



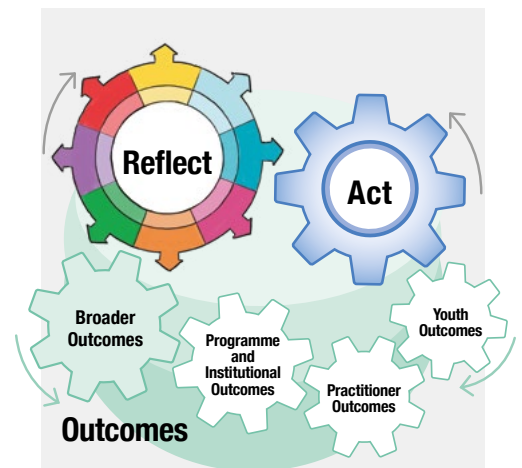
Co-designing



YESTEM Insight #2.3

What is the issue?

- Informal STEM learning (ISL) spaces are characterised by many different sorts of activity, including hands-on workshops, events and exhibits. Routinely, ISL activities and spaces are designed, created, and managed by adults, while young people are typically seen as users and consumers of ISL, or as an audience that is catered to. Often, young people's views on ISL are restricted to evaluations and feedback on the activities, rather than young people being actively involved in shaping the ISL spaces and activities.
- As a result, **many ISL spaces tend to reflect the needs, values, and practices of privileged adults, rather than providing opportunities for young people to engage with STEM in ways that make sense to them.**
- Co-designing is a practice that seeks to disrupt this status quo by advocating ISL design *with* and not just *for* young people. Co-designing is one way that youth can contribute to Reclaiming STEM (see YESTEM Insight 2.4: Reclaiming). From an equity perspective, this practice can support engagement with STEM among young people from underserved communities who have historically been excluded.



YESTEM Model for equity in ISL

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

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What is the practice?

This Insight provides examples of how ISL practitioners can use the practice of Co-designing to support equitable participation through a range of means, including youth panels/boards, focus groups, design teams, and also project and research teams. Creating opportunities and spaces for young people to enact their agency in the Co-design experience has the potential to transform taken-for-granted practices in ISL but, as the spotlights show, genuinely **Co-designing with young people has to be adapted to context.**

Co-designing orientated towards social justice can disrupt the dominant power relations (e.g., those based on whiteness, masculinity, etc.) and supports more equitable forms of power-sharing between young people and adults.

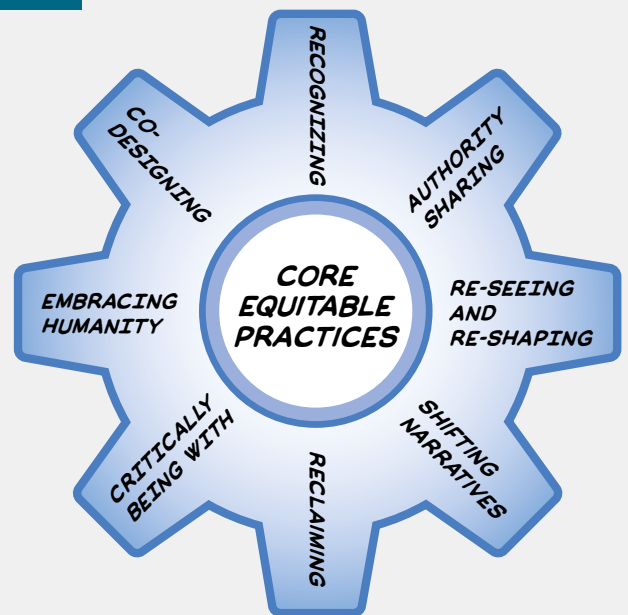
Organisational cultures are the cumulative effect of beliefs, values and actions that are often produced through unequal power relations. Within any ISL setting, the organisational culture shapes possibilities for how different young people might feel and behave and will facilitate or limit their agency. Embedding the practice of Co-designing into an organisational culture can help scaffold the engagement of young people, particularly those from communities who have been historically marginalised within STEM.

Co-designing can recognise young people's interests, experiences and contexts, and provide opportunities for them to play an active role in shaping their ISL experience. This requires ongoing commitment from practitioners to **recognise, challenge and change socially unjust practice.** (see YESTEM Insight 1: The Equity Compass: A tool for supporting socially just practice).

Co-designing provides young people a visible and valued presence in the ISL environment, supporting young people's agency and publicly respecting and recognising what they bring to the setting. Critically, this means working with young people on an **ongoing basis** to enable them to shape an ISL organisation's goals, processes, activities, programmes, projects, and accountability structures.

Co-designing draws on a myriad of inter-related practices (please see the section on Additional tools and resources).

Act



The practice of Co-design is about sustainable and non-hierarchical ways of working with young people individually, in groups and through youth representative to collaboratively create experiences, artefacts, spaces, processes and desired outcomes.

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



Spotlight on practice: Adapting Co-designing to context (UK)

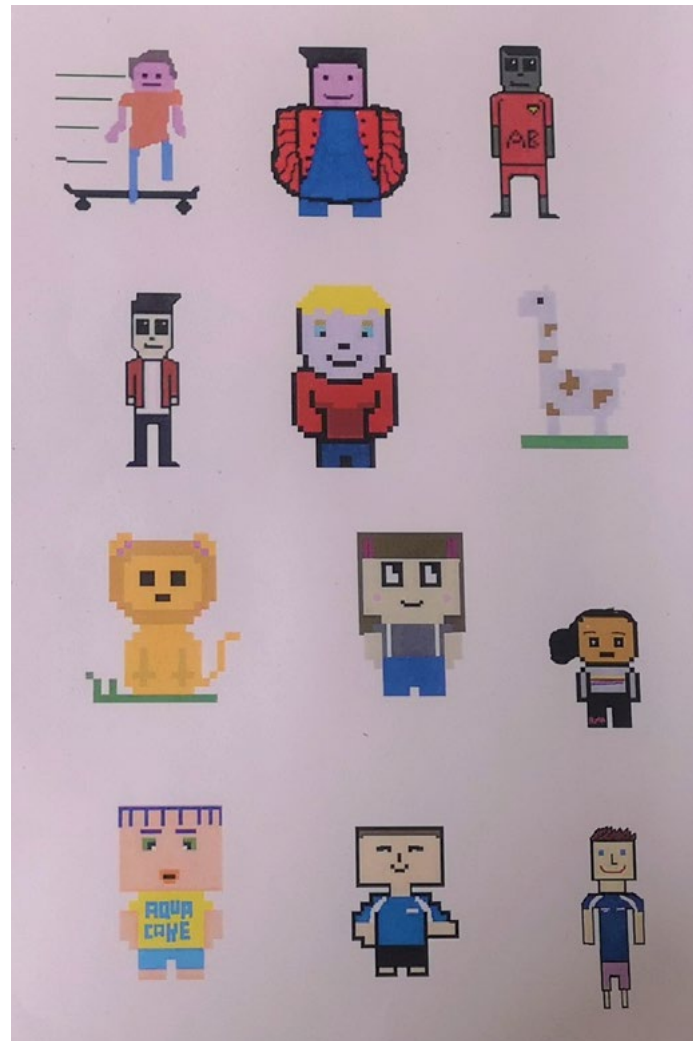
In a community-based digital arts centre the staff demonstrated an on-going commitment to seeking young people's opinions and input as they designed new hands-on workshops, events, projects and spaces. Erin, one of the ISL team leaders, said she saw the value of setting up a youth board with dedicated time to work *with* young people on specific tasks but at first did not see how it would work in their setting. The team went on to adapt the idea of a youth board for their setting by Co-designing their youth board with young people.

Initially the dedicated youth board time was treated as a 'learning experience' for both adults and the young people. At these sessions the young people were invited to become advocates and ambassadors empowering them to be representatives and tasking them with enthusing and drawing in other young people. The young people were **given ownership of gathering ideas for activities, events, workshops, projects and the design of ISL spaces**. Erin explained that the young people were familiar with using an interactive board to share ideas and a tactile voting device to make decisions. In this device different coloured balls are used by young people to cast their votes. This fun and engaging approach valued young people as partners in generating ideas and making decisions. As Erin said, this was a stepping stone to enabling young people to opt into joining special interest project groups.

Erin described the genesis of one of the workshops. "So we did one about what issues you care about in [city] with the options like 'Climate Change', 'Arts and Culture', and 'Politics'. There was a real interest around climate change, so we did a workshop on climate change the following week." In another example young people were valued for their experience and ideas about their own needs where a group of young people opted to co-design what activities would be offered at the centre and contribute their design for the planner leaflet (see the photo on the right for some of the young people's images). Erin said "We've also had our leaflets done; you can see all of their designs on the front. As soon as they saw that, and they walked through the building they immediately saw that they had ownership over their programme." This momentum has come from the adapting the youth board concept as a vehicle for valuing young people's interests, knowledge and choices.

By adapting the idea of a youth board to an ISL setting, the centre has avoided the 'box-ticking', token exercise (consulting but not acting). Instead, we can see that young people's authentic decision-making power arcs towards equitable outcomes for young people, including voice and agency, being heard, being recognised, feeling appreciated and purposeful, having ownership and a sense of belonging, as well as gaining new skills. The practitioners were taken by surprise by some of the young people's ideas. The young people asked for a cinema club and wanted responsibility for running this; they asked for a homework club and help with maths. Erin told us **"The young people have started back this week, they've already come in asking: When are we having our next meeting?"**

This is an example of equitable practice because in adapting youth board ideas to the community-based digital arts centre, young people's agency is being nurtured both within the experience and beyond the moment in organisational change.



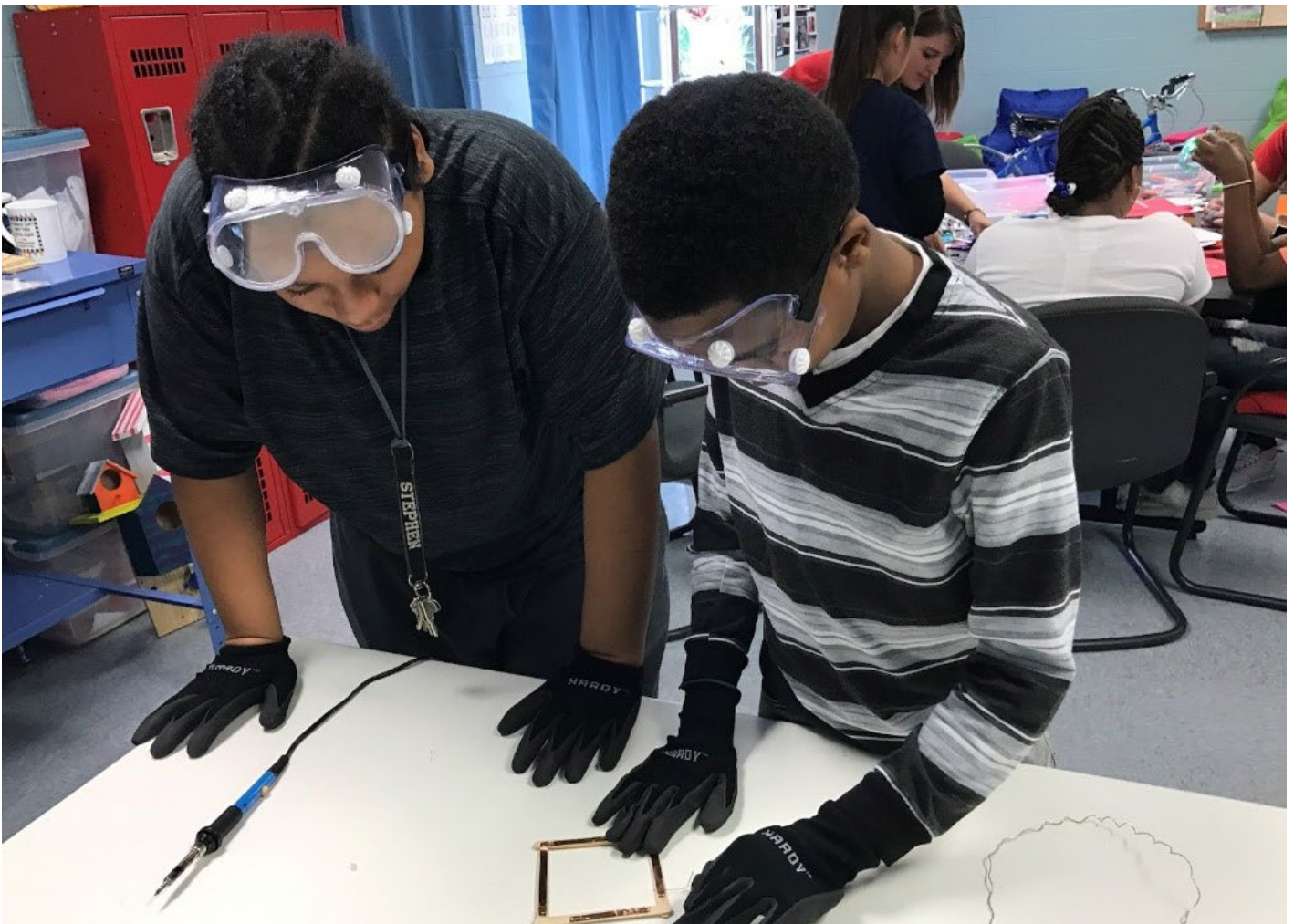
Spotlight on practice: Electric Art Community Workshop (US)

On a chilly October evening in Great Lakes City, sixteen youth welcomed over one hundred visitors to the first ever Electric Art & Green Energy Maker Workshop that took place in a Community Club makerspace. The youth transformed their own makerspace and an adjacent room into where visitors of all ages, from children as young as six years old to parents, could create their own electric art. In the rooms decorated with the youths' electric projects, visitors were able to make light-up artifacts (e.g., bracelets, wristbands, mini-bulletin boards, canvas art, and card-designs) powered by traditional and renewable energy sources. In some activities, visitors were able to learn about energy, circuitry and making (e.g., using multimeters, soldering, solar panels, and power tools). In one corner, visitors could experience a bicycle renovated to power their smartphones. In addition, the youth made “snack zones” and “chill zones,” where visitors could enjoy music, food, and electric-art games designed by the youth, especially if their maker projects became “frustrating” or they “needed to blow off steam.”

How youth and educators Co-designed the workshop

This workshop was an outcome of Co-designing practice the sixteen youth and their makerspace educators enacted over the course of four weeks, across 12 sessions (three afternoons per week). As one of the ISL educators, Maria, explained,

The youth in our program kept saying how much they wanted their friends and families to have the chance to make things with electric art like they did. This gave us the idea that we should co-design what those experiences could be. It would not have been the same if we, adults, did the planning, as the youth are the experts on what they want for their families and friends. They are experts on how and why electric art matters in their lives.



Responding to and resonating with the youths' hope and desire, educators and youth Co-designed the workshop in ways that directly linked to the youths' community. Their Co-designing was enacted in multiple interconnected phases:

1. Establishing the purpose and expected outcomes of the workshop:

They conceived a workshop that would offer opportunities, tools, and resources for visitors to make things to take home, do something with, or convey serious messages juxtaposed with playfulness. One of the main goals of the workshop was, in one youth's words, to help other youth "feel accomplished" because of "what you learned, how you worked on it, and how others saw it and what it meant to them."

2. Educating one another on the STEM knowledge and practice needed for Co-designing the workshop:

Youth educated and learned with and from one another knowledge that helped explain how to build and power different electric circuits with different energy sources. This was critical to further planning the workshop.

3. Prototyping artifacts and activities for the workshop:

Youth brainstormed and tested out different ideas for designing electronic-circuit artifacts that might be of interest to the visitors from the youths' community. They also helped each other learn how to solder, use multimeters, and trouble-shoot problem circuits.

4. Examining the utility and values of the prototyped workshop activities and artifacts:

Youth continuously examined what activities would be most interesting to the visitors, what approaches would lead to durable and usable products, and what technical knowledge and challenges they needed to figure out to help visitors.

5. Designing the spatial organisation of the workshop:

To help visitors navigate the activities, they organised the workshop rooms to have different making stations, exhibit areas, and refreshments areas. They decorated and put signages showing where different activities would take place. They also created a green-energy corner where a bicycle they hacked was available to power smartphones.

Through Co-designing and holding the workshop, the youth centred on local community assets and potentialities. It was not enough for the youth to simply offer an enjoyable experience with an artifact for one to take home. In the Co-design the youth sought to ensure that the ideas and practices brought to the workshops by the visitors and their peers became a part of their efforts to deepen and extend their STEM knowledge and practice. STEM-rich making had to involve more than, as Jazmyn explained, "science mumbo-jumbo."



How to use this practice: Reflect & Act

The table below sets out five Co-designing practice areas with guiding questions for reflection and action. The **first three areas** (review, critique and adapt) are there to prompt generative envisioning of Co-designing ‘with’ young people and working with youth to adapt Co-designing practice to a specific ISL programme and/or setting. The **fourth area** (visible and present) suggests some guiding questions specific to Co-designing of ISL spaces and artifacts ‘with’ young people. The **fifth area** is about building partnerships with young people. Youth boards are one way of enacting co-design but this can be complicated. The guiding questions for reflection and action signpost some of the complexities that require ongoing negotiations, sensitivity, creativity and sometimes workaround and compromise.

In YESTEM research we observed examples of some *pitfalls* which can stall socially just Co-designing practice. In addition, as well as the examples in the ‘Spotlight’ section, we also observed how ISL practitioners embraced *opportunities* for Co-designing with young people. Some of *pitfalls to watch out for* and *things to consider* are included as comments in each of the five areas of Co-designing practice.

Focus area	Guiding questions for reflection and action, with comments on potential pitfalls (what to watch out for) and examples, things to consider and why	
<p>Reviewing and critiquing the current state/status of how youth voices are integral to ISL design practice.</p>	<p>Reflect</p> <ul style="list-style-type: none"> • What and when are we currently co-designing with young people? • Where and how do young people have ownership of ideas and a say in the decision making? • How central is co-designing practice to the culture of our organisation? 	<p>Act</p> <ul style="list-style-type: none"> • Where and when can we share/critique our experience of co-designing practice with each other? • How do we find out what young people say about our co-designing practice? Do they think co-designing is being done ‘to’, ‘for’ or ‘with’ them?
<p>Watch out for co-designing practice being conflated with good relations with youth, or blanket claims of “We are doing it already”, and/or aspirational vision statements about consulting the public. Social justice orientated practitioners argue that co-designing practice that supports the development of youth identity and agency must be recognised as continually work in progress ‘with’ young people and therefore policy and practice should be reviewed regularly.</p>		
<p>Developing new critical understandings of and possibilities for organisational culture of co-design.</p>	<p>Reflect</p> <ul style="list-style-type: none"> • Critically reflect on current practice by applying the YESTEM Insight 1: Equity Compass: A tools for supporting social justice practice. • Using your compass map as a lens - what is new and critical in your understanding of equitable socially just co-design practice? How does this compare to the current organisational culture of co-design? • What do young people say about the culture of co-designing in your ISL organisation? 	<p>Act</p> <ul style="list-style-type: none"> • How can we run joint ISL practitioner and youth working groups to build on our collective experience, knowledge and skills and act on our new and critical understanding of co-design practice? • How can we support young people to engage with co-designing with us on an ongoing basis? • What resources will be needed to build and sustain a vibrant culture of co-designing with young people? • What does <i>ineffective</i> forms of co-design practice look like?
<p>Watch out for <i>tokenistic</i> claims of co-designing, which come from corporate rhetoric of consulting the public, while in practice, power relations remain hierarchical and youth input has no ‘weight’. <i>Weak forms</i> of co-design include scenarios where co-design practice sits outside the structure of the organisation and where there is no reporting or accountability. <i>Short-term</i> co-design projects are initiatives without a legacy plan. <i>Short circuited</i> co-design projects put effort into engaging young people but there is no follow-through into action.</p>		

Focus area	Guiding questions for reflection and action, with comments on potential pitfalls (what to watch out for) and examples, things to consider and why	
<p>Adapting co-designing practice to the specific context of ISL setting.</p>	<p>Reflect</p> <ul style="list-style-type: none"> • What co-designing practice can be adapted to your specific ISL context? (See spotlights). • How will the envisaged co-design practice recognise and disrupt systems and processes that block more equitable forms of power-sharing between young people and adults? • Discuss possible starting points (see examples below) and how they can be adapted to your specific ISL setting. 	<p>Act</p> <ul style="list-style-type: none"> • How will young people and ISL practitioners share ownership of planning specific co-designing practice? • When and where will young people voice their interests and needs and have an integral role in the design of activities and events that act on their ideas? (See spotlight). • How will organisational processes follow through in a timely way and ensure that ongoing co-designing with young people is sustainable?
<p>For example, consider adapting/combining/reinventing any of the following: youth consultation panels, youth boards, youth representation on management committees, youth led focus groups, youth focused design teams, youth-led special interest projects, youth design and lead events and youth researching their own experiences and interests.</p>		
<p>Visible and present by co-designing physical spaces and objects.</p>	<p>Reflect</p> <ul style="list-style-type: none"> • Who designs the physical and virtual spaces; and the activities and events that take place? • How equitable is the allocation of space and resources? • When and where do young people have a say in the design process? • How are the young people's contributions recognised? • What happens to artifacts that are created by young people? • Where is there provision for continuity and leveraging of past co-designing activity? 	<p>Act</p> <ul style="list-style-type: none"> • How do we find out if young people feel an ownership of the different spaces and artifacts? • Where, when and how will there be recognition of young people's input and expertise in redesigning spaces and creating artifacts? • How can spaces/objects created by young people be given a sense of permanence (e.g., beyond the programme where they were created)? • Are the spaces/objects integrated 'as is', without being appropriated by organisational branding?
<p>Thing to consider. The diversity of ISL settings means that co-designing practice is open to interpretive imagination. For example, in a large Science Centre young people were given a research role and worked with professional installation designers to make exhibits. Evidence of their influence on the final design was exhibited alongside the installation (e.g., workshop photographs). In a zoo ISL setting young people redesigned the signage which was then permanently installed. In this case, the young people's work was recognised in that they were given passes to invite family and friends to the launch event.</p>		

Focus area	Guiding questions for reflection and action, with comments on potential pitfalls (what to watch out for) and examples, things to consider and why	
<p>Youth Board a vehicle for co-designing sustainable partnerships with young people.</p>	<p>Reflect</p> <ul style="list-style-type: none"> • What will recruitment process look and feel like to young people? Consider formal vs. informal, virtual vs. in-person. Consider creative/open approaches like videos and mixed media. • What issues will impact on equitable recruitment e.g., fair inclusion of geographical, social, ethnic, class, language, disability, and age range representation? • What are the considerations in enabling all youth can participate? For example, after discussion anonymised voting on the name of the group ('what do you want to call yourselves') and on projects and action priorities. • What is involved in co-creating code of conduct, negotiating frequency of meetings, timings, and actions in between meetings? How is this same/different to adult responsibility for basics of health and safety, data protection, safeguarding, and legal compliance? • In the organisational structure - what will be the role of the youth representative(s) e.g., appointed to trustees and/or senior managers? Discuss the complications e.g., the connection to existing structures can be empowering but is also reproducing the status quo and is difficult to sustain in smaller ISL settings. • What are the considerations for valuing and recognising youth involvement? For example, with titles, pay, incentives and crediting. In principle young people's contribution should be visible with a share of organisations marketing and publicity but care is needed to act on data protection regulations. 	<p>Act</p> <ul style="list-style-type: none"> • Design the recruitment approach and evaluate the plan to address equity of physical and digital access. • Design processes to ensuring an equitable and balanced youth council. Include transparent decision-making processes where some categories exclude others; and transparent prioritising to address limitations of resources. • Make provisions for paying for attendance, travel, food and time but give due consideration to scheduling times, transportation, chaperoning and safety and security generally. • Ensure that in meetings/workshops all youth have a voice so that no one dominates. • Support the board to be effective and productive. Ensure age and setting appropriate clarity around collective responsibility, young people's responsibility and adult responsibility of equitable 'duty of care'. • Build consensus on where in the organisation the youth board can exercise power and have 'teeth' (influence on the organisation). • How can our ISL setting get the most out of having youth representatives? In some cases there maybe the possibility for youth representatives to receive outputs directly with mandates to act, respond and engage, with an allocated budget (where appropriate and possible) and be given fundraising powers. • Appoint a youth representative champion in a leadership role with ownership and responsibility for stable resourcing, monitoring of socially just practice, and ensuring visibility in policy and practice of young people's contribution.
<p>Things to consider. The ISL practitioner with an equity/social justice mindset has a key role to play in allowing and embracing innovative co-designing practice. What was evident from YESTEM fieldwork in diverse ISL settings in the UK and US is that engaging <i>'with'</i> young people on a power sharing bases generates a new energy and momentum so that the dynamics of adult/youth collaboration are mutually recognised as "the obvious way to go". (See UK and US spotlights).</p>		

Additional tools and resources

This Insight has focused on Co-designing practice as opportunities for ISL practitioners to disrupt and transform the status quo by nurturing power sharing between young people and adults. Co-designing depends on other inter-related practices. The additional resources explore these.

- Finding ways to position young people as experts on youth experiences, their own social connections, and their passions and dreams for the future (see [YESTEM Insight 2.2: Re-seeing and Re-shaping](#)).
- Working with young people to understand how ISL spaces can feel exclusive or uninviting. Focusing on experiences of young people and their needs and desires can help to ensure that the ISL experiences, spaces, as well as tangible material and digital design and creation of things, can productively serve all youth (see [YESTEM Insight 2.4: Reclaiming](#)).
- Valuing and amplifying young people's experiences as integral to their engagement in STEM. This practice can shift dominant constructions of under-served youth as not "science-y" or not active in informal STEM learning (see [YESTEM Insight 2.5: Shifting Narratives](#)).
- Finding ways to empower young people by tapping differences in young people's experiences and the complex context of their lives (see [YESTEM Insight 2.6: Critically Being With](#)).

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

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