not meet their expectation, the most frequent reason was that they did not want to work in teams on a business.
- Some final feedback and thoughts from students include:
  - “I really grew as a person and got to understand the efforts that are out when creating and devolving a business. It expanded my mind and sparked my interest in business.”
  - “Class was fun and I got to build up my business and get certified, it was great”

### End of Year Outcomes

- About 70 percent of E2 students report having completed a Lean Canvas for their business (19 percent were not sure and 11 percent said no).
- Almost all students (97 percent) reported using the new pitch deck in their classroom competition.
- At the time of the survey, about 20 percent of students reported having taken the ESB and said that they all passed. Another 40 percent said that they intended to take the exam. The remaining: 20 percent said maybe, 6 percent said no, and 18 percent did not know what it was.
- The vast majority of E2 students will be in high school next year (73 percent). Of those who are graduating, 95 percent report that they will be going to college next year, 21 percent will be getting a job, and 26 percent will be starting their own business (they could select all that apply – hence the number totals more than 100).

	Not At All useful	Not Very Useful	Neutral	Useful	Very Useful	Not sure what this is/Does not apply to me
Working with volunteers/advisors in the classroom Count Row %	3 3.2%	0 0.0%	20 21.3%	37 39.4%	33 35.1%	1 1.1%
Pitching your business idea in a classroom competition Count Row %	5 5.3%	2 2.1%	22 23.4%	30 31.9%	35 37.2%	0 0.0%

## Curriculum, EM and Business Development

	Not At All useful	Not Very Useful	Neutral	Useful	Very Useful	Not sure what this is/Does not apply to me
Experiential activities (e.g., Paper Airplane activity) Count Row %	10 10.6%	1 1.1%	20 21.3%	27 28.7%	33 35.1%	3 3.2%
Having days for learning content and lab days to work on the business idea Count Row %	5 5.3%	2 2.1%	26 27.7%	33 35.1%	25 26.6%	3 3.2%
Practicing and reflecting on my entrepreneurial mindset growth Count Row %	4 4.3%	5 5.3%	20 21.3%	31 33.0%	33 35.1%	1 1.1%
Developing a business idea Count Row %	3 3.2%	2 2.1%	17 18.1%	34 36.2%	38 40.4%	0 0.0%
Using the Lean Canvas to develop a business idea Count Row %	7 7.4%	4 4.3%	25 26.6%	27 28.7%	28 29.8%	3 3.2%
Using the digital tools on Burn Rate, Revenue Streams, or Distribution Channels Count Row %	5 5.3%	8 8.5%	27 28.7%	24 25.5%	25 26.6%	5 5.3%
Working in a team Count Row %	3 3.2%	4 4.3%	23 24.5%	23 24.5%	40 42.6%	1 1.1%

**Appendix II:  
E2 Pilot End of Year Insights, EMI  
July 2018**

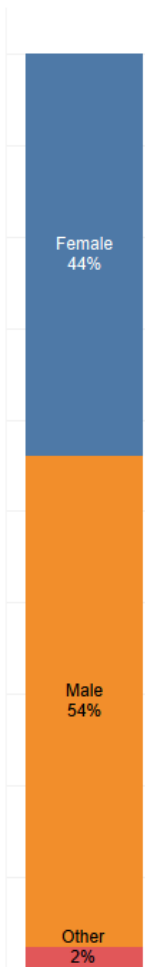
**Overview**

The NFTE Research Team administered the Pre- and Post-Entrepreneurial Mindset Index (EMI) as part of E2 pilot assessment administration. 383 students took the EMI at the beginning of the year and 122 students took the EMI at the end of the year. We were able to identify 84 students who took the EMI at both points in time (an approximately 70 percent match rate, which is on par with prior NFTE analyses).

The below insights are based on the matched EMI students. We present E2 student demographics, entrepreneurial mindset results, and other impact measures related to the mindset and the program.

**E2 Demographics**

**Gender**



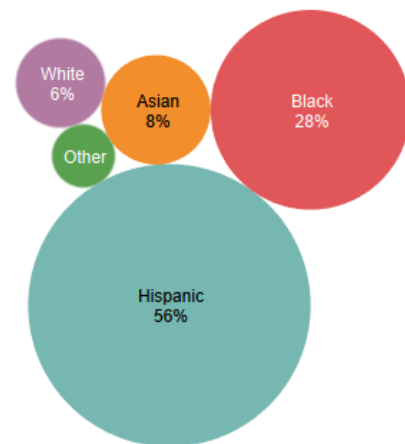
**U.S. Born**

Yes	87%
No	13%

**Grade**

8th	11%
9th	1%
10th	20%
11th	46%
12th	21%

**Race (Totals 100%)**



NOTE: Based on matched EMI student records (n = 84).

## Entrepreneurial Mindset Index (EMI) Results

During the E2 pilot year, we did not see growth in entrepreneurial mindset overall. This may be due to a variety of reasons, including it being a pilot year of learning for teachers as well as the pilot implementation being different across regions. Another potential reason may be due to E2 students coming in with a higher level of entrepreneurial mindset. We will be analyzing results at the end of next year to better understand E2 trends on the EMI as well as compare them to E1 students.

### E2 EMI Results



### Entrepreneurial Mindset – Other Measures

We also analyzed other measures related to entrepreneurial mindset and found some interesting results. These include:

- E2 students' entrepreneurial self-efficacy, or confidence in their ability to start a new business, appears to increase significantly throughout the E2 program, from 69 percent at the beginning to 82 percent at the end of E2. This is a much higher increase than our prior NFTE programs.

- E2 students' intent to start their own business persists throughout the E2 program, at about 79 percent wanting to own a business. This is encouraging given that research (and our own prior NFTE results) suggest that entrepreneurial intent on average goes down after students go through an entrepreneurship education program.
- E2 students also seem to demonstrate a high increase in the number of times they have presented an idea in front of their peers, going from 72 percent having presented 2+ times at the beginning of the year to 85 percent reporting having presented 2+ times at the end of the year.

### **Course Outputs**

We asked students information on end of course deliverables:

- 96 percent report having completed a Lean Canvas at least partially (61 percent report having completed it entirely). These numbers are in line with the end of year surveys.
- 67 percent report having competed in a classroom competition. Of those who reported competing, 70 percent state that they had judges who were part of the community (and not just the school) in their classroom competition.
- 70 percent report having worked with a coach/advisor on the Lean Canvas, with 85 percent having worked with the coach/advisor 3+ times.

### **Course Impact**

- 92 percent of E2 students report that the class taught them practical skills.
- 88 percent of E2 students report that they liked the ways they learned in E2.
- 74 percent of E2 students report that the course is more relevant than their other courses.
- 81 percent of E2 students say they would recommend E2 to a friend.
- When asked about their confidence in their future success prior to NFTE compared to after having taken E2, 69 percent state feeling confident prior compared to 83 percent now, a 14 percent increase.

**Appendix III:  
Certiport ESB Report of E2 Pilot  
June 2018**

**Summary**

In 2017-2018, NFTE implemented a pilot of the Entrepreneurship II (E2) course. At the end of the course, E2 students were given an opportunity to become certified in Entrepreneurship and Small Business (ESB), a new Certiport certification offering. Students were able to practice for ESB through four Quarterly assessments, provided by NFTE in the Canvas LMS, as well as GMetrix, an external practice test recommended by Certiport. Both of these resources aligned with the content on the ESB exam. During the pilot year, all schools received ESB and GMetrix vouchers at no cost. This report illustrates E2 students' performance on ESB during the pilot year as well as provides insights on the effectiveness of the practice resources and the implementation challenges around ESB.

**Key Findings**

- The overall pass rate was 53 percent. This included 10 classes across 7 regions with a total of 173 students. See the following section for a detailed breakdown of pass rates by school and region.
- Out of the 10 teachers who administered ESB, all of them administered at least 1 Quarterly assessment and 9 used GMetrix.
- Various statistical analyses suggest that Quarterly assessments have a strong relationship with passing the ESB:
  - Participation in the Quarterly assessments is a significant predictor of ESB scores. Of the 21 teachers participating in the pilot, 19 administered a Quarterly assessment. Overall, 64 percent of students completed at least one Quarterly assessment.
  - Students seemed to have a better chance of passing the ESB if they took more quarterly assessments. Of the 31 students who completed all four Quarterlies, 81 percent passed the ESB.
  - Students who performed well on the Quarterly assessments seemed to be more likely to score higher on the ESB.
- There is also a relationship between GMetrix and performance on the ESB, but not as strong as the Quarterly assessments:

- Taking the GMetrix practice test seems to matter for students’ chances of scoring higher on the ESB.
- However, GMetrix was not as strong of a predictor for passing the test. Of the students that passed, about half (52 percent) used the GMetrix practice tests. There is not a significant relationship between using GMetrix and passing ESB. There also does not seem to be a relationship between passing ESB and GMetrix performance or the number of times students took a GMetrix test.
- Based on interviews with teachers and conversations with Certiport, the primary challenges to administering ESB were technical issues with Console 8, technical issues with ESB set up after Console 8 was installed, lack of interest and low participation, number of ELLs and lack of time as the school year came to a close.
- Of those teachers who administered ESB, 60 percent were in schools who administer other Certiport certification exams. The Research Team observed the “certification culture” in a few of these schools during site visits. It also helped that these schools already had Console 8 installed and were familiar with the ESB/GMetrix processes.

**Detailed ESB Results\***

A total of 10 teachers administered ESB, one of which did not participate in GMetrix. Overall, the pass rate is 53 percent. A breakdown of the pass rate for ESB is shown below.

	Pass	Fail	Total Number of students	Other Certiport Opportunities (marked with X)
Arroyo High School	0%	100%	1	
Dallas ISD – W.T. White High School	100%	0%	4	
Delaware Design-Lab High School	100%	0%	8	
Franklin Learning Center	100%	0%	10	X
Hallandale High School – Broward	51%	49%	37	
John A. Ferguson Senior	75%	25%	24	X
Jose Marti 6-12 MAST	81%	19%	21	X
LAUSD – Carson Senior High School	4%	96%	27	X
Oxon Hill High	46%	54%	13	X
Perspectives High School of Technology	23%	77%	26	X



	90	83	173	
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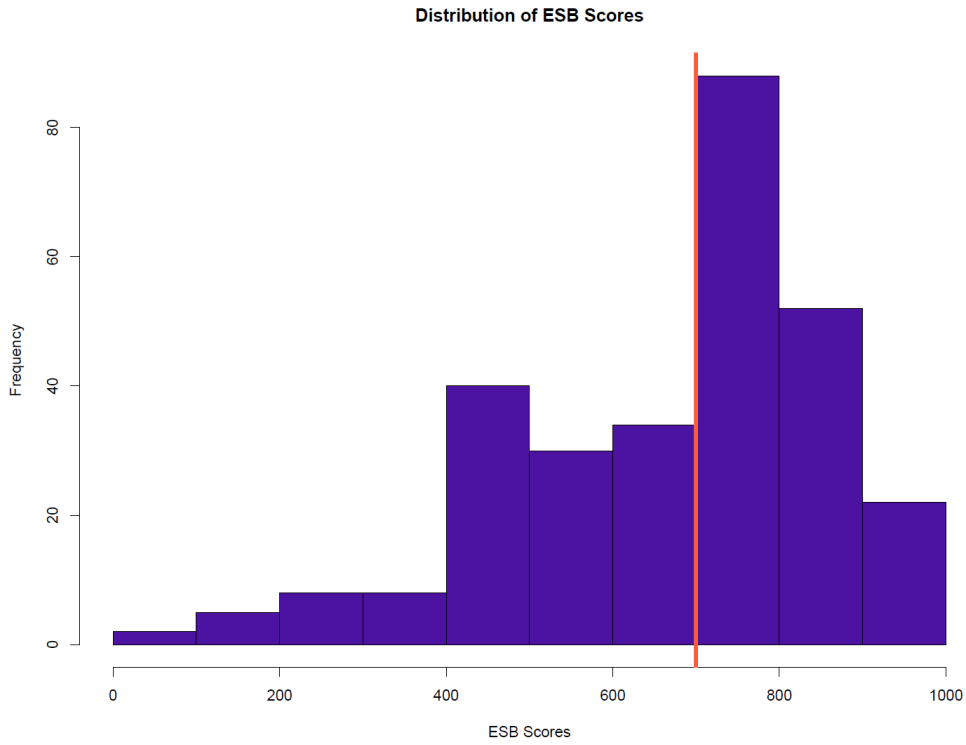
At least one school from the seven regions was involved in the ESB portion of the E2 pilot (Bay Area, Chicago, DC/Baltimore, Los Angeles, Texas, Philadelphia and Florida). Florida is the best-represented region in the analyses with three schools. Philadelphia had two schools participate in ESB, while the other remaining regions only have one school representing them.

Region	Pass	Fail	Total number of students
Bay Area	0%	100%	1
Chicago	23%	77%	26
DC/Baltimore	46%	54%	15
Los Angeles	4%	96%	27
Texas	100%	0%	4
Philadelphia	100%	0%	18
Florida	66%	34%	82

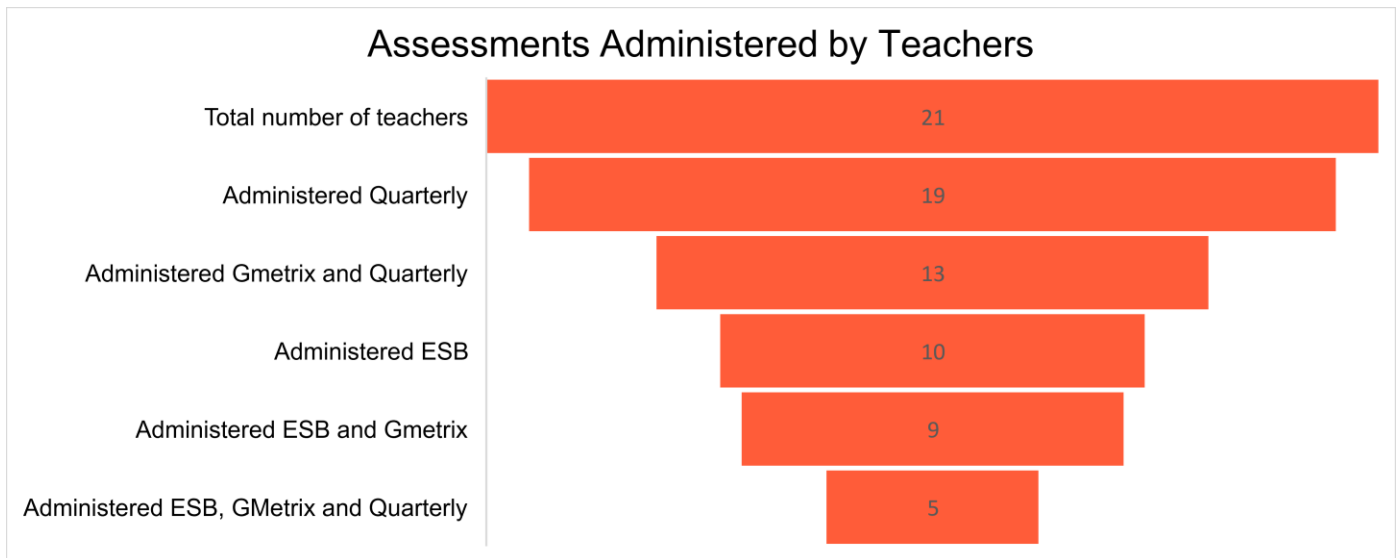
Many of these students were offered a chance to re-take the assessment after having failed; around 50 students were given this opportunity and 57 percent were able to pass on their second attempt. Though not a significant amount, the re-take option did increase our overall pass rate from about 40 percent to over 50 percent.

Regionally, Philadelphia employed this feature of ESB the most, with 82 original data points (39 percent passing) before removing duplicated students' failed scores. Oxon Hill High students in D.C., Carson High School students in L.A. and Arroyo High School students in the Bay Area took this assessment on their last day of classes and were unable to re-take the assessment. With this in mind, we can see that the re-take feature, when utilized, greatly benefits the students and allows for an increase in certifications awarded.

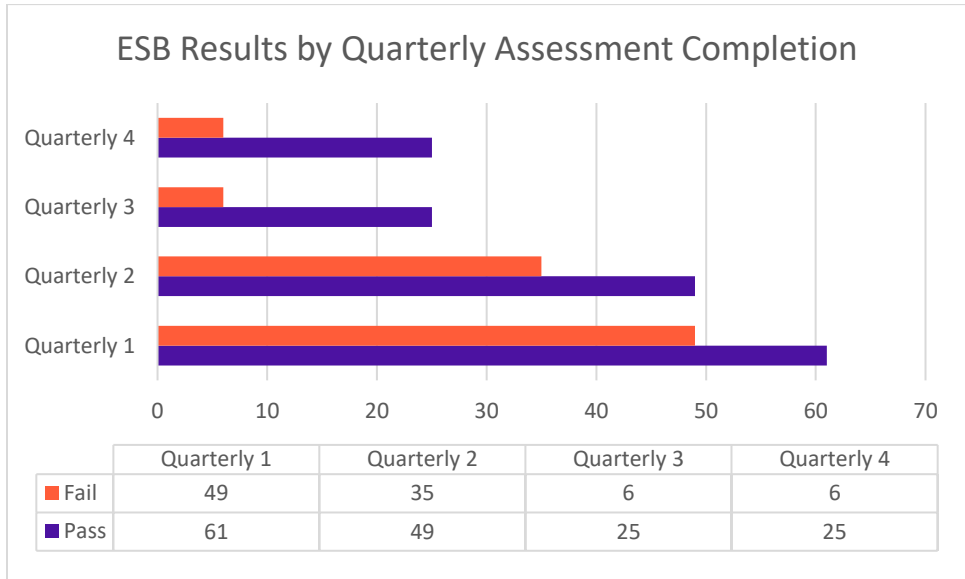
A histogram of the results is shown below; the vertical line indicates the passing cut-off score of 700. The distribution of scores has a right-skew, suggesting more students pass than fail. In addition, we do not see too many students on the cusp of passing. This is likely due to the re-take feature; students who nearly passed the first time had a better chance of passing the second time. In addition, teachers indicated that they had pushed students with scores 600-699 to take ESB a second time.



The chart below indicates how many teachers administered each of the assessments.

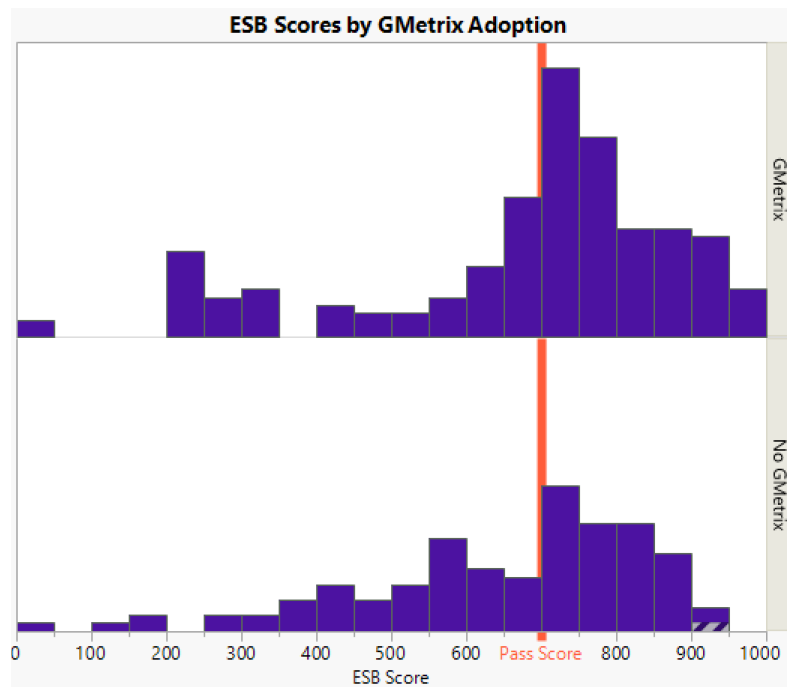


We see an interesting relationship between Quarterly assessments and ESB results. Of the 31 students who had taken the four Quarterly assessments, 6 failed ESB and 25 passed. These results are the same for those who took Quarterly 3. Of the students who completed Quarterly 1, 49 failed and 61 passed; while 35 of those who completed up to Quarterly 2 failed ESB and 49 passed. As we can see, our overall sample reduces, but the proportion of students passing increases significantly.



Below is a breakdown of students who passed/failed ESB based on their participation in GMetrix as well as a histogram of ESB scores based on whether students took GMetrix. The two visuals indicate that while there was not as much difference between the pass rate between GMetrix and non-GMetrix users, the students who scored higher on the ESB were those who also participated in GMetrix.

	Did not take GMetrix	Did take GMetrix
Pass	56	60
Fail	25	30



## Statistical Analyses

After merging the data, 123 students were found to have taken GMetrix, ESB and have available data in Canvas. Of the students who had completed both ESB and Quarterly assessments, six did not take any Quarterly assessments.

### ESB and Quarterlies

Of students who had completed all assessments associated with E2, 87 took only the first Quarterly assessment. A multiple regression analysis suggests that scores on Quarterly 4, for those who completed it, were not significant predictors of ESB scores and, therefore, do not predict certification status. According to a different multiple regression model, however, combined Quarterly scores on Canvas are significant predictors of ESB scores when accounting for a student's school, time used to take ESB and whether or not he/she participated in GMetrix ( $p < .01$ ). That is, when students are not penalized for taking fewer than four of the Quarterly assessments, their scores on the Quarterlies are significant predictors of ESB scores.

### ESB and GMetrix

After merging the GMetrix and ESB datasets, 171 students were matched after removing duplicates; two ESB observations were incomplete and were excluded from analyses. Only 81 students had taken both GMetrix and ESB, while the remaining 90 took just ESB. Results from the chi square test of independence suggest that there is not a statistically significant relationship between GMetrix participation and ESB outcomes. Scores are marginally higher for those who took GMetrix, but this is not a significant relationship. It is important to note, however, that the statistic used for this

analysis is a chi square, which is very sensitive to sample size and can be misleading with particularly small, or large, samples such as ours.

We were able to see, however, that scores on ESB are significantly related to where a student attends school, which includes the student's teacher since each school just has one teacher representing it. In addition, results from a statistical analysis suggest that students who have taken GMetrix score, on average, 62.55 points higher (out of 1,000) on ESB when holding constant the time it took a student to complete the test and the school that the student attends ( $p < \alpha = .05$ ). However, scores on GMetrix are not significant predictors of scores on ESB; that is, practice with the material is related to higher test scores, but performance on the practice is not. In conclusion, practicing with GMetrix can lead to higher test score, but does not necessarily predict passing ESB. This is confirmed through both a chi square test of independence and a multiple regression analysis.

Similarly, the amount of times a student took a GMetrix practice test is not a significant predictor of ESB score ( $p = .83$ ). Therefore, we can conclude that practice with the material is important for higher test scores and, as a result, certification on the ESB exam; however, increased practice does not necessarily predict higher scores on ESB, nor does higher scores on the practice test. One teacher noted that students are able to go back on GMetrix and change their answers, which may explain why GMetrix scores are not good predictors for ESB scores – GMetrix scores are not true representations of a student's ability.

### ESB, Quarterlies and GMetrix

Fifty-six of the students who took a quarterly assessment did not take GMetrix while 31 did, indicating that only 31 students in our sample had experience with all forms of practice and an opportunity to become certified. As noted previously, 25 of those 31 students passed ESB, which is quite a large proportion. The actual scores on the Quarterly assessments, however, are not significant predictors, indicating that it is not necessarily about student performance on the practice, but more-so about grappling with the information. This suggests that understanding the course material, either when developed by NFTE or by a third party like GMetrix, is imperative for receiving certification in Entrepreneurship and Small Business.

