

# Project management for researchers and evaluators



## Visualizing your timeline

Creating a network diagram and calculating your critical path can help you prioritize tasks and manage your overall timeline

The project management field brings many tools and techniques that can help us more efficiently organize and implement research and evaluation projects. One helpful tool is a network diagram. Network diagrams are visual representations of the tasks needed to complete your research or evaluation project, showing the overall project schedule and the ways that activities build on each other through the project.

Once created, a network diagram can help you:

- **Visualize the “flow” of the project** – Seeing the relationships between your tasks can help ensure that tasks are completed in the right sequence
- **Establish a realistic project timeline** – Having the project broken down into the desired sequence of tasks allows you to calculate the minimum amount of time needed to complete the project
- **Prioritize your activities and manage delays**– Understanding the relationships between your tasks can help you determine which are most important to complete on time, and which have room to slide a little bit without impacting your overall project timeline
- **Track your progress in completing tasks** – Comparing your actual progress to your network diagram can help you monitor the overall project implementation and prioritize your next steps.



## Creating a network diagram

### Step 1: Identify all of your project tasks

Before you can create a network diagram, you need to have a complete list of the tasks required for the research or evaluation project. It's helpful to start with a completed Work Breakdown Structure. See the tip sheet in this series about Work Breakdown Structures for tips and instructions for creating one.

### Step 2: Determine the right sequence of tasks

Some project tasks can happen fairly independently and are not tied to other tasks. However, often our activities build on each other over time. For example, we obviously need to collect data before we analyze results or share findings. Identifying which tasks need to be finished before others can start (predecessors) and which are dependent on earlier activities (successors) can help us avoid later bottlenecks.

### Step 3: Estimate the duration of each task

Determine how much time is needed for each task (usually in term of days). See the tip sheet in this series on estimating timelines and budgets for suggestions on how to figure out task durations.

# Sample: Community focus group project

You are working with an agency that wants to build a neighborhood community center, and they are interested in gathering some community input regarding potential programs and services. They ask you to organize and conduct a series of five focus groups with community members, with groups offered in English and Spanish. You develop the following Work Breakdown Structure, and then add information about how the tasks need to be sequenced and how long each one should take to complete.

Tasks	Immediate predecessors	Estimated days needed
<b>Prepare for focus groups</b>		
A: Find a facility in which to hold the focus groups		3
B: Confirm focus group dates/times with the facility	A	1
C: Arrange for food and child care to be provided at each focus group	B	3
D: Prepare flyers to publicize focus groups and recruit participants	B	1
E: Translate recruitment flyers into Spanish and check the translation	D	5
F: Distribute flyers to neighborhood residents	E	3
G: Register community residents for focus groups	F	10
H: Purchase gift cards as incentives for participants	G	1
I: Draft focus group questions		1
J: Revise/revise protocol with input from community center staff	I	3
K: Translate focus group questions into Spanish and check the translation	J	5
L: Confirm staffing for focus groups (facilitators and note-takers)		3
M: Schedule training for focus group facilitators and note-takers	L	1
N: Conduct training for focus group facilitators and note-takers	M, K	1
<b>Conduct focus groups</b>		
O: Conduct focus groups	G, H, K, N	5
P: Transcribe focus group notes	O	3
Q: Pay focus group facilitators and note-takers	P	1
<b>Analyze results</b>		
R: Review transcripts and develop coding protocol	P	1
S: Code focus group notes	R	2
T: Analyze focus group results	S	2
<b>Prepare summary of findings</b>		
U: Prepare a draft summary of focus group results	T	3
V: Review/revise the draft summary based on feedback from community center staff	U	3
W: Present focus group results to community center staff and collaborators	V	1

## Step 4: Diagram the tasks

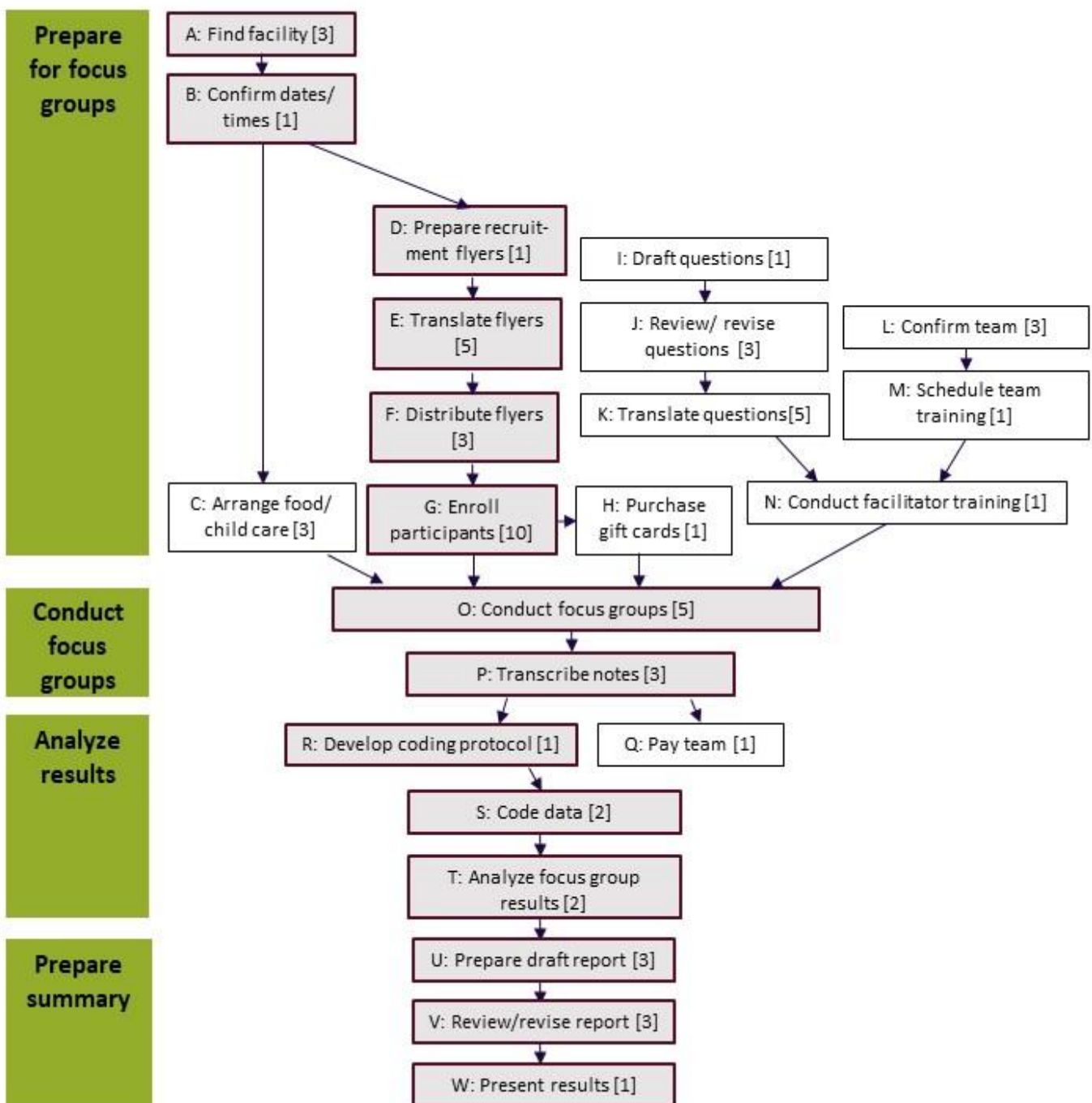
To create the network diagram, identify all activities that have no predecessors and add those to the diagram first. In this example, tasks that do not rely on any previous tasks include finding a facility for the focus groups (A), drafting focus group questions (I), and confirming the team of facilitators and note-takers (L). Because they are not dependent on any earlier tasks, these tasks could begin as soon as the project is launched. From there, add the other tasks and connect them with arrows.

There are several different ways that network diagrams can be created. The diagram below reflects the most common strategy, called “activity-on-node”, where nodes (the squares or rectangles) represent the project activities and the lines between them represent the relationships between them. Typically, a network diagram would be formatted to progress from left to right. This example is formatted vertically to better fit the space.



### Consider using project management software to construct the network diagram

Network diagrams can be constructed using paper and pencil, post-it notes, or standard software packages (like Powerpoint or Microsoft Word). There are also a variety of software packages available that can generate your network diagram for you fairly easily.



## Calculating the “critical path”

Once you have your network diagram, you can calculate your critical path. The **critical path** is the shortest possible time that is needed to complete the project. For this example, the critical path would be the minimum number of days that would be needed to move from the focus group preparation tasks through the final presentation.

You could simply add up all the estimated durations for each task and assume that it will take 62 days to complete this project. However, in this example, there are tasks in the preparation phase that can happen concurrently. For instance, you could train your project team while also recruiting participants. The critical path takes the relationships between tasks into account, determining which must be completed sequentially and which may occur concurrently.

To determine the critical path, you need to determine how many days are needed for each “pathway” through the project tasks. In this example, it will take an estimated 20 days to complete the focus groups, analyze the results, and summarize the results. This part of the diagram is pretty straightforward.

However, there is more complexity in the earlier tasks, so we would want to compare the timelines for each path through the preparation phase. For example, it will take 23 days to recruit participants. It will take 7 days to find the location, confirm the focus group dates, and arrange for food and child care to be provided. It will take 4 days to confirm the team and schedule training. However, before the training can take place, the focus group questions need to be prepared and translated, which will take 9 days.

Since the critical path needs to represent the longest path through the diagram, it needs to include: finding a facility (A), confirming the dates/times for the focus groups (B), preparing the recruitment flyers (D), enrolling participants (G), conducting the focus groups (O), transcribing the notes (P), developing the coding protocol (R), coding the focus group data (S), analyzing the results (T), preparing the draft report (U), reviewing and revising the report (V), and presenting the results (W). The critical path is shaded in the example.

Once you have identified the critical path, you can use it in several important ways. First, you can use this information to **negotiate the project timeline**. The total time to move through the critical path is 43 days. That means that you will need a minimum of 43 days to complete the project. That does not mean that you

have to commit to providing the report in exactly 43 days. You can extend your timeline, to give you a cushion during the project. However, if the community center wants the report in 30 days, you know that this will not be feasible and you can negotiate accordingly (by reducing the scope of work or extending the timeline).

Second, the critical path can help you **identify your priority tasks**. It will be especially important to complete tasks on the critical path on time. If it takes 5 days to find a facility, rather than the 3 days projected, we may not be able to complete the project on time. We may need to extend the timeline or identify ways to complete other tasks more quickly than planned.

Third, **you can identify how much room you have to let other activities slide in your timeline**. In project management terms, some tasks have some “float” or “slack” in your timeline. For example, in this project’s critical path, you will need 23 days to prepare the focus group (the time needed to secure the location and recruit participants). During these 23 days, you have other tasks to complete. For instance, it will take 10 days to prepare your focus group questions and train the team. You can jump into the protocol development on the first day of the project. However, writing the focus group questions could slide for a week or two, as long as it is done when the participant recruitment is complete.

*Note: This is a simplified approach to determining the critical path and the amount of float. Project management offers much more complex calculations, developing more detailed time frames for each task, calculating the earliest and latest dates that the task can be completed, and determining the specific amount of float for each individual task. There are many useful guides online if you would like to dig into this more deeply.*

Fourth, you can use the network diagram and critical path to **monitor your project implementation**. You can compare your projected timeline to your actual status, to determine if you are on track and to identify tasks that need to be accelerated. Continue to update the critical path as you proceed. It may change over time if there are unanticipated delays in other tasks.

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