Professional Development Facilitator's Guide for Activity Settings

Northern Illinois University

NSF

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This professional development (PD) guide is for facilitators of PD programs for activity leaders (ALs) and counselors in summer and afterschool science, technology, engineering, and mathematics (STEM) programs for middle grades youth. The PD should be appropriate for those who work with youth in Grades 5 through 9.

This guide accompanies the PowerPoint slide deck pertaining to activity settings in an Informal STEM Learning (ISL) program. It provides background and procedural information about the content and activities presented in the PowerPoint deck. Facilitators are encouraged to customize the PD to their needs. Some of the slides and activities can be selected depending on needs and the time available for PD. Several of the practical methods in the *How Activity Leaders Can Design Effective Activity Settings* section can be used as stand-alone sessions.

The ultimate goal of the STEM Interest and Engagement (IE) project was to disseminate the practical implications of the National Science Foundation-funded study of summer STEM programs to ALs and directors of ISL and summer programs. A toolkit developed by the STEM IE project can be found at www.niu.edu/stemie. It contains information about the project, resources, and highlights five aspects of programs (quality, activity settings, promoting relevance, facilitating interest, and supporting youth agency) that are important to engaging youth in STEM programs. You might want to refer to it while organizing the PD session(s).

A central goal of the STEM IE project was to disseminate the practical implications of the NSF- funded study of summer STEM programs to Activity Leaders (ALs) and Directors of Informal STEM Learning (ISL) and summer programs. A toolkit developed by the STEM IE project can be found at www.niu.edu/stemie. It contains information about the project, resources, and highlights five aspects of programs (quality, activity settings, promoting relevance, facilitating interest and supporting youth agency) that are important to engaging youth in STEM programs. You might want to refer to it while organizing the PD session(s).

PowerPoint Slide Deck for
Group Professional Development

*Preparation: print copies of slide 6 (and 9 and 10 if using those slides) for each pair or small group.*

Slide 1. **Title Page: Activity Settings.**

Fill in the presenter's names and the date of the training. If available, you can replace the photo with one from the program or programs receiving PD. If participants do not know one another, have them share their names and, if they come from different programs or locations, ask them to identify the program or organization with which they are affiliated.
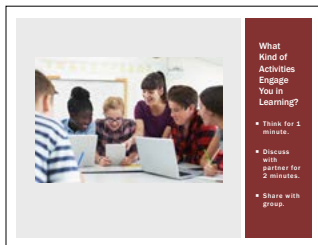

Slide 2. **Motivating and Engaging Youth in Informal STEM Learning Programs.**

Slide briefly shares the purpose of the professional development.

(1 minute)
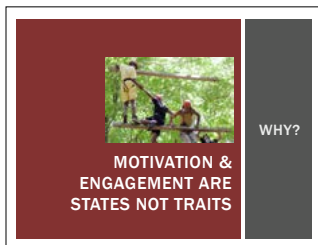
Slide 3. **Motivation is a State Not a Trait.**

Slide shows concept that motivation is a state not a trait with the thought that states can be influenced.

(1 minute)

Slide 4. **What Engages You in Learning? Motivates You?**

Introductory Activity: Ask participants to think individually about what engages them in learning and motivates them; they can jot down a list if they like.
(1 minute)

Have them turn to a person sitting next to them to discuss their responses.
(2-3 minutes)

Then, they should share out to the whole group.
(4 minutes)

As participants share, note what they identify about activities and reiterate/summarize the ways they saw them as important. If only some or few do, then acknowledge what they did identify and mention that often people say that they are engaged by the activities. Ask them whether that pertains to them, too, and why they think that only a few mentioned that.
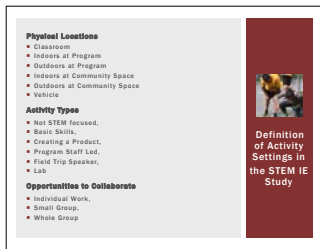
(10 minutes)

Slide 5. **What Is an Activity Setting?**

Can show this slide and move on (approximately 1 minute to introduce) or you can choose to prompt group discussion with these questions (recommended):

1.   How do the youth with whom you work respond to different types of activities?
2.   Do they prefer certain settings over others?

(Discussion time approximately 5 minutes)

Slide 6. **Definition of Activity Settings in the STEM IE Study.**

This slide presents how activity settings were coded in the STEM IE study.
(1 minute)

Slides 7-12.
## Why Activity Settings Matter in ISL Programs.

Slide 7. **Section Header with title.**

Slides 8–12 pertain to the research methods and specific findings from the STEM IE study. Some will want to know this detailed information and others will not. Slide 12 presents an overview of findings, which are important to understand the practical suggestions in the next section.
As facilitator of the professional development you may decide to include or delete slides 8-11.
(Slides 8-11: 8 minutes)
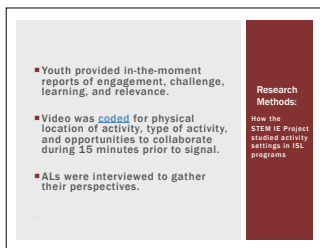
Slide 8. **Research Methods.**

Hand out copies of slide 6. These will also be used for slide 22.

Research methods used in the STEM IE study are outlined. [Details to share with participants:] Youth were signaled several times during their ISL learning and activity time. They used an app on a cellular phone to provide in-the-moment reports of how they were feeling in the 15 minutes before being signaled. Video was coded for the categories shown on slide 6.
(2 minutes)

Slide 9. Time Spent by Location.

Hand out copies of slide 9.

The figure on Slide 9 displays the percentage of time that youth spent in various locations during their STEM learning time in the nine programs that were studied. [Ask participants] Examine chart and note the variation of time spent in the different locations across programs. [Note] The classroom space was the most utilized space overall. Zoology Partners and Island Explorers spent the most time outdoors in the community compared to other programs. Uptown Architecture stands out in their use of indoor community space and outdoor program space.
(3 minutes)
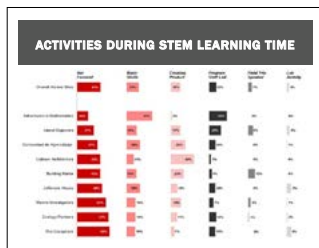
Slide 10. Activities during STEM Learning Time.

Hand out copies of slide 10.

Ask participants to study the chart and discuss what they are seeing. Tell participants that each column is a type of activity that was coded; the top row is the average across sites with remaining rows showing individual sites. Next, have them share their observations. If they notice the following, emphasize it: during scheduled STEM learning time, participants were NOT focused on STEM content or activities 43 % of the time (on average across the nine programs). In fact, it was the most common use of time, on average. If they do not notice, ask them a question: Questions: 1.a. What was the most common activity, in general? 1b. How much time, on average was not focused? 1c. Does this surprises them? 1d. What are possible reasons for and drawbacks of so much unfocused time? 2. Unfocused time varied a lot across both programs and ALs. How did time use categories vary across programs? 3. How did time use (not focused time, basic skills, lab time etc.) vary across programs?
(4 minutes)

> **Note for presenter:** In showing such data to activity leaders, there is sometimes a great deal of justification provided for why there is so much unfocused time. It is important to emphasize that each of these programs had time allotted for breaks, snack, meals, and so on. Time that was not focused did sometimes include ice-breaker/relationship building, and physical activity breaks, but much of the not focused time was spent with the majority of youth waiting, transitioning without some STEM related content, or off task.


Slide 11. Time Spent by Opportunities to Collaborate.

Ask participants to study the chart and discuss what they are seeing. [Optional questions for participants:] How much time was spent in each type of grouping? How did this vary by program? What are the advantages and disadvantages of these groupings? Do certain types of activities work better with one of these groupings?
(1 - 4 minutes)
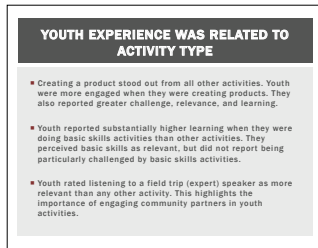
Slide 12. **Findings about Activity Settings.**

This slide summarizes findings pertaining to activity settings from STEM IE research.[Ask participants] Why was creating a product so well received? Has this been their experience with youth?

(2-3 minutes)

Optional Activity: Select, show and discuss one or more video clips that are most relevant to your program. NIU EA Automata clip shows campers building an automata. In addition to showing the relevance of what youth are learning in their summer program, DIVAS Value is also about the opportunity they have to make things at camp. Youth are deeply engaged in creating products at this ISL "maker" camp.

Additional Discussion Questions: Why do participants think doing basic skills was perceived as relevant to the youth? Is it a problem that they reported low challenge in that activity? Why or why not? How about field trip speakers? Why do youth think that was the most relevant activity they did?

Optional Activity: Show Click2Science Engineer & Robots about youth working on their project with an engineer. This is related to the idea of field trip speakers although the engineer in this case, came to the program.
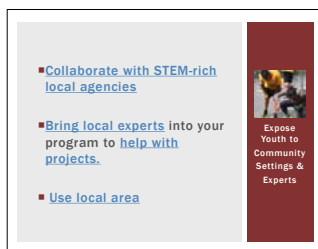
(3-8 minutes)

Slides 13-21
How ALs Can Design Productive Activity Settings
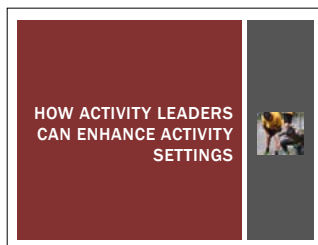
Slide 13. **Section header with Title.**

HOW ACTIVITY LEADERS CAN ENHANCE ACTIVITY SETTINGS

Slide 14. **Expose Youth to Community Settings and Experts.**

Brief videos demonstrate three options for exposing youth in your program to the type of experience which the youth in our study rated as the most relevant activity they did in their ISL STEM program:

- Collaborate with STEM-rich local agencies The linked video shows how local agencies can serve as resources for an ISL program.
- Bring local experts into your program. The first link in this bullet shows a soil scientist coming into as ISL program and the second link shows youth working on their project with an engineer. This is related to the idea of field trip speakers although the engineer in this case, came to the program.
- Use local area shows activity leaders taking youth on foot to an open space near the program and presents what youth could learn there.

More in depth training on building relationships with STEM-rich partners (90 minute session) can be found by clicking on the link.

■ Collaborate with STEM-rich local agencies

■ Bring local experts into your program to help with projects.

■ Use local area

Expose Youth to Community Settings & Experts

ACTIVITY 1A: PLAN ACTIVITIES YOUTH FOUND ENGAGING

Creating a Product
- Review learning targets and content of program
- Each person will brainstorm product(s) youth might create to learn or apply those targets.
- Share and discuss ideas. Choose one or more to try with youth.

Field Trips/Speakers
- Review learning targets and content of program
- Develop a list of places in the community that might exemplify or elaborate on learning. Consult the ETEAMS website & The Connectory for ideas
- Share and discuss ideas. Choose one or more to try with youth.

Slide 15. Planning Activities Youth Found Engaging (1A).

Divide group roughly in two. One half will work on planning an activity or activities in which youth create a product. The other half will work on planning field trips/speakers and related learning activities. They can use the webpage (www.niu.edu/stemie) as a resource.
(15-20 minutes)

- Plan an activity for your program identified during Activity 1A.
- Go to the National Center for Afterschool Quality toolkit planning link. Click on the "Planning Your Lesson" tab. Read and consider the questions.
- Access and complete the planning template

ACTIVITY 1B: PLANNING A LESSON

Slide 16. Planning lesson (1B).

Slide provides instructions for:

1. Planning an activity for the projects identified during Activity 1A;
2. Going to the National Center for Afterschool Quality toolkit planning link and clicking on the planning your lesson tab. Participants need to read and consider the questions found there.

Access and complete the planning template which can be completed individually or in small group(s). Participants will share plans with group.
(15-25 minutes)

MAXIMIZING TIME USE

Time Loss Situations
1. Transitions (both within and between settings)
2. Youth finish at different times
3. Unprepared materials
4. Unclear directions

Solutions
1. Assign riddles, games, discussions, field sample activities
2. Provide options for individual work
3. Set up, organize in advance, use helpers
4. Plan directions carefully

Slide 17. Maximizing Time Use.

The situations during which time is often "lost" are identified in the first column and solutions to those appear in column two. Review those and emphasize: 43 % unfocused time was during the STEM learning time sessions and did NOT include scheduled breaks and other planned time for recreation and routines. [Add this information:] Down time is not all bad, youth need time "off" but this is often provided in program scheduling of breaks. Youth do sometimes need time to reflect or "compile" what they have learned.
(3 minutes)

Find, share & discuss concrete ways you can manage time loss given situations 1, 2, 3, and 4 in your particular program. Select a specific lesson and apply solutions for maximizing time use.

~10 minutes to find and ~ 5 minutes to share

Activity

Stemming Time Loss during Transitions

Slide 18. Activity for Maximizing Time Use.

Ask participants for and be prepared to provide examples for things youth can do during transitions to continue learning and options for when youth finish at different time. Give them 5-10 minutes to go to the time use section of *How ALS can Maximize Youth Experience within Activity Settings* on the STEM IE website and look for concrete ideas to use in one or more of their specific lessons.
(5-10 minutes)

Share ideas for maximizing time use with group.
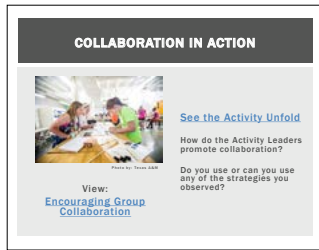(5 minutes)

OPPORTUNITIES TO COLLABORATE

- Cooperative work is part of STEM.
- What is the value of working individually? In small groups? In whole groups? What does this mean for planning?

Slide 19. Opportunities to Collaborate.

View brief video of activity leader talking about cooperative groups and how and why it is important in her summer camp.
(2 minutes)

Either have a large group discussion or have participants talk to a partner (person sitting next to them and then share with large group). Ask them to discuss the value of working in small groups and individually (prompt appears on slide). You might ask a follow-up question about the implications of this for planning activities. You can also ask: What are considerations for assigning youth to small groups (mixed age, mixed ability, interests, behavior, what else?).
(6 minutes)

Slide 20. Collaboration in Action.

Click on link that appears in the left side of the slide to watch a two minute video about encouraging group collaboration in STEM programs.
(4 minutes)

Then click on the link on the right side of the screen to watch the activity unfold.
(2 minutes)

Ask participants the questions on the slide. 1. How do the activity leaders promote collaboration? Do you use or can you use any of the strategies you observed?
(3-5 minutes)

You might also want to consider the 2-minute video on slide 21 as either a substitute or an additional example.

> **Optional Activity.** Distribute this handout about how activity leaders can support collaboration and have them watch the video(s) looking for examples of whether and how the leader uses such language to facilitate youth collaboration.
> (3 minutes)
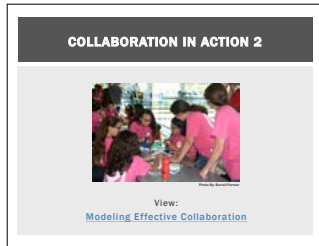
Slide 21. Collaboration in Action 2.

View the video (click link) to see another example or use it as a substitute for the video on the right side of Slide 20.

Slide 22. Review Aspects of Activity Settings.

Refer participants to slide 6, which they will use while doing the activity: Click the link to either or both videos and have them listen and watch for types of activities, locations and opportunities to collaborate in these programs.

Sources of deeper training about collaboration include: Three group workshops (60 minutes, 50 minutes and 30 minutes respectively) that are publicly available. One individual self-study guide, It Takes Two Encouraging Collaborative STEM Work, requires user registration to utilize. (It is free unless one wants credits, which requires payment before taking an assessment and obtaining documentation at the conclusion of the training.