



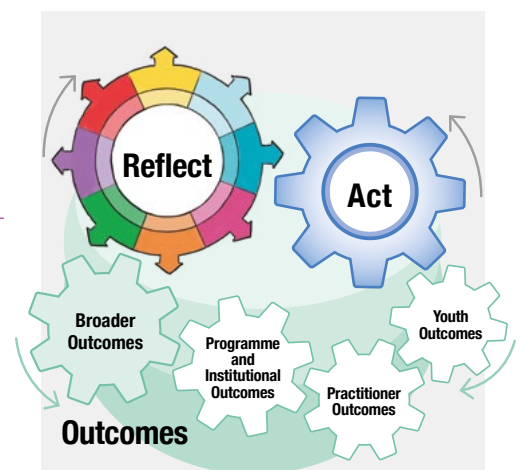
Re-seeing and Re-shaping



YESTEM Insight #2.2

What is the issue?

- The informal STEM learning (ISL) terrain is made up of multiple organizations, institutions, people, resources, and opportunities. Re-seeing and Re-shaping how the different parts of the terrain relate to each other creates new possibilities for participating in ISL.
- For example, if a youth is interested in robotics, she might ask family members about their experiences with robotics. She might join the robotics team at school or an after-school robotics club. She might attend a STEM summer camp focused on robotics. She might reach out to a university robotics team, faculty member, or department to ask about their experiences and opportunities available to learn more.
- Each of these institutions, people, and resources are only available to a youth if they 1) know they exist, and 2) the tools and resources they have to engage with them are recognized as relevant to robotics.
- While there may be multiple institutions, people, and resources related to STEM in a particular place or field, youth may not know they exist or may not have feasible means to connect with them.
- In addition, the people, organizations, and programs may not recognize the tools and goals youth bring to the field if they look different from those that have shaped these people, organizations, and programs.



YESTEM Model for equity in ISL

Please see yestem.org for the full model and related Insight documents detailing each component.

How to cite this publication: YESTEM Project Team (2021). YESTEM Insight 2.2: Re-seeing and Re-shaping. yestem.org

What is the practice?

Re-seeing and Re-shaping is the practice of making visible the ISL terrain—the institutions, people, resources and opportunities—as they currently exist, while simultaneously noticing the rich assets youth bring for Re-shaping the terrain in powerful ways.

Re-seeing is about seeing the terrain (ISL institutions, people, and opportunities) and youth assets and interests as they are and as they could be in relation to one another.

Re-shaping is about organizing for new possibilities in ISL by facilitating connections between youth and people, resources, and opportunities that highlight how youth might use the tools and resources they bring to STEM.

Re-seeing and Re-shaping can help adults refine and expand our mental models of youth, what matters to them (and how/why), and what this could mean for their futures.

Re-seeing and Re-shaping supports youth to:

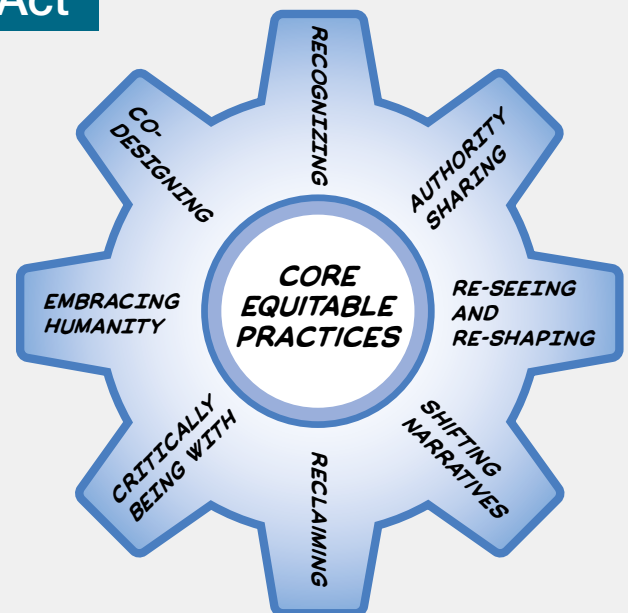
- Develop expertise and social capital beyond STEM
- Access resources and social networks not available in school
- Connect STEM to everyday experiences and loved ones
- Challenge what counts as STEM expertise
- Create pathways to future learning

Re-seeing and Re-shaping can help educators and organizations:

- Tailor programs and opportunities to youth interests and goals in STEM
- Deepen their understanding of how their STEM field connects with their local community
- Challenge what counts as STEM expertise



Act



Re-seeing and Re-shaping matter. Adults can help create new opportunities to expand youth learning and development. These opportunities should position youth as experts by inviting others to engage in youth experiences, social connections, and visions for the future.

Visit yestem.org for more information and resources from our international research effort.

Spotlight on practice: “Mashup” (US)

Institution Level

There is a science center that provides a variety of informal science educational experiences for youth in the community, including public exhibits and specialized programs for school groups, parties and summer camp. In the same community, there is an afterschool club that provides a place for youth to socialize while doing homework, playing sports, creating artwork and science and engineering projects. The directors of these two institutions met and were discussing their institutions’ programs. These directors appreciated the opportunities provided for youth by each institution. Then they took this a step further and thought, **why not expand who has access to the STEM programs of the Science Center to youth at the Community Club?** This was how the “Mashup” program was born. The director of the Community Club made space for a STEM program every Friday afternoon and the Science Center director talked with her educators and decided one of their veteran educators would implement a Forensic Science program at the Community Club during this time. The two directors engaged in **Re-seeing** the ISL terrain **when they identified the opportunities their institutions were providing local youth and imagined a way to create connections that would expand these opportunities.** Rather than expecting youth to come to the Science Center, directors **reshaped the ISL terrain** by bringing part of the Science Center programming to the youth at their Community Center.

Educator and Youth Level

When the Science Center educator, Addison, came to the Community Center, she and the youth there also worked to Re-see and Re-shape the ISL terrain. One of the youth, Chloe, already knew Addison because her school participated in a Science Center Program. She had also joined the Science Center’s Youth Action Council (YAC) which was a group of youth and Science Center staff who met monthly to get youth perspectives on possible new maker projects for the Science Center and to redesign the makerspace at the Science Center. Another youth, Louise, asked Addison what YAC was and if it was free. Addison told Louise that not only was it free, but it came with a year membership to the Science Center for the youth and their family. When Louise left to go home, Addison said she hoped to see Louise the next day for YAC. Louise became a regular YAC member, attending the monthly meetings and participating in a project to redesign one of the Science Center rooms to center the lives and histories of people of Color. **Together, Addison and Louise identified opportunities available and Louise’s skills in making to jointly create a new connection between Louise and local ISL terrain (YAC).** By joining YAC, Louise reshaped ISL terrain through her very presence at YAC and through her participation in literally reshaping Science Center spaces to be purposefully youth-focused.



Spotlight on practice: Young people Re-shaping the science center (UK)

A science center started a year-long program for young people from a disadvantaged area of the city, who generally tend to be less likely to visit the center. The program combined school-based STEM club sessions and organized visits to the science center. While delivering activities outside the physical building is not uncommon for science centers, the specific program led to Re-shaping science centre's physical environment and ways of working.

The young people in the program were invited to share issues and topics that they would like to see featured in future science center exhibits. Through working closely with the science center staff, their ideas were developed into permanent exhibits, with the young people's input being explicitly recognized in the public space of the science center. In this way, the young people were able to directly Re-shape the ISL setting to better reflect the interests of young people.

Another part of this program included work experience, whereby the young people were matched with science center staff aligned with their interests and aspirations (young people's choices included working with technicians, web designers and facilitators).

Through young people's presence and regular interactions with staff across different science center departments, young people contributed to Re-shaping the practice at the science center that went beyond the specific activities they were involved in. One of the staff reflected that **"just having the young people in the building, walking around the staff area, in itself, had quite an impact"**, adding that **"there is now an even greater commitment to ensuring that young people's interests are represented throughout the work we do. The learning from that activity is forming the root of all our new activities with young people"**.



How to use this practice: Reflect

Reflection questions

1. What organizations, people, resources, and opportunities exist in your field/community? What assets/tools do youth bring to STEM?
2. How do you support youth in building on their assets/tools to connect with relevant organizations, people, resources, and opportunities?
3. What obstacles could be addressed to support Re-seeing and Re-shaping more broadly at your institution? Who would need to be invited to those planning/ reflection sessions?

How to use this practice: Act

Things to do

1. Build caring and trusting relationships with youth

Building relationships is fundamental to Re-seeing and Re-shaping. Pay attention to youths' ideas, actions, and choices. Try to understand and identify their needs, expertise, and vision. One way to start could be giving a quick survey at the beginning of your program such as questions about youths' interests and goals or more specific questions about what youth are interested in or want to accomplish related to your institution's goals and resources.

Make notes of youths' interests and connections you see to resources, people, programs you're familiar with. Integrate these connections into your program or share with specific youth individually.

This can help educators identify and understand the assets and tools youth bring to STEM, and make visible connections to people, resources, and opportunities that would be most beneficial for youth.

2. Organize information of various opportunities and make accessible to youth

Pay attention to and note possible learning opportunities that can be shared with youth. Put together a set of programs, resources, people, and opportunities available in your institution to which you can connect youth. This way, as interests and goals related to these come up, you have relevant information easily accessible (e.g., in the form of pamphlets, flyers, a website, a connections corner where educator and/or youth post interesting

opportunities and resources). Consider integrating Re-seeing and Re-shaping opportunities into your program (e.g., field trip, inviting/visiting experts, inviting/visiting community members, showcasing artifacts of other people, connecting school activities).

3. Make space for youth to share their resources

Youth bring knowledge, expertise, and social connections into the STEM learning space. Offer opportunities for youth to mentor and share these resources with one another (e.g., showcase youth-created artifacts, ask youth to invite parents/ other relatives as guest speakers, invite youth to share learning opportunities with friends).

4. Make space for youth to Re-see and Re-shape

Listen to youths' ideas of what connections they want to make and how. Help youth identify what they'd like to do as the next step and what kind of access to resources, experiences, or people would be helpful. Note where these resources, experiences, or people exist and how they might be brought into the learning space (physically or virtually). Decide who should work toward accessing these resources (i.e., should the educator use their connections to arrange to bring in materials or invite guests to the space? Should youth make a phone call or write a letter requesting access themselves?)

Additional tools and resources

Try out some “Talk Moves”

Talk moves can be helpful daily-habit tools for verbal reminders of Re-seeing and Re-shaping practice.

Asking youth to express their interests, goals, expertise

- “What is your name?”
- “What do you like to do?”
- “What is something you do really well?”
- “What do you want to do or be in the future?”
- “Let’s brainstorm to whom you want to showcase your projects.”

Recognizing what youth are into at the moment

- “Do you like []? You might try [].”

Including an explanation as to how the new activity/event/program is related to the young person’s current interest

- “It seems like you like programming. Did you know our science center offers programming camp in the summer?”

Educators keeping in touch with youth even after their program is completed

- “If you need help and this is really what you want to do, here’s my card”
- “Talk to your parents and please let me know whether you can meet the engineers.”

Ways to elicit and recognize youth bids for Re-seeing and Re-shaping

- Youth offer verbal cues for educators to leverage upon as to identify and navigate what and how to Re-shape.
- You may use exit surveys to elicit youths’ ideas for Re-seeing the assets/tools and interests they bring to STEM.

About our project

- Over four years, our project involved researchers, ISL educators and young people working in partnership to develop new understandings and insights about how ISL might better support equitable outcomes for young people aged 11-14 from minoritized communities.
- Our project partnership involved data collection in the UK and the USA with partners in two science centres, two community STEM clubs, a zoo and a digital arts centre.
- Overall, 260 young people and 30 practitioners took part.
- In the wider project we also conducted surveys with 2,783 young people.

For the full range of Insights documents summarizing the project’s tools and resources, including Core Equitable Practices and Equitable Youth Outcomes Model, please see yestem.org

This material is based upon work supported under a collaboration between the National Science Foundation (NSF), Wellcome, and the Economic and Social Research Council (ESRC) via a grant from the NSF (NSF grant no. 1647033) and a grant from Wellcome with ESRC (Wellcome Trust grant no. 206258/Z/17/A).

Disclaimer

Any opinions, findings and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the view of NSF, Wellcome, or ESRC.

yestem.org

 [@yestem_uk](https://twitter.com/yestem_uk)

