First2 Network Coaching Handbook

Hello Coach,

Welcome to the First2 Improvement Science Team!

Improvement science is a disciplined approach to testing ideas for systems change. The First2 Network uses improvement science to test high-impact practices — "change ideas" — that improve retention of first-generation and other under-represented college students in STEM fields. First2 has developed a theory of change that identifies four primary drivers of success (see resources below) for these students. Institutional teams within the First2 Network plan, conduct, study and act on change ideas using a Plan Do Study Act (PDSA) cycle, then share their findings throughout the Learning Community Network (LCN).

First2 Improvement Science Coaches are essential to our improvement science process, helping institutional teams meet the standards and goals of First2. Please use the resources following in this document to learn about coaching improvement science work and support you in planning for coaching sessions.

If you have questions or concerns you can always reach out to Brigid Brown, our First2 Network Improvement Science and Data Manager, at first2measurement@gmail.com.

Thank you for the great work you are doing and your dedication to the First2 Network.

With gratitude,
The First2 Network Improvement Science Team

Brigid Brown, Co-chair
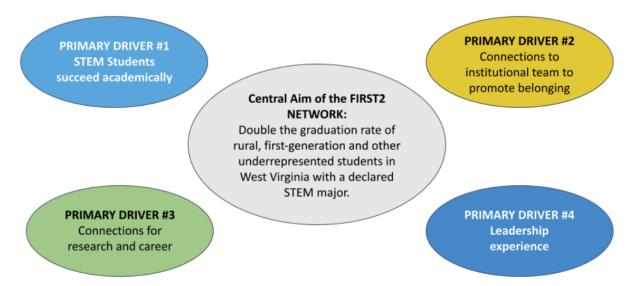Sue Ann Heatherly, Co-chair

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Useful Links

- **Networked Improvement Community:**
  - https://www.carnegiefoundation.org/blog/why-a-nic/
- **Improvement Science Resources**
  - https://first2network.org/pdsa-resources/
- **Overview of Institutional Team Structure**
  - https://docs.google.com/presentation/d/1ngbTHdgg0PS_ejIuEQE_AU1bpWHmA7fAz4oAUPSDXms/edit?usp=sharing
- **Institutional Team Onboarding**
  - https://docs.google.com/presentation/d/16hyJFVVNQqcbn1cGLLbxVvmXBZKupoToO0QzhXkd6uw/edit?usp=sharing
- **PDSA Process**
  - https://docs.google.com/presentation/d/1kf9C3SKIGZfjLkzoGOjk0Yye9qCZ_HBN/edit?usp=sharing&ouid=106780631075508067182&rtpof=true&sd=true
- **PDSA Status Tracker**
  - https://docs.google.com/spreadsheets/d/1-ScQ1VeDANrhZr7J6f1jrAj-X6OUfTDwdkI5uGrjPIk/edit?usp=sharing
- **Office Hour Ideas**
  - https://docs.google.com/document/d/1lS9oAK47w8kOaYi9McAU0v-g9gqtTn31QiK-4nLd-b4/edit?usp=sharing
- **Learning Improvement Strategies 2023**
  - https://docs.google.com/document/d/1JT9ehuwbhKmKiVyDvMMZI8ZaRIcMlIcIodMoHhmDrRg/edit?usp=sharing

Four Primary Drivers of Success

FIRST2 DRIVER DIAGRAM: A look at how First2 Network plans to achieve central goals.

PRIMARY DRIVER #1
STEM Students succeed academically

PRIMARY DRIVER #2
Connections to institutional team to promote belonging

Central Aim of the FIRST2 NETWORK:
Double the graduation rate of rural, first-generation and other underrepresented students in West Virginia with a declared STEM major.

PRIMARY DRIVER #3
Connections for research and career

PRIMARY DRIVER #4
Leadership experience

For full driver document visit:

https://docs.google.com/presentation/d/1oO62KoMd0-KVEqDqUh4yJolJ5ANRpt1-/edit?usp=sharing&ouid=106780631075508067182&rtpof=true&sd=true

Improvement Science and Coaching Best Practices

Pre-Coaching

- Familiarize yourself with the First2 Coaching Checklist (https://docs.google.com/document/d/1vW6cxsNDTfUiJlFtfMLzHdxOK4eAwrji8VJLEi_aV7M/edit?usp=sharing) and refer to that document prior to coaching.
- Find PDSA in PDSA Status Tracker (https://docs.google.com/spreadsheets/d/1-ScQ1VeDANrhZr7J6f1jrAj-X6OUfTDwdkI5uGrjPIk/edit?usp=sharing) and ensure that the status matches your understanding. If it doesn't, contact Brigid Brown (first2measurement@gmail.com).
- Review existing PDSA document or description from Coaching Request Form (https://docs.google.com/forms/d/1zsZL4QBRPH28CpbQArNgTbk8Eds1E16mLlBOla9CCFA/edit); output from this form is available on the third tab of the PDSA Status Tracker document
  - Overall focus on both big ideas and details.
  - Alignment with First2 Drivers (https://docs.google.com/presentation/d/1oO62KoMd0-KVEqDqUh4yJolJ5ANRpt1-/edit?usp=sharing&ouid=106780631075508067182&rtpof=true&sd=true)
  - Change idea description
  - Learning questions include process and outcome measures
  - Learning questions include at least one of the six required outcome (https://drive.google.com/file/d/1F3QuNvJKR2jvsOHxnx5_yCxJBIlpivXI/view) measures:
    - Persistence/reenrollment
    - Course completion rate
    - Course pass rate and/or grades
    - Belongingness
    - Grit
    - Self-efficacy
  - Match predictions to learning questions
  - Surveys and other metrics
- Review similar PDSAs if available, such as prior PDSA cycles with the same change idea from the same institutional team or other institutional teams located in our PDSA Status Tracker (https://docs.google.com/spreadsheets/d/1-ScQ1VeDANrhZr7J6f1jrAj-X6OUfTDwdkI5uGrjPIk/edit?usp=sharing)
- Consult with other First2 coaches as needed

'Plan' Coaching

- Positivity sandwich: open with highlights, use constructive critiques, and end with statements of good work. Use when appropriate, but the goal is to be direct and constructive.
  - Open with positives: "glow"
  - Emphasize to the team the good work they are doing for the network and reinforce the potential for systems change from this PDSA and its scaling.
- Confirm your (coach) understanding of the overall purpose of the PDSA and the key components of the change idea
  - Summarize your general understanding of the PDSA cycle and change idea, asking the PDSA Lead to clarify any misunderstandings you might have
  - Alternatively, ask the PDSA Lead (person implementing the PDSA) to summarize the key points (e.g., drivers, change ideas, learning questions, outcomes, etc.).
- Talk through the PDSA Template section by section, usually in the order the template is organized.
- Spend as much time as necessary to talk through the Change Idea Description section and the Learning Questions section.
  - All other sections of the PDSA template flow from these two sections, so getting these two sections correct is critical to ensuring high-quality PDSA work.
  - Do learning questions include process and outcome measures?
  - Do learning questions include at least one of the six required outcome measures (https://drive.google.com/file/d/1F3QuNvJKR2jvsOHxnx5_yCxJBIlpivXI/view)?
    - Persistence/reenrollment
    - Course completion rate
    - Course pass rate and/or grades
    - Belongingness
    - Grit
    - Self-efficacy
- Predictions: Make sure these are specific and match the Learning Questions.
- Walk through details of implementation of the Plan.
  - Details of target audience, recruitment, outreach
  - Prioritize actions and determine who is responsible for what
  - Confirm all First2 members participating/carrying out the activities for this PDSA
  - Timeline for each step of implementation
  - Discuss whether surveys will be used.
- Discuss plan for data collection
  - What kinds of data will be collected? (surveys, academic records, attendance)
  - Determine survey questions
  - Will data answer the learning questions?

- - Survey timeline should be established (e.g. distribution, completion, and summary)
      - How will data collection occur: who will collect data, from whom, and at what point in time?
    - Are surveys linked and/or questions listed in the PDSA document
      - Are the [Priority Common Questions (https://docs.google.com/document/d/1NFGrCM39sZvsaMwWJHokTS0Nr91QcOUufodtC8iVHuo/edit)](https://docs.google.com/document/d/1NFGrCM39sZvsaMwWJHokTS0Nr91QcOUufodtC8iVHuo/edit) included?
- Address larger impact of the PDSA in our learning community
  - Address what system changes could result from this PDSA
  - Consider scaling potential (how many students in this institution could be impacted over time, how many institutions could replicate this PDSA)
  - Consider iterability (is this a one-off or is this intended to be repeated multiple times)
- Establish timeline for conducting and completing the entire PDSA (to help Brigid know when to check in with the team.)
- Reminder to work with your team's IRB liaison to obtain approval from Institution's IRB.
- End on a positive note. (Examples: thank you for the great work you are doing for the First2 Network, it is great to see your team coming together on "this" project, this idea has a lot of potential for systems change and scalability).
  - Mention again some specific high point in the plan.
- Complete the [Coaching Update Form (https://docs.google.com/forms/d/e/1FAIpQLSdW0tgFAMO6YrmleXJMT1FKoYlsTxQwu-rv86wsHb52U0P8Mg/viewform)](https://docs.google.com/forms/d/e/1FAIpQLSdW0tgFAMO6YrmleXJMT1FKoYlsTxQwu-rv86wsHb52U0P8Mg/viewform)

Completion Coaching (Before final Approval of Completed PDSA)

NOTE: Institutional teams may request assistance from IST coach(es) to review collected data before Do and Study Sections have been drafted.

'Do' Coaching

- Institutional Team may draft/complete this themselves
- Check to see how closely the implementation plan matches what occurred
- During the coaching, thoroughly explore and understand the data collection:
  - Were data collected as planned? If not, why not?
  - Can the learning questions be adequately answered with the data collected?
  - Can the data still be collected if needed? If so, create an action plan for getting the needed data prior to final approval.
- Ensure there are links to deidentified survey data collected by the Institutional Teams.

'Study-Act' Coaching

- If requested, meet with Institutional Team members to assist.
- We hope the full Institutional Team is involved in the "Study" activity.
  - Who was involved in the review?
  - Were any key people missing from the review?
  - Optional data review with IST.
- Ask questions that probe what the team thought about the data during their discussion.
- Check that all learning questions were answered and predictions were assessed with specific references to data.
  - If some learning questions cannot be answered and/or some predictions cannot be assessed due to missing data, have the PDSA Lead explicitly document which cannot be answered/assessed and why.
- Check that all learning questions and predictions were answered/assessed accurately based on the data.
- How was the Act decision determined?
  - Was scalability considered in the decision, either within this institution or with other network institutions?
- Check that the Act decision and next steps are aligned to the Study section.
  - For example, there is a lack of alignment in deciding to ADOPT a change idea because it was successful when the Study section indicates missing data prevented understanding whether students benefited from the change idea.

Onboarding of New Coaches

Sequence of coaching apprenticeship:

1. Join IST and attend some meetings.
2. Read our PDSA Resources page (https://first2network.org/pdsa-resources/) at First2Network.org to understand more about the improvement science process and how First2 acts as a learning community.
3. Engage in a coaching apprenticeship with an experienced coach involving 4 sessions, where a "coaching session" involving shadowing includes a pre-coaching planning meeting, shadowing during a coaching session, and a debriefing meeting afterwards.
   a. For the first two shadowing sessions, existing coach is the head coach and new one is the shadow.
   b. Session 3 is for co-piloting - new coach is lead and experienced coach is co-pilot. New coach doing more leading and facilitation.
   c. Session 4 - new coach leads and experienced coach is there to be available.

Norms for Improvement Science Work

General

- Institutional Teams carry out PDSAs.
  - Institutional Teams are composed of the participating faculty, staff, administrators and First2 funded students at each institution.
  - Although a PDSA Lead(s) is identified, the whole team "owns" the PDSA and should be vested in it.
  - PDSAs should identify all actors involved in conducting each step of the PDSA, including both implementation steps and data collection steps.
  - Coaches help reinforce to PDSA Leads that the STUDY section is ideally done by the full Institutional Team, instructed by the PDSA Lead(s).
  - All funded First2 students at an institution are part of their institutional teams.
- When the PDSA Lead(s) is a faculty member, remind them of the additional incentive that this work can benefit their academic career more widely, as PDSA work can lead to conference presentations and publications.
- The term "First2 students" in the Driver Diagram refers to ALL rural, first-gen and other underrepresented STEM students at an institution, not just funded First2 students.

Eligibility for Approval of PDSA Plan by IST

1. PDSA must include at least one of the six primary outcomes detailed in the First2 Measurement Examples document (https://docs.google.com/spreadsheets/d/1kGEcs5DeNTYcD7LM3FV-86NUPQPLWMu0/edit#gid=1383867739); Probationary Status, Course Completion, Retention/Persistence, Grit, Self-Efficacy, Belonging.
2. Teams will be encouraged to use IST-approved templates (https://drive.google.com/drive/folders/1hlj6r-e4oFlXibTwQv8_VD3wHW7RIK9w).
3. Teams will be encouraged to use existing common metrics and surveys (https://docs.google.com/spreadsheets/d/1V7-Jh73XMTorBowmnVFjX3k0QCwDKhgt-Qpxx2sXf7Q/edit#gid=0) that measure the six primary outcomes.
   a. Whenever possible, PDSA surveys will include 9 Priority Common Questions (https://docs.google.com/document/d/1NFGrCM39sZvsaMwWJHokTS0Nr91QcOUufodtC8iVHuo/edit) that measure belonging, grit, and self-efficacy, in order to assist collection of common data across different change ideas throughout the network.
4. The change idea must be aligned with the First2 Driver Diagram (https://docs.google.com/presentation/d/1oO62KoMd0-KVEqDqUh4yJolJ5ANRpt1-/edit?usp=sharing&ouid=106780631075508067182&rtpof=true&sd=true), but does not require alignment (though encouraged) with existing change ideas.

a. When a new change idea is proposed by an institutional team, IST must review and determine whether to accept.
b. Some change ideas may be encouraged as team activities, even if not meeting the criteria for a PDSA.
c. Some PDSAs may connect with more than one of the Primary and Secondary Drivers.
5. PDSAs must be intended to be repeated multiple times to ensure they are iteratively improved.
a. The PDSA must include an intended cadence, but the particular cadence is not specified by IST (e.g. every few weeks, once a semester, once a year are all possible).
6. Teams are encouraged to consider scalability of their change ideas with a goal of reaching a broader sample of First2's target population of first-generation and other under-represented students in STEM.
a. Example: First2 Campus Club PDSA predicts that at least 10% of first-gen first- and second-year SSTEM majors will attend at least one campus club event each month.
7. Retroactive approval of PDSAs.
a. Retroactive approval is not a typical or desirable practice, but there have been and could be in the future extenuating circumstances that indicate a need to coach a PDSA that has already been initiated.
b. The IST could make a retroactive approval in the following circumstances:
    i. Willingness of the institutional team to continue or add to data collection to ensure that one of the six required outcomes is measured.
    ii. Demonstration by team of a good faith effort to obtain coaching in a timely manner.
    iii. Plan coaching was completed but a revised Plan was not submitted before the Do section was initiated.
    iv. PDSA has high potential for being repeated and scaled, especially at multiple institutions, if some initial data are available after retroactive approval.

Coaches' Communication with IST

1. Coach assignment and follow-up.
a. Institutional teams request coaching assistance by completing this Coaching Request Form (https://docs.google.com/forms/d/e/1FAIpQLSejMvcJ4HdNFYlL1X6ZYyrkkK_bVKEGg9bc-NKN2O8ElvOAfA/viewform).

b. The Improvement Science and Data Manager (Brigid Brown) will respond to coaching requests in a timely manner and schedule sessions according to availability to PDSA leads and coaches.

c. If PDSA Leads or institutional liaisons reach out directly to coaches for coaching, coaches will copy Brigid on their response and/or refer them to the coaching request form.

2. Coaches will complete a [Coaching Update Form](https://docs.google.com/forms/d/e/1FAIpQLSdW0tgFAMO6YrmleXJMT1FKoYlsTxQwu-rv86wsHb52U0P8Mg/viewform) (https://docs.google.com/forms/d/e/1FAIpQLSdW0tgFAMO6YrmleXJMT1FKoYlsTxQwu-rv86wsHb52U0P8Mg/viewform) following each coaching session and after requested revisions are approved. Form entries feed into a sheet in the PDSA Status Tracker.

3. The Improvement Science and Data Manager will update the PDSA Status Tracker and report on PDSA status each week during IST regular meetings.

4. IST will review and discuss PDSAs in progress at each weekly meeting.

5. In most cases, coaches are authorized to approve PDSA plans and complete PDSAs on their own, but are encouraged to request assistance from IST to resolve questions about PDSAs that arise during pre-coaching or coaching sessions.

   a. New change ideas proposed by institutional teams.

   b. Requests for retroactive approval

   c. Other PDSA eligibility criteria

6. In the following cases, PDSAs must be discussed by IST before a PDSA is approved by a coach.

   a. Any new change idea (not just PDSAs) that in the coach's understanding are not replications or adaptations of existing change ideas that have been tested at least once already.

      i. If using one of the common PDSA templates, it would be unlikely that it would need to be discussed.

      ii. Example: If Fairmont State is doing SciTech social and WVU is doing a social and both are using the common [student-faculty social interactions](https://docs.google.com/document/d/1bPZfn_QGMPd3gWR9kf3hZ0EBfmPFj4_n/edit?usp=sharing&ouid=10678063107550806182&rtpof=true&sd=true) (https://docs.google.com/document/d/1bPZfn_QGMPd3gWR9kf3hZ0EBfmPFj4_n/edit?usp=sharing&ouid=10678063107550806182&rtpof=true&sd=true) template, IST agrees that those two would not need to be discussed or approved.

First2 Coaching Checklist

Quality Criteria	Criteria Present?
PLAN: Articulation of a clear hypothesis and learning goals	

• Change idea is specified and developed?
  a. Clear actors and action verbs
  b. Aligned with First2 Driver Diagram (https://docs.google.com/presentation/d/1oO62KoMd0-KVEqDqUh4yJolJ5ANRpt1-/edit?usp=sharing&ouid=106780631075508067182&rtpof=true&sd=true)
  c. An iteration of a First2 high-impact change idea (https://docs.google.com/document/d/10jaSgUjGWfIFsuGFTAb9S25Wfv5Dm6te3rt1dcI8e7A/edit); not required, but encouraged)	

• Are the learning questions of the cycle clear and appropriate to measuring the processes and outcomes of the change idea?
  a. Are there process questions around recruitment, participation, engagement?
  b. Are there outcome questions around the intended impacts of the change idea?
  c. Is there at least one question that includes one of the required six primary outcomes (https://docs.google.com/spreadsheets/d/1kGEcs5DeNTYcD7LM3FV-86NUPQPLWMu0/edit#gid=1383867739); Probationary Status, Course Completion, Retention/Persistence, Grit, Self-Efficacy, Belonging?	

• Clear predictions?
  a. Do the predictions align with the learning questions?
  b. Are predictions readily measurable?
  c. Avoid yes/no predictions when possible: "to what extent"	

• Scalability of the test appropriate?
  a. How many students (or what percent of the total target population at an institution) will this impact?
  b. Possible impact to a broader population?
  c. To what extent can the scale of this test affect systems change?	

• Is the PDSA iterable?
  ○ Intended to be repeated multiple times
  ○ Intended cadence for repetition (once per semester, once a year, etc.)
  ○ Has an iterable design.	

• Details of implementation
  ○ Alignment with change idea description
  ○ Is detail adequate so that another team could duplicate?
  ○ Details in chronological order of when they will be done.
  ○ Is the timeline feasible?
  ○ Are actors specified? (Who is doing what, when, and how)	

• Data collection plan? (learning questions and predictions are clear)
  a. Are there clear actors and action verbs for who will be collecting what data from whom at which points in time?
  b. Will the data collected be sufficient to answer each of the learning questions (LQs) and assess the predictions?
  c. Are surveys, etc. linked for reference?
  d. If using a pre-/post- design, does the data collection plan include both time points?
  e. Which of the Priority Common Questions (https://docs.google.com/document/d/1NFGrCM39sZvsaMwWJHokTS0Nr91QcOUufodtC8iVHuo/edit) are included?	

Additional points to consider: • Does the change idea have the potential to interrupt inequitable practices? • Are assumptions explicit so they can be tested? • Have we integrated user voice to understand the user experience of the change?	

DO: Documentation of learning	

• **Was the PDSA carried out as planned?**
  ○ How closely do the details match the implementation plan?
  ○ Did anything unexpected happen?	

● **Interrogate the data collection.**
    ○ Was data collected as planned? If not, why not?
    ○ Can additional data still be collected? Is there an action plan to do so?
    ○ Are links to survey data provided? (Or a detailed description of data included in the PDSA document?)	

STUDY: Evaluate the original hypothesis	

● **Thoroughness of data review.**
    ○ Compare what actually happened with predictions.
    ○ What questions do the data bring up?
    ○ Was the full institutional team involved in the study activity?
    ○ How does the team interpret the data? What observations did the team make?	

● **What are the key learnings?**
    ○ Is there new learning or theory refinement?
    ○ Is there explicit reference to the original hypothesis, predictions and goal(s)?	

● **Equity checks:**
    ○ Re-examine the findings: were our original hypotheses influenced by biases or deficit thinking?
    ○ Were all team members and end users given fair opportunity to voice and challenge interpretations?
    ○ Do the next steps have the potential to interrupt inequitable practices and systems?	

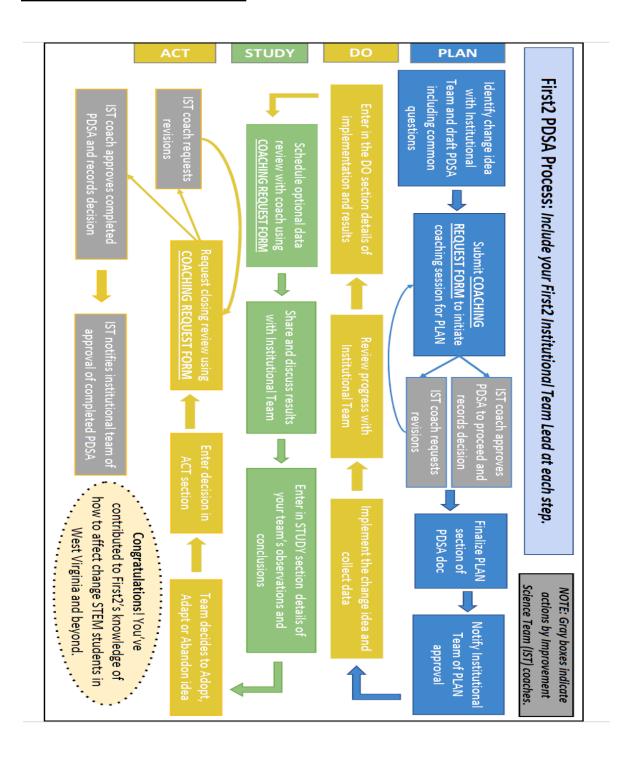|	
ACT: determine next steps	

● **What decision was made: Adopt, Adapt or Abandon?**
    ○ Is the decision based on interpretation of the data?
    ○ Was scalability considered in the decision?
    ○ Has this change idea been adapted before?
    ○ What next steps are suggested based on learning from this cycle?	

PDSA Process Flowchart

First2 PDSA Process: *Include your First2 Institutional Team Lead at each step.*

PLAN

- Identify change idea with Institutional Team and draft PDSA including common questions
- Submit COACHING REQUEST FORM to initiate coaching session for PLAN
- IST coach approves PDSA to proceed and records decision
- IST coach requests revisions
- Finalize PLAN section of PDSA doc
- Notify Institutional Team of PLAN approval

DO

- Enter in the DO section details of implementation and results
- Review progress with Institutional Team
- Implement the change idea and collect data

STUDY

- Schedule optional data review with coach using COACHING REQUEST FORM
- Share and discuss results with Institutional Team
- Enter in STUDY section details of your team's observations and conclusions

ACT

- IST coach approves completed PDSA and records decision
- IST coach requests revisions
- Request closing review using COACHING REQUEST FORM
- IST notifies institutional team of approval of completed PDSA
- Enter decision in ACT section
- Team decides to Adopt, Adapt or Abandon idea

Congratulations! You've contributed to First2's knowledge of how to affect change STEM students in West Virginia and beyond.

NOTE: Gray boxes indicate actions by Improvement Science Team (IST) coaches.