



A Handbook for Undergraduate Engineering Students

“
*Teamwork is never equal to the sum of
the parts that go into it.
It is always equal to more or less.
Building an effective team environment
is step one to making it equal to more.*
”

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I Introduction

This handbook is designed to support students in setting up, navigating, and succeeding in hybrid engineering teams. Teamwork in undergraduate engineering requires the ability to collaborate both in person and virtually – a hybrid approach.

In-person teams operate face-to-face by being physically present in the same space and conversing and using tools that are all within reach. Different from these, virtual teams are conducted fully online, using collaborative tools that everyone can access an instance of on their own device, and converse through audio/video calls and messaging. Hybrid teams are a combination of the two, having both virtual and in-person components.

OUR APPROACH TO DEVELOPING THIS HANDBOOK

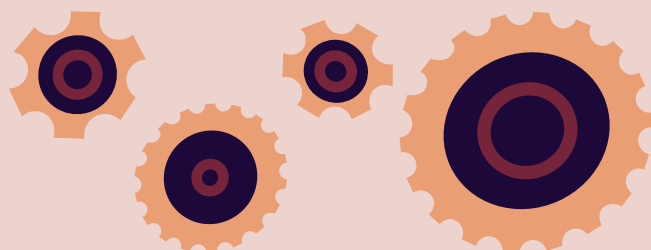
Through this handbook, we wish to enable teams to adopt strategies and practices so that they can be equally as effective in virtual and hybrid teams as they are when working fully in person. It is a collaborative effort of four students upon their completion of first year, a teamwork professor, and the voices of students who have experienced both virtual and hybrid teamwork during the pandemic.

This handbook gathers learning from the literature and our experience at the University of Toronto to provide recommendations and best practices for engaging in hybrid teamwork. This handbook serves as a guide, not a prescription. To get the most out of this handbook, all recommendations should be considered within the context of a team or course. You will be suggested important points to consider when engaging in hybrid teamwork, and it is ultimately up to you to determine what is important. Be mindful that every team is different – they have different needs and face different challenges. Each team will need to adapt these practices to best fit their specific situation.

II

Setting yourself up for Success!

The first step in being an effective team member is being an effective student and individual. This means that balancing your other classes and taking care of yourself is going to improve your ability to contribute to your team. This section provides some suggestions on how to set yourself up for success when you engage in teamwork.



MANAGING YOUR TIME

One of the biggest challenges in transitioning to university is learning how to manage your time. In university, everyone has different methods of doing this. As you start overseeing your own schedule, it is more important than ever to develop time management skills that work best for you! Time management enables you to succeed individually, but also enables you to succeed as a team. Setting out time for your teamwork (either for meetings, or the work that happens between meetings) is necessary for success. Ensuring you have this time blocked off will enable you to contribute your work to the team on time, thus showing that you are a responsible team member.

“The biggest enemy is procrastination”

Some tips on how to manage your time:

Have a planner/ use a virtual calendar - see the Tech section for task management tools

Make sure that you schedule in time for you away from school and your computer (at least an hour a day)

Decide how much time is enough to spend on one assignment

Schedule team meetings in advance and consider commute time for in-person scenarios, and sleep time for virtual meetings – make sure every can attend alert!

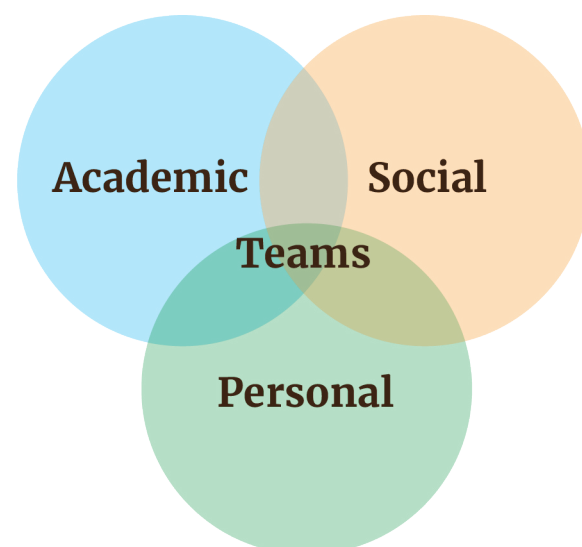
Have a consistent and reasonable sleep schedule to avoid being tired or late for team meetings

CREATING BOUNDARIES TO GIVE YOURSELF SPACE

Teams in university exist at the intersection of one's academic, social and personal life. They will require you to share your academic competency with others (to complete the projects), engage with your team socially (to get to know everyone and enjoy the experience), and your personal life (to share when you are able to work, what you are able to do, and what strengths you bring to the team and the project). With hybrid teamwork, you may be joining onto virtual meetings from home or arriving home late from an in-person meeting. Making friends with your team members is great – and we highly recommend it! But spending all your time with the same people as you move through the different parts of your life may be exhausting. Make sure that you have time to take care of yourself away from your team.

If you have the option, make sure you aren't using the same space for teamwork / virtual meetings and for sleeping or relaxing. This can be as simple as creating a distinction between sitting at a desk or on the floor, and being on your bed. Having a defined workspace enforces the separation between work and relaxation in your mind, leading to both an efficient workflow and better sleep (Kim, 2017).

Make sure you are also spending **a minimum of an hour a day away from school and your computer doing something for yourself**. To avoid exhaustion and burnouts from the huge amount of time we put into our schoolwork, it is recommended to do things outside of school. This includes picking up a hobby, meditating and exercising, or even going out for walks. This will expand your personal and social circles so that you grow the non-team part of your life. These experiences can also be a source of inspiration for team design work in the future!



Remember that social media accounts can be personal, and you or other team members may not want to disclose to colleagues any content meant exclusively for friends and family. Therefore, normalize asking for consent when connecting with each other on different digital platforms. A good strategy to avoid the discomfort of sharing personal content or information is to **use separate email and social media accounts for academic, professional, and personal settings**.

PREVENTING CONSTANT CONNECTIVITY

Your ability to be an effective team member is interwoven with the state of your mental health and level of motivation. In other words, staying motivated and resilient, and having a good mental health facilitates your academic and teaming performance (Allen, 2017).

A virtual or hybrid setting can encourage the mentality of always being reachable by team members through instant messaging and emails. This constant communication demand may cause information overload, cognitive strain, and therefore increased stress (cite). To avoid this, a suggestion is to **have “available hours” for your teams**, group projects, and even yourself. This means you are only going to be online during certain hours of the day to respond to emails or messages. This limits your screen time and is also beneficial for those who are working from different time zones.

Be careful not to fall into the trap of “whoever is online dictates the project.” Ensuring that you have agreed upon time to work together makes sure that everyone's voice is included at the table.

FINDING WHAT MOTIVATES YOU

To gain further insight on what keeps you driven, consider your extrinsic and intrinsic motivations. Extrinsic motivation are the motivation factors that originate from outside of yourself, such as grades, awards, career and family expectations. Intrinsic motivation stems from within, which could be personal connections to the assignment, the feeling of achievement and pride when completing a task or being one step further towards your goals.

Once you have identified your extrinsic and intrinsic motivations, ask yourself the following questions when starting a task (adapted to a team context from (UTSC Academic Advising and Career , 2013)).

What is the purpose of the assignment? What are your goals for it?

Why are you working as a team for it? What do you have to do as a team to complete this?

What questions do you or your team have about the assignment?

What are some difficulties your team may face?

What will you or your team enjoy the most about this?

What connections can you and your team make between the assignment and other courses, real-life applications, life experiences, or personal goals?

If you are overwhelmed, such that you cannot stay motivated or have a good state of mental well-being, reach out for support! Check out the resource section for more well-being related supports.


ASKING FOR HELP WHEN YOU HAVE QUESTIONS!

Being an effective team member also means knowing when to reach out for help in your teaming experience. This means going to studio/tutorial and office hours, emailing and posting on discussion boards when you have questions, and reaching out to your professors, teaching assistants (TAs), and other instructors (communication or teamwork) if you have conflicts or need guidance within a project. Reach out to any member of your course teaching team if you have questions – if they don't know the answer, they will be able to direct you to someone who does. Having a good rapport with your teaching team has shown to improve student experience and performance in courses (Kahu & Picton, 2019).

In addition to communicating with your instructors, it is useful to connect with your peers for further support. This includes your team members, classmates, upper years or friends. Ask them questions, seek suggestions or advice on university, get help with problem sets, or simply spend time with them. Even in the individual-focused courses, engineering is a team sport. Unless you are told not to collaborate, working with others to figure out the assignments can enhance your own understanding! Your peers can also be an important part of your academic and social life and provide you with a sense of belonging. Take this chance to create meaningful and lifelong relationships, whether through having group study sessions, hosting game and movie nights, or grabbing coffee together.

For more team and academic supports, refer to the [resource](#) section.

III Designing an Effective Team Environment



IF YOU DO NOTHING ELSE...

At its core, an effective team understands and builds on team members' ideas, communicates effectively and resolves conflicts (Sheridan, Kinnear, Evans, & Reeve, 2015). If your team can do these three things, all the other work should fall into place. It may not be easy, but your team will be able to figure it out and work through it together.

If you and your team stop reading here, just remember these three pillars:

1. Respect one another

Respect each other's time, boundaries, ideas, opinions, and identities. This mutual respect of personhood is the basis of your relationship.

2. Communicate with one another

Don't ghost your team members, remember that minimal communication is better than none, and that providing a reason for an action is more understandable than saying nothing at all.

3. Take time to understand one another

Spend time playing games and getting to know one another outside of the project. Remember that these are not just people that are assigned to you, but they are your peers with whom you have much more in common than just the class you are taking. Take the time to talk about how you want to work together and decide on how you will implement this.

BEING AN EFFECTIVE TEAM MEMBER

An effective team requires each member to work to be the best team member they can be. According to Sheridan et al (2018), effective team members demonstrate 12 behaviors – the best practices in this handbook aim to promote these behaviors.

As you build (and re-build) your team, constantly check in with yourself to see if you are being an effective team member. **If you answer no to any of the questions on the 12 behaviors, you may want to explore how you could build up that competency.** Talk to a member of your teaching team, a peer, or a teamwork coach/mentor for advice.

1. Are you organized?

- Do you attend team meetings prepared?
- Do you complete your fair share of the work?
- Do you deliver your work on time?
- Do you help to plan and organize the workflow?

2. Do you build Relationships with your team members?

- Do you follow through on your promises and demonstrate accountability?
- Do you seek and include input from your team members?
- Do you show respect for team members?
- Do you listen and pay attention to your team members?

3. Are you communicating with your team?

- Do you exchange information in a timely manner?
- Do you openly express your ideas and opinions?
- Do you promote discussion towards decision making?
- Do you have difficult conversations when there is disagreement or conflict?

DESIGNING YOUR FIRST ENCOUNTER

Your first meeting with your team will set up your first impressions of each other and define how you want to work moving forward. This is both an exciting and stressful time as you will want to share your best self to create effective bonds moving forward. For your first meeting, you will want to think of both how you will meet (logistically) and how you will get to know your team.

1. SETTING UP THE FIRST MEETING

Hopefully, your professor will help facilitate your first point of contact with your team members. In hybrid teamwork, usually your first meeting is in person in-class. If this is not the case, it is good practice to send a group email introducing yourself and starting a conversation on when/where to meet.

Try to meet in person for your very first meeting! Being able to see and hear all the non-verbal communication will enable you to get to know each other both better and faster. If that is not possible, it's good practice to pick a non-social media platform

associated with your university account so it's accessible to all your team members: Microsoft Teams, or Zoom are possibilities.

During your first meeting, you'll also want to discuss what platform you want to use for your future communications (video/audio call and messaging). Each team should have one asynchronous channel to maintain connection with each other. Refer to our tech handbook for some recommendations.

Consider the following things when picking a virtual platform:

Accessibility

Please make sure all your teammates have easy access to this platform. Do not assume everyone is okay with a Messenger group chat, Discord, etc. just because you like it.

Internet bandwidth

Be mindful that everyone on your team may not have equal internet access so be patient with bandwidth and what platforms you decide to use as a team. Testing different calling mediums with your team and figuring out which one runs the smoothest is a good idea to do early on.

Available features

What's important for your team to have? Emoji responses for quick approval? Read receipts? Increased structure (e.g. file sharing, separate channels)?

Frequency of responses

How often do you check this medium? How often do you expect team members to respond on this medium? Is there a mobile app that makes it easier? Is there a way to choose your own notifications on the app (night-time mode)?

Team space vs personal space

Are you okay with meeting on social media platforms? Would you prefer keeping schoolwork separate to not be overwhelmed? Does the potential increased frequency of response outweigh the cons?

II. GETTING TO KNOW YOUR TEAM

Your first meeting will set the tone for your future meetings. At this meeting, do not jump straight into work but take the time to get to know each other. If you are not able to do this during the class time provided to you, set up another meeting to get to know each other as people. Students who have relationships and connections with their team members have a more positive teaming experience. Knowing who your team members are enables you to create a positive space for conversation as you will be able to anticipate how people will respond to your contributions.

Some ways to open discussion in your first meeting in getting to know each other are:

Where you are currently (if connecting virtually)?
Where you are from (if it's different)?

Why did you choose Engineering/the program/discipline?

What do you think is the most valuable skill you bring to the team?

Your favourite thing to do outside of school and learning?

Another more fun way to do this is through games and socializing outside of your mandatory team time. You can build a stronger bond if you do something completely unrelated to your team as a way of getting to know each other. This could involve going for coffee or lunch together if in person, or playing some online games together if you are connecting virtually. Any games that you can play with all members of the team would work; we also have a list of our recommendations in the games and activity section. For a guided icebreaker, feel free to watch [Icebreaker for New Teams](#) by Dr. Stephanie Halderson from Troost ILead.

DESIGNING HOW YOU WORK TOGETHER (TEAM CHARTER)

Creating a structured document where you define how you will work together in your team may be a component of your course (e.g. Team Charter). If it is not part of your course, we recommend that you take some time to agree on how you want to work together. It is an important conversation that teams should have as it sets the tone and expectations of the entire project and sets the foundation to develop accountability.

More importantly, it creates a third-party document that everyone is accountable to. If things do not go as planned, you can return to this document to guide a discussion on how to change how your team is operating. If someone is not meeting the agreements in the document, you can converse with them about their obligations to the team.

It is important to note that a team is a living entity – it evolves and grows as its team members learn more about themselves and how they work together. Your first draft of these agreements will not necessarily be the best. Take time to refine it and iterate it over the course of your work together.

Below are some important points you and your team should touch upon during this conversation.

I. YOUR EXPERIENCE AND BELIEFS ABOUT TEAMS

Talking through the following points will implicitly help you get acquainted with your team better, but it's also helpful to have an explicit conversation about what you bring to a team and what's important for you in a team. Use this as a guiding foundation for how you and your team set up your teamwork environment.

First, individually reflect on your previous team experiences. Give yourselves at least 5-10 minutes to reflect on your own.

What went well?

What went poorly?

What do you want to avoid?

Why was that important for you?

What do you want to ensure happens in this team?

What do you want to get out of this project this semester?

Then, as a team, share some of your experiences and goals when it comes to teamwork and if you're comfortable, share the reason/experience why this is important to you. This will help you better understand one another and what behaviors/situations may cause tension and stress later on.

From this discussion identify some of the critical situations and determine the behaviors that created them. If they were positive, do you want to recreate those in this team? If they were negative, how can you avoid them in this team?

Then as a team, discuss what your “ways of working” will be in this upcoming project. Develop 3-5 agreements on how you will work together based on this experience.

Some questions to think about as you craft these agreements are:

Is it important to keep a disciplined schedule and have work done on time so you can focus on other courses?

Is it important to hand in a quality project even if it takes a lot more work to get done?

What kind of relationship do you each value with your team members?

How will decisions be made in your team?

When and how will you meet?

What are the expectations of team members in meetings and between meetings?

While it may seem simple to agree to any way of working initially, other priorities and balancing a difficult workload in other courses can make it difficult to have an ideal project experience without intentional consideration from the team members. The intentional commitment early on (meaning following through with the promises you make in the first meeting) is a pivotal steppingstone in being accountable and creating trust within your team.

II. LEADERSHIP, ROLES, AND RESPONSIBILITIES

Leadership is a critical aspect of driving a team forward. There are many ways leadership can emerge in a team. To know what leadership structure will work best for your team, requires you to know your team well. Sometimes it helps to try out different structures before settling on a specific one.

To decide on a leadership structure, you must decide what your role is as a team member, both explicitly (formal role) and implicitly (what unique skills and perspective you can bring to your team) to better support your team members and play to the strengths of the team. In some teams, a team leader will be designated to guide the project and ensure that the goals and vision of the team are being met. In some teams, leadership will be shared and decisions and organization will emerge out of the conversation of the team.

Regardless of which structure you take, as a team member you must **demonstrate leadership by showing initiative in the team**. Whether this is coming up with a new idea between meetings, determining a new way to collaborate on the project, scheduling the next meeting, or proactively keeping track of the work completed, everyone needs to show that they are willing to take some responsibility for the team. The initiative

you are willing to take is your leadership in the team – it is what will influence your team and move it towards achieving its goals.

Some teams define specific roles for their team members. We share a few here as a guide to thinking about how you want to define your team. If you choose to define your team into people with roles, try to ensure that the roles fit the people taking them on. If you choose not to have defined roles, acknowledge that the responsibilities of those roles still need to happen in the team. How you choose to ensure those responsibilities are met is a discussion that will need to happen.

Team Leader

Responsible for ensuring that the team and project are advancing. They are in charge of providing the team with the support needed to succeed. Some traits of a team leader are looking at the big picture, working with different personalities, dealing with change and iteration.

Project Manager

Responsible for the determining and managing the details of making the team succeed. They ensure that the work is done on time and correctly, organize workload and check-in with team members on their progress, and forward any remaining concerns to the team member. A project manager needs to be organized, disciplined with their time, a people-person and diplomatic.

Communication Liason

When working with an external client or stakeholder you may want to have one person as the contact person for the whole team. They will ensure that a unified message is going from the team to those outside the team. You will want someone who likes to talk to people, and doesn't mind conversing with people they do not know well in such a role.

Schedule Coordinator

Responsible for checking in with team members to note what work or ideas are on a meeting agenda, set up and send reminders for meetings, and communicate this to the team. They are detail-oriented, and are able to improvise if there need to be last minute meeting changes.

Specialists

Depending on your project you may have people with different disciplinary backgrounds who are needed for a specific skill that they bring to the team. These individuals may focus their work in that specific area to ensure that the project goals are met. They are task-oriented, have extensive knowledge on an area and educate other team members along the way. While a specialist may know one aspect of the project best, they should not be the only decision maker in that area. The entire team should know what is happening in all aspects of the project.

Editor

Sets a style guide for other team members regarding formatting, references, etc. They lead the final check for consistency within documentation or presentations. While all team members remain responsible for their own critical thinking, logical argument, and proofreading an editor can be supportive in ensuring that the entire document/presentation is cohesive.

Leadership is not only reserved for the team leader or the project manager but is necessary from all team members. Growing your leadership skills not only enhances your own inter-personal skills, but also the quality of the workflow and project.

You may ask yourself the following questions when performing your role:

Do you know your role and expectations?

Are you communicating effectively and aligning with your team members?

Can you be more organized?

Are you enforcing a positive and motivating environment for the team?

Include the agreements around roles and responsibilities in your team charter as a way of ensuring everyone knows how they will contribute to the success of the team.

III. EFFECTIVE AND TIMELY COMMUNICATION

Team members frequently responding in a timely manner is the most important first step to building an effective team. If you aren't talking to each other, you cannot build your team or work together. Continually communicating with team members is essential to developing accountability and building trust.

As a team, you want to make sure you define a communication plan that everyone is willing to partake in. One of the most frequent communication issues is team members that are unreachable - there would be periods of time where team members didn't hear from each other. Full collaboration in these situations becomes nearly impossible.

To set up effective communication, think realistically about what and when you are able to contribute to the team.

Here are some points to discuss setting up some agreements around communication:

1. Your availability

Be up front with your team members about your circumstances and when you are available. If you know in advance of any situations that might prevent you from being present at a meeting or contributing to the best of your ability, let your team know. If you work on Saturdays, ensure the team knows so that meetings do not get scheduled for Saturdays. If you are commuting, share what you know about transit availability and duration so that you can decide on in person or virtual meetings.

Share some basic information about your weekly commitments / studying schedules. Compromises must often be made in teams for synchronous meetings, but it's important to keep boundaries for yourself. Laying out everyone's schedules can identify free times to meet and help plan the synchronous/asynchronous workflow.

2. How to stay in contact

Life happens – sometimes we can't meet our expectations or get our work completed on time. A short text does a lot to appease the stress and worry on your team member's end. During your available hours, respond or react to your team members' messages promptly and avoid leaving them on *delivered* or *read*. If something comes up, let your team know as soon as possible.

3. Tech and responsiveness

In hybrid teams much of the scheduling and organizing of the team happens through virtual means. Responsiveness expectations should be a central conversation around picking your primary communication platform.

Here are some considerations:

Talk about the expectations for asynchronous messaging. How long should it take for a team member to respond on this platform?

Have a set structure for when to communicate “on and off hours” on the chosen platform. There is less need to compromise with asynchronous communication, and it’s important to set healthy boundaries to not feel overwhelmed.

4. Plan for adaptation

Since we know no team will have everyone attend every meeting and get all work completed by internal deadlines, plan for adaptation. As a team, discuss the action plan team members should take if someone misses a meeting, or does not respond to a message.

Consider:

The support offered by the course instructors • They may have resources or suggestions specifically to help with team issues.

Have a backup mode of communication on a different medium • This is like exchanging phone numbers in person and calling a team member who’s late to a meeting to determine their whereabouts. If someone doesn’t respond on Teams, do you then try to message them on Messenger? The different medium should only be used in emergency circumstances to ensure personal boundaries are maintained as much as possible.

Punctuality expectations • Often at UofT we generally give 10 mins grace before starting a meeting (T-time). But it can be frustrating when team members join meetings halfway through and need to be caught up. Discuss your expectations and consequences for being late without notice. If you are generally late, warn your team members from the start!

Missing meetings protocol • Will there be meeting minutes? Will they be caught up in the chat or at the next meeting? Are they expected to send a message before to indicate that they won’t be there? How many missed meetings (without notice) will your team tolerate before having a conversation with the team member?

CREATING AN INCLUSIVE CULTURE

Diversity is a huge benefit in teamwork, and in design teams in particular. It enables teams to see their projects from different perspectives, build ideas from different experiences and create design solutions that account for a multitude of different stakeholders. However, to enable the benefits of diversity your team needs to create a inclusive culture where every team member feels valued, trusts one another, and is respected.

1. UNDERSTANDING ONE ANOTHER

It is important to make sure that we know who our team mates are so that we can include them in the team effectively. Team members are not just content producers – they are not what they contribute – but whole individuals here to learn something from engaging in the team experience. Making sure that we know who our team members are is critical to including them appropriately.

When you first meet with your team make sure to find out everyone’s preferred name, how their name is pronounced, and their pronouns. Ensuring you refer to people as they wish to be referred to is step one in making them feel welcomed into the team.

To ensure that you are aware of how your team members are responding to different situations, try to connect using as high a fidelity of communication as possible. The more non-verbal communication we can perceive, the greater our ability to understand how comfortable a team member may be in a situation.

One of the challenges with virtual interactions is that we can lose aspects of nonverbal communication that we perceive when in person, some examples of this are body language, tone, gesturing etc. At times, we may need to be more explicit verbally to share our emotional response to a situation when our body language can not be seen.

When engaging in conversations that could be controversial, are critical for everyone to be on the same page (e.g. decision making), or relate to team dynamics, have these conversations in person where possible. If you cannot, use a video call over an audio call as you will be able to see gesture, facial expression and tone.

A comparison of audio and video call benefits is below:

Video calls

Video calls make understanding tone and emotion easier as you can hear their voice and see their reactions

There is a performative element to video calls including the feeling of “needing to be on” when on a video call which means you might not get the most authentic reading.

Audio calls

While audio calls allow you to understand tones, it does not expose you to facial expressions.

These can be suitable to avoid lag in low bandwidth situations

Work very well when everyone needs to discuss a drawing or document that is on a shared screen that needs everyone’s focus.

II. BUILDING A PSYCHOLOGICALLY SAFE ENVIRONMENT

Developing connections and trust with your team members is important in fostering a sense of comfort to sharing ideas and taking risks. This sense of comfort is called psychological (psych) safety. Psych safety is “one’s emotional ability to express oneself in a ... [team] without fear of negative consequences in relation to well-being, self-image, and status.” (Zhang, Fang, Wei, & Chen, 2010)



Image credit: Fahd Alhattab

In a team it is critical to build psychological safety so that we are able to take risks, share ideas, and be able to create better designs. When people on the team are scared of sharing their opinions, or “looking stupid” the team is not able to benefit from all of its team members. As a result, the ability to create a great project and learn from how the team progresses is not possible without psychological safety.

One way to create a psychologically safe environment is to adopt brave space principles in setting up your team. Brave space principles acknowledge that at times conversations can be uncomfortable and unpleasant, but that if you enter with respect and good intentions then everyone can grow from having the conversation. We have adapted some brave space principles below to the teaming context; adopting these can help build the psychological safety of your team.

You can find out more about how brave space principles are used in equity-diversity-inclusion work through AWARE-LA’s communication principles (AWARE-LA, n.d.).

Ways to engage in teamwork bravely:

Speak from your experience - it helps to make you personable and make connections. In sharing your story/identity you add to the psych safety in the team

Assume everyone has good intentions - challenge the topic not the speaker

Have inclusive discussion - make sure everyone is speaking roughly for the same amount of time

Admit when you have made a mistake, and reach out for support when you need it

Make sure you are actively listening and responding to team members

Have patience in dealing with technical issues (internet access)

Choose your language carefully - slang and formal language can be alienating, make sure to try and use plain language and always speak in the language of instruction (English)

Share ideas even if they are not fully developed

Recognize your own privilege and actions in the space and how that impacts your team members

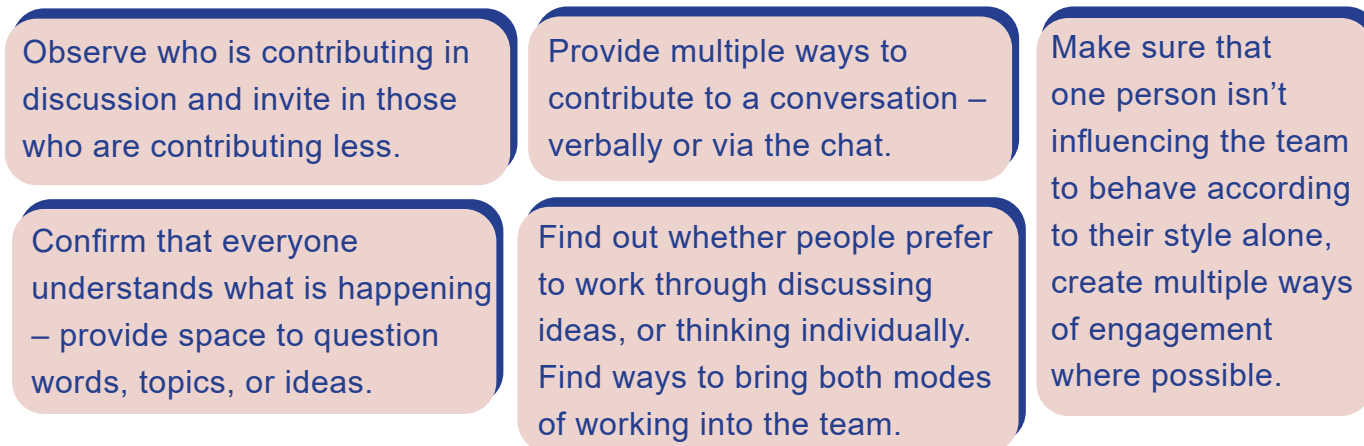
III. ACKNOWLEDGING DIFFERENCES IN WORKING STYLES

Every team member arrives into a team with different experiences, perspectives and preferences. That diversity is what enables a team to do its best work in creating diverse ideas to solve problems. However, it can be more challenging to build trust and psychological safety with people who are different than us as it takes more conscious empathy and willingness to understand other perspectives.

“Successful integration is the key to successful cross-cultural design teams. Successful team integration required acceptance and understanding of cultural differences within the team while focusing on one common objective, forming an integrated, powerful and compelling team.”

— (González, Guerra-Zubiaga, & Orta , 2008)

Diversity in teams can be measured along a number of characteristics, however different working styles will most greatly affect how you work as a team. Some of a team member’s working style will come from their culture and past experience which may inform their expectations and values around communication. Some of it will also come from their personality and how they want to engage with others on the team. It is important to acknowledge these differences and work to include everyone in the team. Some ways to do this are:



Though it can make leadership more challenging, diversity in an effective team can produce very creative and robust work. It is important to communicate respectfully, empathize and take time to really listen to one another.

IV. RESPONDING TO OTHER’S COMMENTS AND ACTIONS

When working in a team it is important to acknowledge that we all approach teamwork from our own perspective, culture, and experiences. Some things are considered ‘givens’ in one culture, which can be difficult to understand from another. People tend to interpret actions within the context of their own accepted norms and culture. It is important to acknowledge this when working with others to make sure you are not responding in a biased manner.

When engaging in conversation, check how your own experience and values are influencing the way you respond. It is possible that the intention of a team member may not be the outcome that you have experienced. If you are engaging in a conversation that is provoking an emotional response, it is critical to check your interpretations of the situation so as not to jump to conclusions.

One way to do this deliberately is to use the PIAA model before responding. This model will systematically guide you through a process of exploring and checking your interpretations before responding.

1) Identify your perceptions (Perceive)

What did you perceive from your team members / the teaming environment. It ranges from what you can hear, see, touch, smell, read, feel etc. Be attentive to the different cues team members may express, as they might not always be verbal. Though given the constraints of online teamwork, remember there is a greater need to be explicit as body language and tone are harder to pick up on a video or audio call than in person.

2) Explore your Interpretations

At this step, explore the different possible meanings from what you’re perceiving. Apply different models of leadership, teamwork, communication or design to explore the situation. Consider your team member’s background and context and try and understand the situation from their perspective. The goal here is to enumerate possible interpretations.

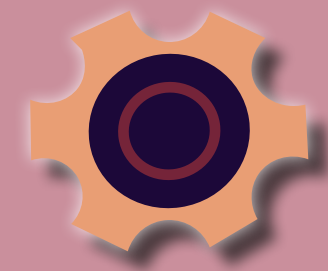
3) Assess their possible Intention

Given the context you've perceived, assess the most appropriate interpretation of the situation. Acknowledge that an interpretation is not fact or truth. Try to narrow down your interpretations to your best guess of the intention given everything you know about your team and the situation. Consider the potential consequences of your interpretations to determine how it may impact the team. It's possible you may have to return to Step 1 (perceive) to gather more information before you can accurately assess the appropriate action to take.

4) Act

Do something based on what you have interpreted and assessed! Some common actions consist of: seeking clarification for a comment made, striking up a conversation to provide feedback to someone, sharing your own perspective to ensure it is understood, confirming the way in which the team will work, or revisiting a team's charter. The key thing is that you take this step last.

This model is a good approach for mitigating conflicts and acting respectfully and intentionally. Remember if you're struggling, it's also a good idea to talk through these steps with an impartial third party to avoid succumbing to your own biases.



IV

Working as a Team

Once you have set up the initial way in which your team will operate, you then get to do the fun stuff – work! With hybrid teaming, determining which work needs to be done together in discussion, and what work can be completed individually outside of discussion is critical. Work that needs to happen “in discussion” typically happens in team meetings (either in person or virtual). Work that can be completed individually, or in sub-teams, happens in between these meetings as a way to create input for the meeting discussions. As a team you always want to make sure that you are doing any collaborative development or decision making together.

HOLDING SYNCHRONOUS MEETINGS

Synchronous meetings are the only time you'll be able to really discuss ideas with team members and make non-binary decisions. These are critical for ensuring the team is on the same page and interpreting the work in the same way. As scheduling time together can be challenging with a full course load, the work you do in-between affects how effective your meeting will be. Setting up well-constructed meetings is critical.

Poorly constructed meetings may lead to unclear actions with no defined outcome, high meeting time, and an overall drain on morale. Avoid meeting for the sake of meeting – always have a purpose or decisions that need to be made. Planning for a meeting can happen asynchronously on your team's messaging platform.

Before the meeting

- **Schedule the meeting!** Make sure everyone needed is available. Ask if everyone will be home on time to call in if you are meeting virtually.
- **Specify the location** (audio platform? Video platform? Meeting room?)
- **Agree upon an agenda** of what you want to get done:
 - Determine key questions to answer
 - Assign any pre-work to team members
 - Identify which team members for what duration are needed for the meeting: Is it a sub-team or full-team meeting?
- If heading into an idea generation meeting: Ask everyone to **develop some ideas individually**. Prepare visuals to illustrate your ideas and assist with your auditory or written descriptions.
- **Remind team members** of the meeting 24 hours beforehand.

During the meeting

- Take time to **have a social chat** before you dig into the work so that you can stick to the planned agenda and have focused discussions. This makes space for humor, human connections, and fosters empathy between team members.
- **Designate someone to facilitate the meeting** and ensure you follow the agenda. If you have shared leadership, rotate the facilitation role amongst team members.
- **Have a designated screen sharer.**

- If you are online, **ensure everyone has equal capabilities on the call.**
- **Don't multitask** during the meeting! Stay focused and find ways to contribute (through conversation, note taking/recording, or using the chat feature to share ideas)
- **Have a shared workspace** – this should be a shared screen or a large whiteboard/flipchart paper. Have all team members mark up the workspace to add ideas, highlight features of a design, or record decisions. See our tech section for some virtual recommendations.
- **Make sure notes are being recorded** on the discussion – challenges identified, decisions made, individual work responsibilities.
- **Allow each team member to present their ideas.** Allot time to eliminate, expand, combine ideas to incorporate collaborative thinking. Invite team members who have spoken less in the meeting into the conversation to ensure they have a space to contribute.
- **Confirm you have made all the important decisions outlined in the agenda** before ending the meeting.

Have you planned a meeting or a work session? Make sure you choose correctly!

Meeting

The team discusses ideas and past work and comes to decisions about how to move forward and develop the design.

Work Session

The team members work on components of the project in a space where they can easily ask each other questions if they arise.

Both meetings and work sessions can happen synchronously (in person or online) but if you aren't focused on discussing and making decisions, it's not a meeting. Some teams find work sessions help them stay focused on the project to get their individual work done – as a team think about whether this might be useful to your team or not.

ZOOM FATIGUE

Watch out
for this!

Video calls are more exhausting than in person meetings – if you choose a video-call as the way to meet try to make the meeting as focused and efficient as possible. We get tired during video calls because we are trying to fill-in gaps in non-verbal communication that are lost from not being in person (Leung, 2020). We all respond to this exhaustion differently; you may be prone to multi-tasking or not fully paying attention to the discussion.

Some ways you can make your video calls more effective:

Hide self-view (if possible).

Turn on the closed captioning.

Take breaks during video calls (every 20 minutes you should have a 20-second break and every hour you should be having a 10-minute break).

Decide if you really need a video call:

- If editing a document when you have a screen shared, audio only conversation may be sufficient
- If you need to make a quick decision that will not significantly affect your design (e.g., scheduling a meeting or clarifying a plan) use a messaging platform for texting.

WORKING IN-BETWEEN MEETINGS

With meetings, you want to use your time as effectively as possible! To do this, you have to work independently in between meetings; there won't be time to do your individual tasks while in a meeting.

To ensure you are most effective between meetings, make sure your team has clearly outlined what work each person needs to complete before the next meeting. Discuss the quantity and quality expectations so that you know what to create. Try to distribute work in a way that is supportive of everyone completing it – do not have one person “assign” individual work, but have the team collectively agree on who does what. As you are working on your individual component, refer back to your notes from the meeting or check in with team-members to ensure you are heading on the right track.

Some ways to be an effective team member in between meetings are:

Block off time to do the work! Schedule in time to work and prep team assignments just as you would with individual assignments.

When you have team brainstorming planned, make sure you **have some ideas before the meeting** so that you can spend less time thinking and more time debating and iterating through the ideas.

Communicate asynchronously (through messaging and commenting) in between meetings; share ideas, make quick or binary decisions, store and share files, keep each other updated on collaborative work.

Store all your work on your team's shared workspace so others can see your progress and work.

Set up your work to be easily found during a meeting: pin important messages as reminders, use keywords to be able to filter through messages or files, use separate channels/folders for different topics.

Get your work done!

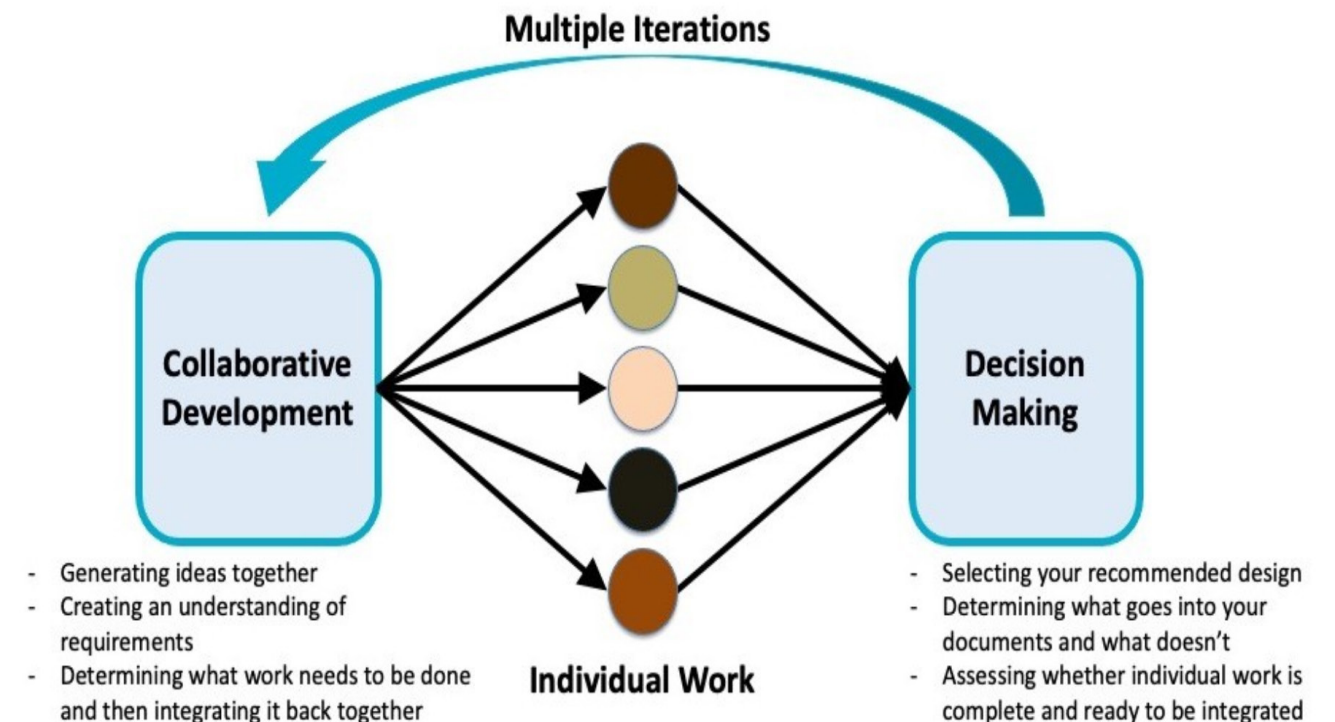
If you are unable to get your work done on time, let your team know. If you aren't sure about something, ask a team member. Do not stay stationary – reach out and find ways to start moving.

Different teams divide individual work according to different criteria. The key is to make sure your division is equitable to all involved. Make sure no one has more work than another (either by items completed, or time on task) and that everyone has the capability to do their part.

WORKING ON DELIVERABLES

The deliverables you create are the output of your teamwork – prototypes, presentations, reports, etc. Setting up an effective working space and norms promotes effective collaboration – this begins with ensuring that everyone has access to all the work the team has created. Start with having a centralized drive for your shared files and an agreed upon file structure. This will help access and track an overwhelming number of files as a team.

Once you have chosen your centralized workspace, the next step is to start working on deliverables which consists of collaborative writing/building. This is a cycle of collaborative development or understanding the deliverable as a team, completing individual work, decision-making, and going through multiple iterations of your work. The figure below details the components of these steps.



PROTOTYPING

Prototyping is essential in engineering design and ideation. In person, everyone can work around the shared materials to craft and share the prototypes. In a virtual setting, many students have reported that prototyping transformed into a very individual task as it was hard to share the work without congregating in-person. See the [tech](#) section for some web-based tools for prototyping.

Ways to increase collaboration with virtual prototyping include:

Setting a meeting to inspect chosen prototyping software as a team. Experiment to observe its compatibility with team members' hardware, and your team's goals.

If one person has more experience with the software, lead and facilitate the meeting by showing team members how the software works. This can be done through screensharing.

Ensure that the software offers the features you want. Some common features include having a virtual sketching platform where team members can interact in real time, allowing users to share and assign tasks, tracking changes and user activity, and being readily available

If the prototyping must be done individually, involve team members in the process by sharing the progress and asking for their thoughts and feedback.

The pressure to succeed academically on team deliverables can often lead to the pitfall of team members tackling areas they are already proficient in. This may restrict them from focusing on areas of growth and taking opportunities to learn. This happens frequently with prototyping and CAD – make sure to share the responsibilities around the team so that everyone can learn from the experience of others on the team.

MAKING DECISIONS

As a team you will need to make decisions about everything, including how to make decisions. It is great to aspire to having consensus in decisions making, but that isn't always practical. Determining the impact of a decision on the design or the way the team works can guide which decision making practice to use.

Some common decision making practices include:

Discussion until we reach agreement

Great for developing requirements and finalizing deliverables.

Voting

Great for selecting ideas or topics from a set.

Checking with another team member

Good for small decisions within your individual work that may impact someone else's work.

Agreeing to disagree

Good for times when progress needs to be made and there isn't time for a lengthy discussion.

Avoid having one individual make the decisions for the team – especially the team leader. It is important to ensure that the decisions made represent the team as a whole. As you make decisions, remember that it isn't always about finding a decision that everyone really likes. Sometimes, it is just about finding something that everyone can be ok with.

NAVIGATING CONFLICT AND FEEDBACK

Productive disagreement is a beneficial component of a team. It enables idea generation, ensures critical thinking about the project and the work the team produces, and can lead to better work created by the whole team. However, it requires team members to voice disagreement, which can look and feel like conflict.

Conflict is not always negative! Conflict that results in team members debating ideas and valuing the contributions of each team member can result in great work! Ensuring you have built a psychologically safe environment will ensure that your team can have productive conflict. Using the brave space talking points discussed previously can ensure contentious issues are raised constructively.

If however, you do not feel that the disagreement is positive – either you see a discussion exploding or team members who are shrinking back avoiding the discussion – it is time to give team members some feedback!

Give constructive feedback with the AID model:

Action

State the behavior your team member has demonstrated, or the idea suggested

Impact

Explain how you interpreted this and how it impacted the team

Development

Suggest how the team member could improve or maintain their engagement with the team.

The AID feedback model can be used to acknowledge both strong points and areas of improvement for team members! The key is that using the AID model to provide feedback opens a conversation. The provider and recipient must work together to navigate the outcome of the discussion.

Your team charter can be used as a reference for conversations about accountability or any other way of working that is not being met. Keep the conversation respectful and don't make personal attacks. Separate who your team members are as people from their actions. Focus on paving a way for improvement and growth – for both you, them, and the team. No matter the conflict you still must continue working together as a team – provide feedback to find constructive ways forward.

If you are concerned about providing feedback, consider inviting an impartial third party (such as a TA or teamwork coach) to help moderate the conversation and keep it constructive.

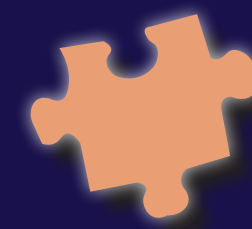
RECEIVING FEEDBACK

Feedback is often interpreted as highlighting the presence of error, leading people to fear it. However, to allow improvements and positive change, you must objectively look at feedback while navigating fear and ego. Realize that you learn the most effectively from mistakes, and effective feedback keeps you from making the same mistakes in the future. This is where having a growth mindset is helpful, as it helps you be open to feedback rather than being defensive or being hard on yourself.

When receiving feedback, take the time to pause, and process the message objectively. When we first receive feedback, our emotional response may not be the most useful. Take some time to sit with the feedback and reflect on it.

Using the PIAA model discussed previously helps you explore what possible meanings the feedback could have. Always remember that you can ask for more information or clarification as a way to develop greater understanding.

If you believe the feedback is valuable, decide how you want to act on it. If you disagree, state that, and open a conversation with the feedback provider to figure out how to move forward effectively with your team.



V Team Building Games and Activities

Building a successful team requires knowing who your team members are – both within and outside of the context of the project. Connecting with each other in a fun environment enables you to get to know your team mates in a way that can develop psychological safety. Both fun games and ice breakers are ways to do this. Dr. Halldorson shares a number of team ice breakers in her video [Icebreaker for New Teams](#). Some fun team building games that will help you get to know each other are listed here. Any games that you enjoy playing could work – share them with your team - but here are some of our suggestions.

Codenames

Hints and clues game. Players can insert their [own words](#) related to different classes or topics. This game improves communication patterns in the team and encourages talking through different interpretations of an idea with your teammates.

Broken Picture Phone

Interpretation and drawing game – a fun way to see how things get (mis)interpreted. Easy to play, it enforces less talking but more interpretation skills from person to person.

Skribbl.io

Pictionary but everyone guesses. Another game where players can insert their own words. Easy to learn and play, this game works on interpretation skills and can be class themed.

Psych

Every team member gives a response to a humorous prompt and then anonymously votes on the best one. Suitable for later into the project when you need to destress, but also good for getting to know each other. Fun, easy to learn and play.

Fast Thumbs

App-based challenge with many categories on trivia and guessing. This is a slightly competitive way to know what your team members are interested in outside of engineering.

Two-Word Stories

In a google docs or shared word file, the team must (in silence) write a story two words at a time. Change the objective of the story to see what you can make, or add themed background music to see what you can create. The goal is laughter.

VI

Technology

This section provides recommendations and ratings on available technology for communication, prototyping, and more. All tech was considered from a teaming perspective and how it could be leveraged to enhance teamwork and collaborative work.

In choosing a which tools to use, here are some questions to discuss with your team:

Is it available through your university account?

Does someone on you team already know how to use one of the tools and can teach the rest of you?

Is there a resource through the university that is offering to teach any of these?

Are there different levels of ownership – will someone have more control than other team members?

Is it collaborative or is it shareable? Can everyone work on it in real-time or do you have to save and upload to let someone else work on it?

Is your instructor promoting a specific tool?

Is it widely available? Are there paid features? Are you comfortable signing up to use a free version?

Would you like notifications? If so, how and how many?

COMMUNICATION TOOLS

All teams should have one continuous asynchronous method of communication (chat) to keep in touch and have quick check ins / updates. Tools that link your chat with a synchronous communication method (audio or video calls) are better, and even better if they connect to a shared file system; then there is only one tool you need to access!

Some tools to consider:

Microsoft Teams

- ✓ Pervasive chat
- ✓ Integrated call and chat features
- ✓ Can connect with shared workspace
- ✓ Can mention people and react to chat messages
- ✓ Connected to university email account
- ✓ Can use in browser or app
- ✓ Can customize notifications
- ✓ Breakout rooms for side conversations
- ✓ Screen sharing
- ✗ Has high latency and large memory usage

Google Meet/ Chat

- ✓ Links to Google chat
- ✓ Can connect with shared workspace
- ✓ Can use in browser or app
- ✓ Can customize notifications
- ✓ Screen sharing
- ✗ May need to create a separate Google account for university work

Zoom

- ✓ Integrated call and chat features
- ✓ Can message single or multiple people in a meeting
- ✓ Connected to university email account
- ✓ Can hide self view
- ✓ Breakout rooms for side conversations
- ✓ Screen sharing
- ✗ Pervasive chat feature not easy to find in the app, and has poor notifications
- ✗ In meeting chat disappears at the end of the meeting

WhatsApp

- ✓ Pervasive chat

✓ Integrated call and chat features
- ✗ Tied to a cell-phone number that you would need to share

✗ Does not connect to a shared workspace

✗ No screen sharing

Discord

- ✓ Pervasive chat

✓ Integrated call and chat features

✓ Can adjust different speakers' volumes

✓ Can integrate different bots

✓ Multiple screen shares
- ✗ Often associated with the gaming community and may not feel welcoming to all users

✗ Does not connect to a shared workspace

If you are having a work session and may want to be able to connect with others, **Spatial Chat** is a great proximity tool to walk in and out of conversations. Everyone can be online working, but you only walk over to chat when needed.

SHARED WORKSPACES

Shared workspaces enable teams to share files and notes, and collaboratively create deliverables (reports or presentations). Finding a collaborative tool that has minimal lag enables the most effective collaboration – as you can view and discuss in real-time.

Three shared workspaces offer the following features:

Revision history and synchronization

Accessible in apps, browser and mobile

Email notifications when someone has replied to your comment

Ability to comment for team feedback and assigning team members tasks

File system can be sync'd to your computer

Microsoft (Office 365, Shared OneDrive and Teams/SharePoint)

- Available apps: Teams, Outlook, Word, PowerPoint, Excel, OneNote, Whiteboard
- Microsoft apps highlight updates your team members made while you were gone
- Lag when using Office 365 collaboratively is substantial
- Accessible through most university accounts
- Integrated reference manager

Google Services (Google Drive)

- Available apps: Docs, Slides, Sheets, Jamboard, Meet
- Not accessible in all countries
- Requires you to create your own account
- Minimal lag with great online collaboration ability
- Has a space cap unless you buy more space

iWorks (Apple)

- Available apps: Pages, Numbers, Keynote, FaceTime
- Only accessible to Mac users (needs an AppleID)
- Minimal lag with great online collaboration ability
- Has a space cap unless you buy more space

TASK MANAGEMENT

Below are tools that can help teams plan and manage their workflow on deliverables. Many of these offer the ability to assign tasks and set due dates for team members and can be used to help hold team members accountable. Although various non-workflow management tools can be used for task management (e.g. a shared word file or a slack/discord channel), the suggested tools are specifically designed for teaming and offer more sophisticated features.

These can also be used by individuals to help manage their own productivity and tasks.

BRAINSTORMING AND IDEA VISUALIZATION

These tools can be used during the brainstorming process to enhance creativity. They can be leveraged to help individual team members represent their ideas, elaborate on ideas collectively, or group ideas for selection/iteration.

Microsoft Project

- ✓

 Good for long-term projects with critical sequencing
- ✓

 Can assign resource loads to ensure no person is overworked
- ✓

 Available with some university Microsoft licenses
- ✗

 Cannot be used by multiple users at once
- ✗

 May be too complex for a short-term team project
- ✗

 Does not send reminders or acknowledge completion status/delays automatically

Microsoft Planner

- ✓

 Integrated with Teams (and associated files) and can be used within a channel
- ✓

 Emails reminders and enables tasks to be assigned to people
- ✓

 Will notify of upcoming deadlines
- ✓

 Can group and sequence tasks with due dates
- ✗

 Will list all tasks for all projects on Planner – hard to group
- ✗

 Cannot assign tasks to multiple users and have all needed to be marked complete

Asana

- ✓

 Can have multiple users simultaneously
- ✓

 Emails reminders and enables tasks to be assigned to people
- ✓

 Can group and sequence with due dates
- ✓

 Has multiple visual layouts (calendar, list, timeline, etc.)
- ✗

 Only has certain features available on the free version

Trello

- ✓

 Can have multiple users simultaneously
- ✓

 Can group and sequence tasks with due dates
- ✓

 Pervasive activity log
- ✓

 Has multiple visual layouts (calendar, list, timeline, etc.)
- ✗

 Only has certain features available on the free version

One Note

- ✓

 Available with Microsoft Office 365 license
- ✓

 Infinite canvas with image insertion, text, and sketching
- ✓

 Can have multiple pages
- ✗

 High latency
- ✗

 Does not have a “post-it note” feature (can be simulated)
- ✗

 Needs to be used with a communication tool for real-time conversation

ConceptBoard

- ✓

 Good for accurate drawing
- ✓

 Good collaboration templates
- ✓

 Highlights where people are contributing
- ✓

 Infinite canvas with image insertion, text, and sketching
- ✓

 In-app audio/video communication
- ✓

 Low latency
- ✗

 Needs users to sign up

Jamboard

- ✓

 Available with Google Suite
- ✓

 Can have multiple pages
- ✓

 Post-its and sketching capabilities to group ideas
- ✓

 Low latency
- ✗

 Needs to be used with a communication tool for real-time conversation

Miro

- ✓

 Has many collaboration templates
- ✓

 Post-its and sketching capabilities to group ideas
- ✓

 Chat and screen share within the tool
- ✓

 Can have multiple boards
- ✗

 Needs users to sign up
- ✗

 Needs to be used with a communication tool for video calls

VII

Resources

ACADEMIC TEAM SUPPORT

ILead Teamwork Support • <https://ilead.engineering.utoronto.ca/academic-courses/teamwork-support/>

Meet with a teamwork coach to enhance or improve your teamwork environment. Can meet with them individually or as a team.

ECP Tutoring Centre • <https://ecp.engineering.utoronto.ca/>

Help with written deliverables in helping skill up your writing and communication skills to a professional level, can do both one-on-one and team tutoring.

Engineering and Computer Science Library • <https://engineering.library.utoronto.ca/>

The Library is a great resource for finding sources and topics.

Academic Success Helpline (St. George Campus) • 1-416-978-7970

24/7 Emergency Counselling Services

U of T My Student Support Program (My SSP) • 1-844-451-9700. *Outside of North America, call 001-416-380-6578.*

Culturally-competent mental health and counseling services in 146 languages for all U of T students.

Good2Talk Student Helpline • 1-866-925-5454

Professional counseling, information and referrals helpline for mental health, addictions and students well-being. (Ontario only)

Accessibility Services •

<https://studentlife.utoronto.ca/departments/accessibility-services/>

Other emergency/talk lines provided by the university •

<https://studentlife.utoronto.ca/wp-content/uploads/Feeling-distressed.pdf>

Skule Mental Wellness • <http://wellness.skule.ca>

Club support that promotes wellness, and runs distressing events and programs, also has an extensive resources page

LEADERSHIP SKILLS

Troost ILead Workshops • <https://ilead.engineering.utoronto.ca/>

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