



Supporting
Project Teams:
how do students
learn team
skills?

**Foundations for
Teaching in
Higher Education**

Siara Isaac


ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

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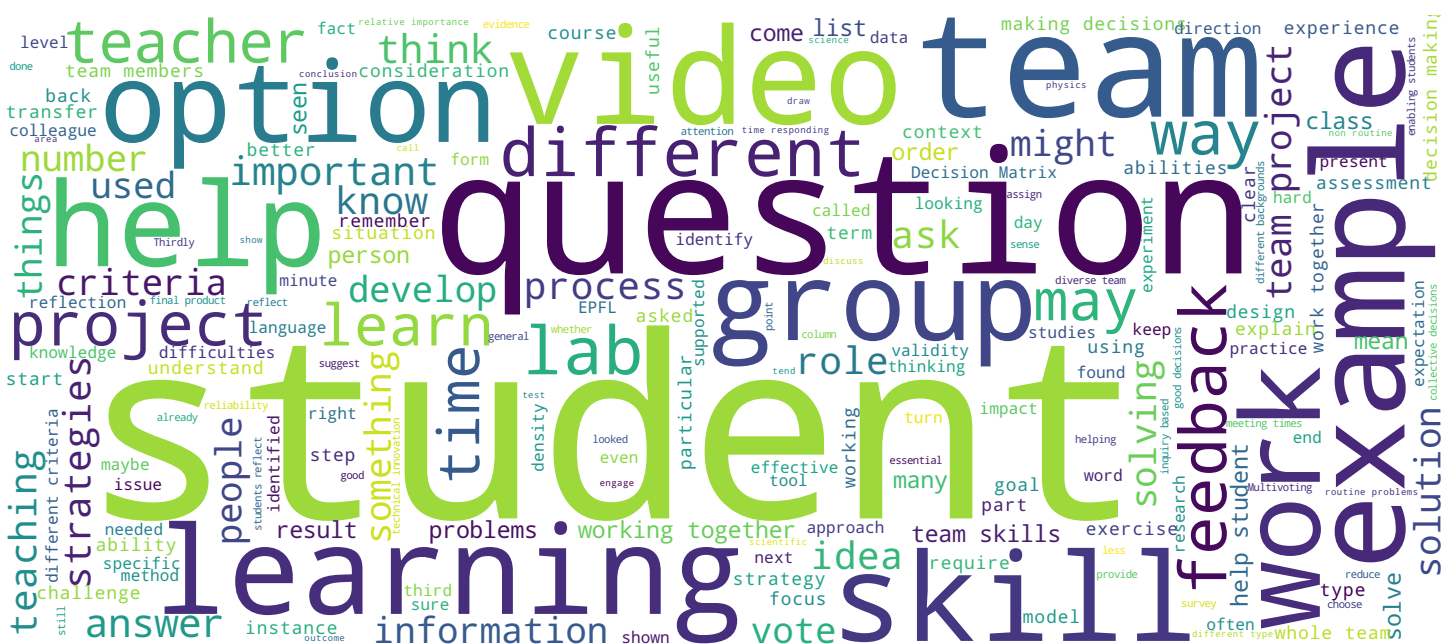
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Video

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EPFL  

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I'm Siara Isaac and I'm a colleague of Cecile, Roland and Ingrid at EPFL, and I'm particularly passionate about how students' work together on teams and the skills which help them work together more efficiently. In this video I'll present some research and strategies around enabling students to develop these skills. Teamwork involves a group of individuals collaborating together to create a shared product; for example a design project or a research paper. While everyone tends to focus on the final product. There are some really important skills for students to learn along the way.

Notes

Summary



0m 04s

"What gaps in your skillset did you have to fill to meet your employer's expectations?" (free text)

Survey of the SIE alumni, July 2017, 190 respondents



These are the results of my 2017 survey of 190 recent graduates from the environmental engineering faculty about the skills that they needed to further develop to meet their expectations of their employers. As you can see professional skills like communicating with colleagues from different backgrounds, facilitating meetings, and negotiating, were among the most common additional skills graduates had needed to develop.

Notes

Summary



0m 36s

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product



Do you remember your first team project? What impression of that experience do you retain today? Team projects can be frustrating experiences when we don't have the appropriate skills for working together.

Notes

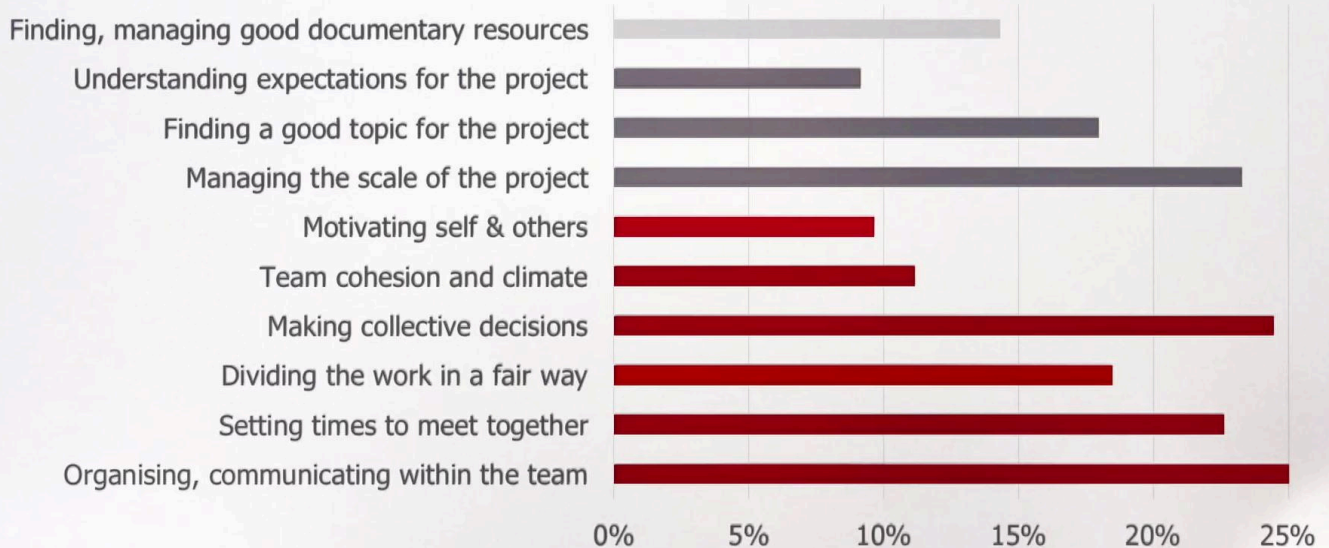
Summary



1m 03s

"What were the two biggest challenges you had to address when working on your team project?" free text

Survey at the end of the Global Issues course (Ba2), 2016, 601 respondents / 900 students



In 2016 I surveyed 600 first year students who completed the first team project at EPFL. I asked what were the two biggest challenges that you had to address when working on your team project. Here we can see that challenges related to working in a team were more commonly key difficulties compared to issues about the subject matter. More than half of the respondents talked about organizational issues such as setting team meeting times and making collective decisions.

Notes

Summary



Goals for this video



- Guidelines for **creating student teams**.
- Propose 2 strategies for **getting teams started** working together.
- Propose 2 **tools for making collective decisions**.
- Create opportunities for students to **reflect on the process** of working as a team, and thus transfer their experiences to new contexts.

This video has four goals related to helping you help student teams. First to present guidelines for forming teams which will create authentic experiences that best support students in learning team skills. Secondly to provide you with two resources for getting student teams to jump in and start working together. This helps keep students and their projects on track. Third this video presents two tools for helping teams make collective decisions. This is a tricky spot of working together. It can consume a lot of time and energy and generate serious friction. Finally you will practice phrasing questions which helps students reflect on their experiences with the actual process of the teamwork. This reflection is essential to enabling students to transfer what they learn on this team to their next team.

Notes

Summary

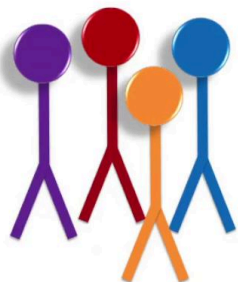


1m 47s

How should student project teams be formed?

- 3-4 people per team
- Create teams that maximise diversity

Rock & Grant, 2016



Okay let's go back to our team project. Before we even start we need to form the team how many people should be on a team. More people means more creativity more skills ultimately a bigger and better project but it's also more challenging for students to work in a larger group. Bigger teams make the difficulties around finding meeting times and decision making much bigger. Groups that have three or four students are recommended to balance these advantages and disadvantages. And how do you choose who to put together on a team? Just making a random assignment or allowing students to choose their own teams might seem like the easiest solution. But this is not ideal. Remember it was the ability to work with people from different backgrounds and with different approaches that was a key skill for graduates to develop. Working in more diverse and interdisciplinary teams isn't more fun and may even be uncomfortable. But diverse teams have been shown to result in higher quality final products in industry. What does a diverse team mean? This will depend on your context. You may have students from different study concentrations, geographical areas or with different relevant skills.

Notes

Summary



2m 35s

How should student project teams be formed?

- 3-4 people per team
- Create teams that maximise diversity
Rock & Grant, 2016
- Except!
 - *Schedules*
Ford & Morice, 2003
 - *Under represented groups*
Joshi, 2014; Landivar, 2013



Think about the abilities that are relevant for your project. Perhaps programming, a knowledge of a specific context, creativity, a language. Consider creating a survey for students in order to collect the data you require. Or you could allow students to form their own teams based on certain criteria. However there are two areas where maximum diversity is not desirable in a team. First schedules; finding time to all meet together as a group is often a major challenge for students. This challenge is often neglected as it is usually invisible to teachers. Students' study program or status as an exchange student are often key factors in their availability. Secondly students from underrepresented groups are less likely to have their contributions to the group recognized when they are isolated on a team with majority group students. For instance a female student on an otherwise male team.

Notes

Summary



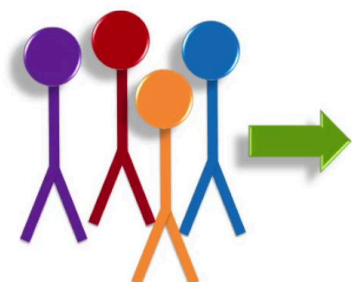
3m 46s

How to get teams started working together?

1. Early deliverable

2. Team roles

- *Rotate during the semester*
- *Recorder, Strategy Analyst, Manager*



Onto the next objective how do we get teams working together? It can take students awhile to figure out how to get started, but if students don't get started quickly they can fall behind and run into difficulties with time management. A good way to help avoid this is to assign the teams a deliverable which is due on the first day or very soon after. One option for this first task could be a team plan where the team sets its own rules for how it will work together and who will be responsible for what parts of the project. Dividing up the teamwork between team members often happens early in a group but if the team is unaware of the abilities or learning aspirations of each person then this division is unlikely to be the best either for learning or project quality. Consider having students reflect on what skills they personally hope to develop from the project and on what skills they are bringing to the project. Sharing this information within the team has been shown to reduce the tendency to stereotypical task assignments in student engineering projects. Another strategy is to assign specific team roles to students. It's important that all team members develop a variety of skills so a role of leader is not typically recommended.

Notes

Summary



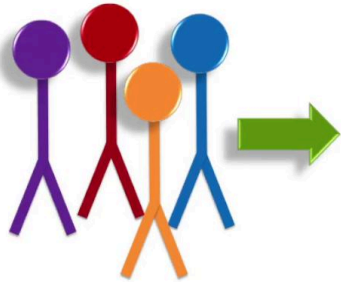
4m 41s

How to get teams started working together?

1. Early deliverable

2. Team roles

- *Rotate during the semester*
- *Recorder, Strategy Analyst, Manager*



Rather the role should make explicit the different types of things that need to happen within a well-functioning team, and the roles should rotate between team members during the semester.

Notes

Summary



5m 52s

Team roles scaffold the development of collaboration skills

RECORDER

- Notes names & roles of the members at each meeting.
- Records decisions, assigned tasks, deadlines, location of reports, etc.
- Ensures minutes of meeting are available to everyone

MANAGER

- Gets team to start quickly & remain focused during the meeting.
- Keeps an eye on the clock.
- Addresses team members by name and ensures that everyone contributes.

STRATEGY ANALYST

- Guides consensus-building, so whole team can agree.
- Observes team dynamics (respect, frustration, everyone participating...)
- Proposes strategies to make the group's work more effective

source:pogil.org

Here are three examples of roles for team members which have been adopted from POGIL resources. These roles consist of specific tasks to assist students in learning about how to get things done in a team. First, 'recorder' to keep note of decisions and deadlines. They might say "Hold on I need to write down this important decision". The role 'manager' to keep the group moving forward and working together. They might say "We need to leave in five minutes. Does anyone have anything else we need to discuss?". And finally 'strategy analyst' to keep an eye on the group's effectiveness. They might say "We seem to have a lot of ideas about this. Let's make a list on the board together".

Notes

Summary



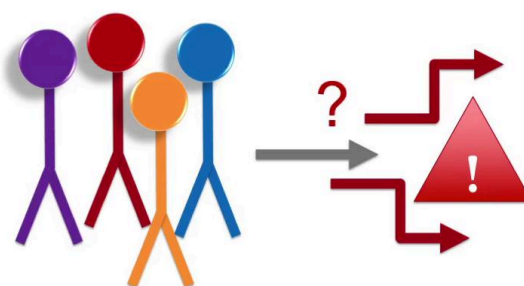
6m 02s

How to help teams make good decisions together?



1. Multivoting

2. Decision Matrix



The next challenge is decision making. It's a good idea to prompt students to start making decisions together early because decision making is hard but necessary. Teams need to make good decisions which will move their project forward. Good decisions means that they are based on the skills, knowledge and competencies of the whole team and are supported by the whole team. This requires good group communication and is a common source of delay and tension in student teams. While making decisions will probably always remain a challenge, there are some specific tools and strategies for making decisions and I will present to here: Multivoting and the Decision Matrix.

Notes

Summary

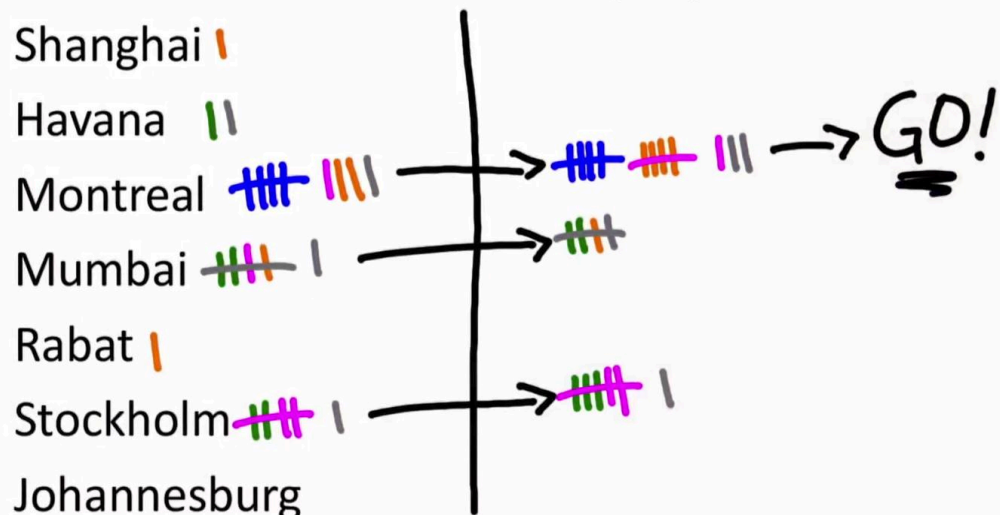


6m 46s

How to help teams make good decisions together?

1. Multivoting

-> *Where should we focus our project?*



First, Multivoting. Let's take an example where a team has to decide on which geographical location to focus or project. The first step is to make a list of all the possibilities. There can be a lot of options too many to explore in depth. Next each person is allocated a certain number of votes. For example each person gets five votes. They can then distribute their votes among the options on the list. Perhaps all five votes the same thing if they're really passionate about one option or two votes on the same option and the other three spread across three other options. Once everyone has distributed their vote. There should be a few options which really stand out. This approach can narrow down the number of options under consideration while ensuring contributions from all the different members of the group. It reduces the chance of having one person with strong opinions who drives a group too much in any given direction and thus doesn't engage the whole team in their skills. If there are still too many options or you need a single choice a second round of voting can be conducted.

Notes

Summary



7m 31s

How to help teams make good decisions together?

2. Decision Matrix

-> Which prototype do we take forward?

SCORES		Cost	Technical innovation ^{.5}	Reliability
5.5	prototype 1*	3	3	1
5	prototype 2	1	2	3
4.5	prototype 3	2	1	2

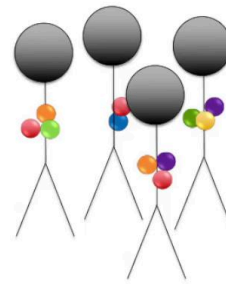
The second strategy for making decisions as a group is the Decision Matrix. Let's take a choice between three prototypes as an example. We make a table where the different options are listed in rows and the different criteria to take into consideration are listed across the column. Here the criteria are cost, technical innovation and reliability. Next we assign a relative importance to each criteria with this example perhaps technical innovation isn't as important as the other two. So it could be assigned a relative weight of 0.5 you then evaluate each option for each criteria by assigning a number. For example the first option may be very inexpensive and should get a top score for cost. However it may not be very reliable and you get the low score in this column. Once you've scored each of the options for other criteria the best options can be found by summing the scores. However if the option that comes out ahead does not fit with your gut feeling, then you may need to assess the relative importance assigned to different criteria. Or perhaps you should add another criteria that was not initially taken into consideration. The decision matrix can help a team structure their discussion and move forward towards a decision that is well founded on their combined knowledge, and supported by the whole team.

Notes

Summary



Students working in teams, without specific attention to developing team skills, results in NO improvement of these skills.



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*What questions can you ask
students to encourage them to
think & talk
about the way they work in teams?*

Cohen, 1994.

Ford & Morice, 2003.

Colbeck, Campbell & Bjorklund. 2000.

While engineering students have often completed several team projects worryingly they do not tend to learn team working skills unless they are explicitly accompanied in developing these skills. As we have seen before in this course, learning by doing requires reflection. Because these team skills are not typically evaluated in student projects, it may be hard for students to even see these abilities as skills that they could transfer to future teams. This brings us to the final goal of this video to help make students aware of the strategies which go into effective teamwork and how they can be used. This requires that students think about their own actions and the outcomes. What are some questions that you could ask students to get them to reflect on these issues? Pause this video and take your time responding.

Notes

Summary



9m 57s

Asking Questions for Reflection about Team Work

What was the biggest difficulty you encountered in your team this week?

How did you resolve it?

Would you do the same thing again?

What looks like a big difficulty next week?

What tools could help you approach it effectively?

What tools/strategies did your team use today?



Here are some questions I have thought of. When framing my questions, I sought to promote both reflection on past experiences and future intentions. I am confident you will think of many others in context with your students. Encouraging students to provide feedback to each other about their team skills is another important aspect of fostering the development of these skills.

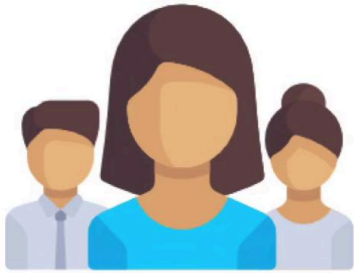
Notes

Summary



10m 52s

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While this video has focused on team skills in projects we can also consider a lab group or any other group work as a mini team with a micro project. If you provide appropriate structure and support every time students work in a group then these can serve as low stakes opportunities for students to develop team skills.

Notes

Summary



11m 14s

Summary



Take a moment to write down:

≥ 1 idea about forming student teams

≥ 1 idea to help teams get started working together

≥ 2 tools/strategies for teams to use during their project

To conclude this video I would like you to take a minute to answer the following questions. Please pause the video and take your time responding.

Notes

Summary



11m 32s