

# TEACHERS' GUIDE TO MY GROUPWORK BUDDY FOR GEOGRAPHY (MGBGEO)



Elizabeth Koh, Dhivya Suresh, Tee Yi Huan, Tricia Seow, Betsy Ng, Helen Hong,  
Liu Zhen, Julian Chang, Sarifah Tamsir, Serene Toh and Sabrina Ho

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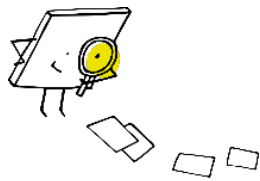
### Additional resources:

1. Sample Lesson slides of GI package with MGBGeo
2. System manual on how to use MGBGeo system



## 1. Introduction

The teacher's guide to My Groupwork Buddy for Geography (MGBGeo) provides teachers with guidelines on how to conduct Geographical Investigation (GI) with an emphasis on teamwork. This is to encourage the dual complementary goals of geographical content mastery and the 21<sup>st</sup> Century competency of collaboration. MGBGeo is both a set of techno-pedagogical principles as well as a system. The guide makes reference to the MGBGeo system which was designed with MGBGeo's principles with the same aims. It also provides a curriculum lesson package with lesson resources that can be used for GI.



## 2. Conceptual Background

### 2.1. Geographical Inquiry Approach

In Geography, learning through inquiry is a recommended pedagogy as it encourages questioning, investigation and critical thinking. The geographical inquiry approach has four aspects: sparking curiosity, gathering data, exercising reasoning, and reflective thinking. For actionable implementation by students, the more conceptual four-aspect geographical inquiry approach is delineated into seven stages (Table 1).

Table 1. Staged Adaptation of the Geographical Inquiry Process for Geographical Investigation (GI)

Geographical Inquiry Process	Geographical Investigation (GI)
Sparking Curiosity	Stage 1: Conduct Preliminary Research
	Stage 2: Construct Hypothesis/Guiding Questions
Gathering Data	Stage 3: Gather Data
Exercising Reasoning	Stage 4: Represent Data
	Stage 5: Analyse Data and Draw Conclusions
Reflective Thinking	Stage 6: Evaluate the GI
	Stage 7: Present the GI

### 2.2. The Team and Self Diagnostic Learning (TSDL) Framework

The **Team and Self Diagnostic Learning** (TSDL) framework is a pedagogical approach for developing the 21<sup>st</sup> century competency of teamwork and collaboration. The TSDL uses digital formative analytics to make teamwork visible in a timely manner, encourage and guide student agency, and create space for student reflection and goal setting. It is aligned with the belief that learning takes place individually and collaboratively, as students construct and co-construct meaning from knowledge and experiences (Singapore Curriculum Philosophy). It complements existing pedagogical practices used by teachers and is part of facilitating collaborative learning as stipulated in the Singapore Teaching Practice. The TSDL follows a team's project and has four iterative stages: *team-based concrete experiences*, *self and team awareness building*, *self and team reflection and sensemaking*, and *team and self-growth and change*, followed by repeated cycle(s) of the stages. This cycle (see Figure 1) can be carried out one to three times during the course of the project. The four stages are explained below.

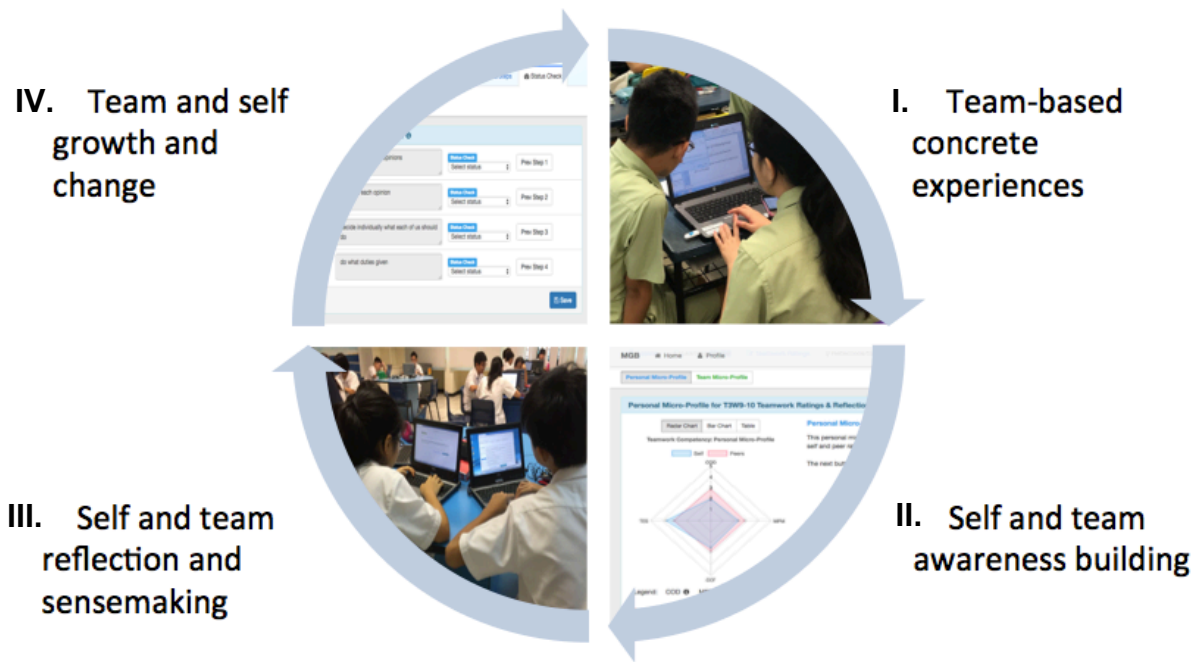


Figure 1. The TSDL framework cycle supported by the MGBGeo system

*In stage I: team-based concrete experiences, students gain experiences in a team with a team outcome in order to activate teamwork behaviours.* This first stage requires a mini-deliverable for the team to complete, for students to engage with their team members in collaborative work. This provides students with sufficient tangible experiences of working in the team for the next stage of awareness.

*In stage II: self and team awareness building, students build an awareness of their teamwork.* Currently, the awareness building is based on students' self and peer ratings. Students are provided with the opportunity to provide feedback to their team in a comfortable environment. The ratings from peers are averaged and comments are anonymized. The ratings are visualized to students as a "micro-profile", which is a snapshot of their teamwork perceptions of four teamwork dimensions (See section 2.3) based on their recent teamwork experience. The micro nature of their profile signals that it can change. The micro-profile makes visible to students their own perceptions as well as how their team members see them, in a timely manner. These provide formative feedback to students and attune them to becoming more aware of their teamwork competency.

*In stage III: self and team reflection and sensemaking, students reflect and make sense of teamwork information from the micro-profiles.* This is done individually followed by as a team, where students focus on one particular dimension of teamwork, typically what is perceived as their weakest dimension. Students are encouraged to look back on their teamwork experience as well as look forward, to take actionable steps to improve on this dimension. These mechanisms help students to understand their teamwork feedback and channel these understandings to positive and future-oriented team behaviours.

After stage III, students are encouraged to apply the steps they have set as they continue on their team-based project. *In stage IV: team and self-growth and change, students self-assess and team-*

**assess their teamwork target(s).** This stage continues to provide agency to the student as well as provide a monitoring scaffold to help students' check their own teamwork progress. Students monitor their progress on the steps they have set individually and as a team to keep track of their progress towards achieving their teamwork competency goals. These processes emphasize the *regulation of the individual and the team on their behaviours*, which are key mechanisms for changing attitudes and actions.

For continuous teamwork improvement, these stages should be repeated, with a minimum of 2 cycles for any project. For the **last** cycle of *stage III: self and team reflection and sensemaking*, where it is at the end of their project, students' steps should be set for future teamwork activities. This emphasizes to students the importance of these steps that can be useful for any team setting. Note, stage IV on monitoring is not needed for the last cycle. Throughout the cycle(s), the teacher plays a vital role in creating the supportive environment for formative assessment and enacting this pedagogical framework.

### 2.3. Teamwork Competency and Ratings

In order to understand the nature of teamwork that students engage in, teamwork is conceptualized as a four-dimensional measure. This teamwork competency measure comprises 4 dimensions: Coordination (COD), Mutual Performance Monitoring (MPM), Constructive Conflict (CCF) and Team Emotional Support (TES). Descriptions and examples for each teamwork competency dimension are below.

TEAMWORK COMPETENCY DIMENSION	ELABORATION AND EXAMPLES
<p>Coordination</p> <p><i>Ability to organize team activities to complete a task on time.</i></p>	<ul style="list-style-type: none"> <li>• <b>Decide on roles for each member of the group based on each team member's expertise</b> <ul style="list-style-type: none"> <li>○ Inform team members of your strengths and weaknesses so they can be aware and make appropriate adjustments to task allocations. Ask team members of their strengths/weaknesses/task preferences to get a clearer idea of how to appropriately distribute the workload among the team.</li> </ul> </li> <li>• <b>Exchange information of one's progress on tasks with others so as to make appropriate adjustments based on the information gathered</b> <ul style="list-style-type: none"> <li>○ When the progress on a task has fallen behind what was originally planned, the team can consider options like simplifying the task, or asking other friends for help. Plan for such adjustments based on the exchange of information.</li> </ul> </li> </ul>
<p>Mutual performance monitoring</p>	<ul style="list-style-type: none"> <li>• <b>Identify lack of contributions from other team members.</b> <ul style="list-style-type: none"> <li>○ In a brainstorming session where everybody is supposed to generate and throw out ideas or solutions, one member remains quiet and does not contribute any ideas. An act of</li> </ul> </li> </ul>

<p><i>Ability to monitor the performance of team members. Gives, seeks and receives task clarifying feedback to help in the team's performance. Reduces social loafing.</i></p>	<p>mutual performance monitoring here would be that a team member notices the lack of contribution from the quiet team member and prompts him/her to contribute, "John, any ideas?" instead of leaving him/her alone.</p> <ul style="list-style-type: none"> <li>● <b>Review your peers' work</b> <ul style="list-style-type: none"> <li>○ Ask your team members to give you opinions on your work and also offer to comment on their work, especially for tasks that can be uncertain or difficult. E.g., clarify with your team members whether your work is appropriate to the assignment and of the correct shape.</li> </ul> </li> </ul>
<p>Constructive conflict</p> <p><i>Ability to deal with differences in interpretation between team members through discussion and clarification.</i></p>	<ul style="list-style-type: none"> <li>● <b>Find out reasons for the disagreements</b> <ul style="list-style-type: none"> <li>○ When your team members say things that you do not agree with, instead of telling them they are wrong, ask them for their reason(s) for thinking so "Okay, so you think that we should look for a different idea. Why?"</li> </ul> </li> <li>● <b>Weigh the pros and cons</b> <ul style="list-style-type: none"> <li>○ For instance, find out from team members the benefits of their choice of an idea instead of taking sides immediately. Involve the entire team in weighing the pros and cons of the choices and decide on the best team decision.</li> </ul> </li> </ul>
<p>Team emotional support</p> <p><i>Ability to bond emotionally and provide psychological support to other team members.</i></p>	<ul style="list-style-type: none"> <li>● <b>Show consideration for your team members</b> <ul style="list-style-type: none"> <li>○ Create a safe environment where members feel comfortable asking for help when needed (instead of hesitating to ask for help). E.g., "I would like to listen and help if I can."</li> </ul> </li> <li>● <b>Value team members' talents, task contributions and competencies.</b> <ul style="list-style-type: none"> <li>○ When assigning tasks to each member of the team, acknowledge your team members' strengths. "John, you are a very organized person. Would you like to be in charge planning the entire project? I think you are the best person for the job!"</li> </ul> </li> </ul>

The teamwork dimensions are measured using a *teamwork competency self and peer rating*. It uses a Likert scale of 1 to 5, with 5 being strongly agree. Students rate themselves as well as those of their team members. Example items include:

COD: I provided information to team members on time.

MPM: I thought of ways to improve how we worked together.

CCF: I asked a team member questions to check on his/her ideas.

TES: I appreciated everyone in the team.

### 3. MGBGeo system

- A web-based system, [geo.mgb.rdc.nie.edu.sg](http://geo.mgb.rdc.nie.edu.sg), is designed to support the teachers' and students' enactment of GI and TSDL. Figure 2 shows a screenshot of the MGBGeo system and listed below are the functions provided by the system: Lesson content pages (Investigate)
- Online synchronous team chat
- Collaborative writing space (Collaborate)
- Self and peer rating of teamwork competencies (Build)
- Student dashboard with micro-profile visualizations
- Personal and team reflections and step-setting with teamwork tips (Reflect)
- Status checks (Monitor)
- Teacher dashboard

For further details, refer to the system manual for teachers.

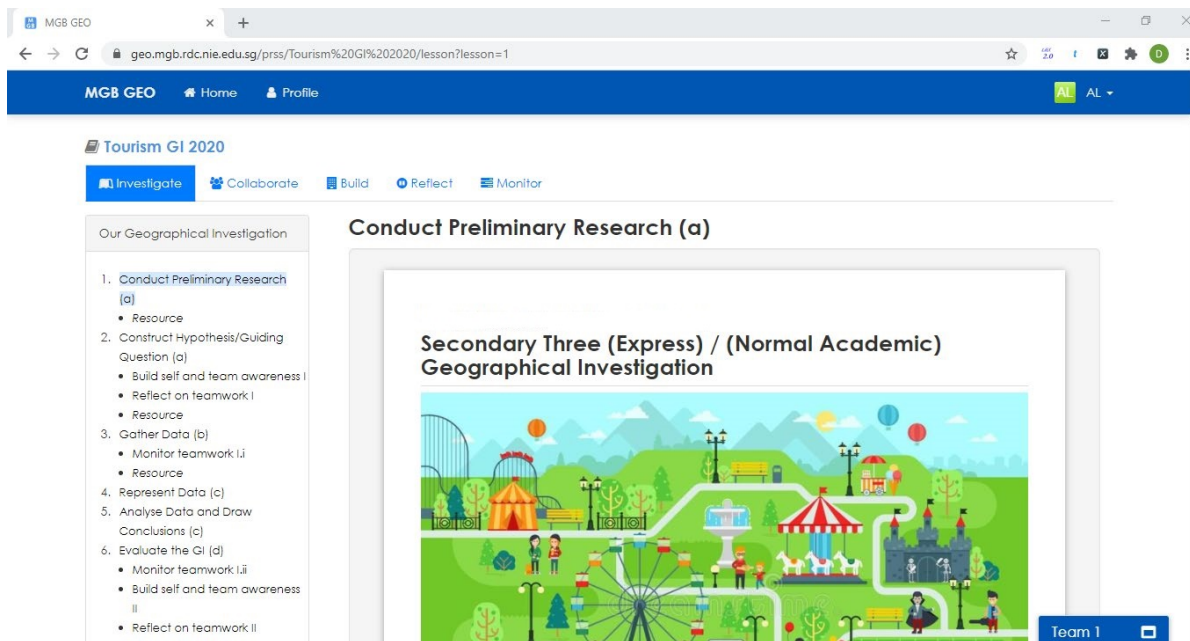


Figure 2. Screenshot of MGBGeo system for students

## 4. Principles

A set of techno-pedagogical design principles have been identified for collaborative inquiry that meets the dual complementary goals of academic excellence and teamwork. These principles are key for the implementation of MGBGeo and are as follows:

1. Enacting a holistic collaborative inquiry model for geography and teamwork learning
2. Creating a motivating and safe classroom climate
3. Providing a one-stop collaborative space for GI with choices and scaffolds
4. Making teamwork competency explicit through visualizations in a timely manner
5. Facilitating teamwork reflection and goal setting
6. Encouraging and guiding teamwork status checks
7. Prompting collaborative inquiry and teamwork

### 4.1 Enacting a holistic collaborative inquiry model for geography and teamwork learning

To help students deepen their understanding of geographical topics as well as their teamwork competency, an overall guiding frame is needed. MGBGeo is designed with a holistic collaborative inquiry model that combines two cycles of TSDL, a formative assessment approach of teamwork, with the geographical inquiry approach. The integrated model, termed the Collaborative inquiry model for geography and teamwork learning, also serves as a visual map of the activities in the curriculum. Figure 3a illustrates the model. Figure 3a depicts the model in a sun-moon diagram, with the white text on the orange sun the stages of the geographical inquiry approach while slightly bordering the circle in blue/purple are the stages of TSDL. Figure 3b shows the same model linearly visualized as a navigation pane for easy referral and clickable on the online system.

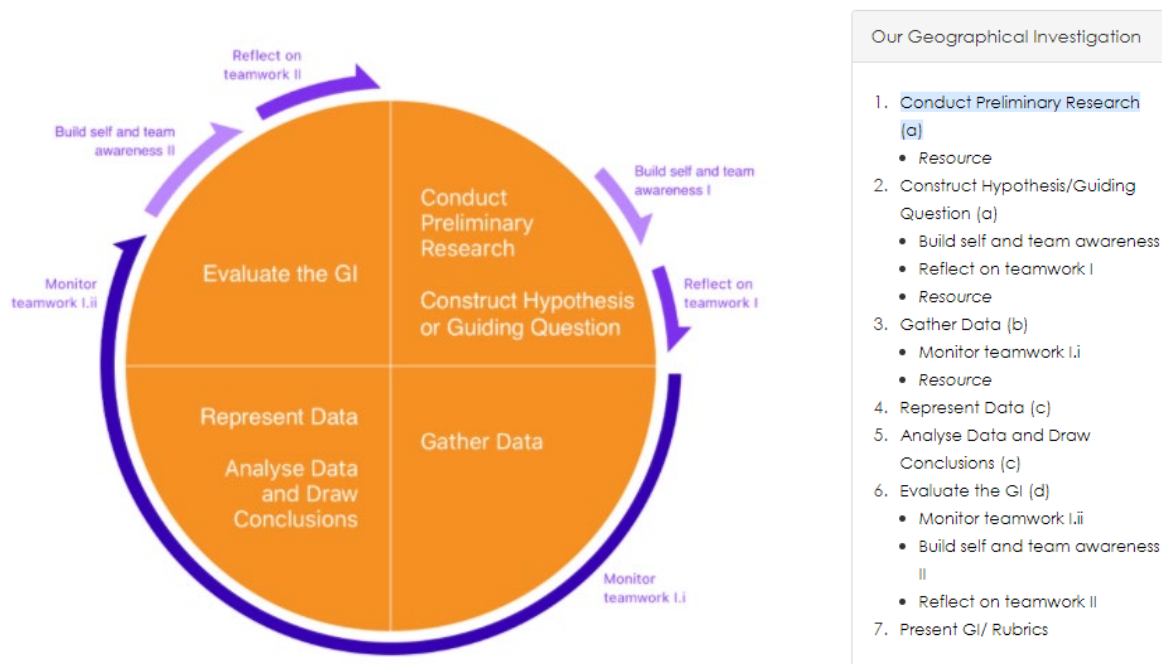


Figure 3a. *Left.* Collaborative inquiry model for geography and teamwork learning.

Figure 3b. *Right.* Navigation pane



This model can be enacted by the teacher as part of the curriculum. As seen from the first quadrant in Figure 2a, this is the phase, sparking curiosity, where students have to work in their team to conduct preliminary research as well as construct the guiding question. MGBGeo strengthens the team-based experiences of students through providing an integrated collaborative space for the geographical inquiry process. After this milestone of coming up with the guiding question and/or hypothesis as a team, students have gained enough concrete experiences (TSDL stage 1) and can proceed to TSDL stage 2, where they will build self and team awareness through self and peer ratings about aspects of their recent teamwork experience focused on the four dimensions of teamwork. This information is harnessed as a form of feedback for students via a visual representation, the micro-profile, for students to reflect on. This provides students with a greater metacognitive awareness of their teamwork, in addition to the task work aspect of the geographical inquiry process.

Following this, students will gather data and exercise reasoning (next two phases of geographical inquiry) with specific activities such as representing and analysing data. During this period, students are reminded to monitor their teamwork progress through status checks (part of the last stage of TSDL). This makes it more visible for students and provides opportunities for them to regulate their individual and team learning behaviors.

Finally, during the reflective thinking phase where students evaluate about their geographical learning and think of ways to improve or extend their GI, the TSDL cycle can begin again, allowing students to consciously assess their teamwork.

#### 4.2. Creating a motivating and safe classroom climate

Creating a motivating and a safe classroom climate is important in order to motivate students to engage in and benefit from their learning. This guideline on classroom climate is not particularly unique to MGBGeo. The importance of student-centeredness and students' emotional well-being should not be taken for granted. Students ought to be adequately motivated in school, with interest in their learning and must feel safe and comfortable in their classroom, with their peers and team. Autonomy-supportive classrooms facilitate greater intrinsic motivation among students. Autonomy-supportive approaches entail taking students' perspectives, acknowledging their needs and feelings, providing support when they face obstacles, and providing choice and supporting initiative where possible. Autonomy-supportive teaching helps to engender such a motivating and safe classroom climate, encouraging students' interest in the project, as well as working in their teams. A safe environment within students' team and classroom to share the positives, negatives and everything in between, should be created.

#### 4.3. Providing a one-stop collaborative space for GI with choices and scaffolds

Students prefer a one-stop platform for GI, a collaborative space to work on their project. Moreover, this space should allow students' with the flexibility to choose options as well as guidance to help in their task. In MGBGeo, the online system provides that space. In particular, the online co-doc, a collaborative writing space allows students to more easily engage in geographical tasks and team dialogue to construct joint understandings of subject content and teamwork. To help maintain learners' motivation during the GI, instead of one large report that is due at the end, chunking is applied to break down the report into bite-sized deliverables with specific guiding questions that are

due at certain time points. Also, scaffolds provided in the form of specific guiding questions for each smaller deliverable mean that explanatory rationales are provided at every step of the GI, so that students are clear about their deliverable. Figure 4 shows screenshot of MGBGeo's collaborative writing space.

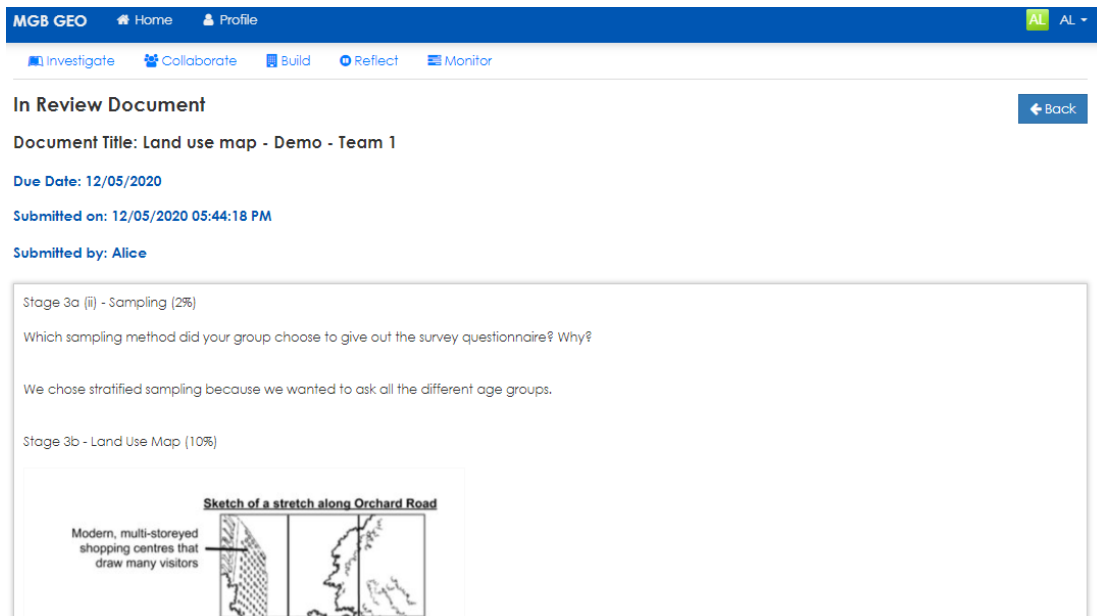


Figure 4. Collaborative writing space

#### 4.4. Making teamwork competency explicit through visualizations in a timely manner

In order to help students become aware of their teamwork as part of formative assessment, students' teamwork can be made explicit to them. This timeliness of teamwork feedback is important as it should be during the course of their team project, not at the end, and provide opportunities for students to improve their teamwork. As teamwork is a rather abstract concept, students' own teamwork processes can be made more explicit and visible in various ways so that students' can start to understand them better.

In MGBGeo, teamwork feedback is currently drawn from self and peer ratings of four dimensions of teamwork and qualitative peer comments. After all members in a team have completed the ratings, the four teamwork dimensions are instantaneously shown to students visually. Termed the personal and team micro-profile (Figure 5; See Section 2.2 for further background), the visual is in the form of a radar chart, bar chart and a table. The micro-profile makes obvious the different dimensions of teamwork as perceived by students themselves and their team members (an average of peer ratings). It is the first aspect of helping students concretize and understand their teamwork in their GI project.

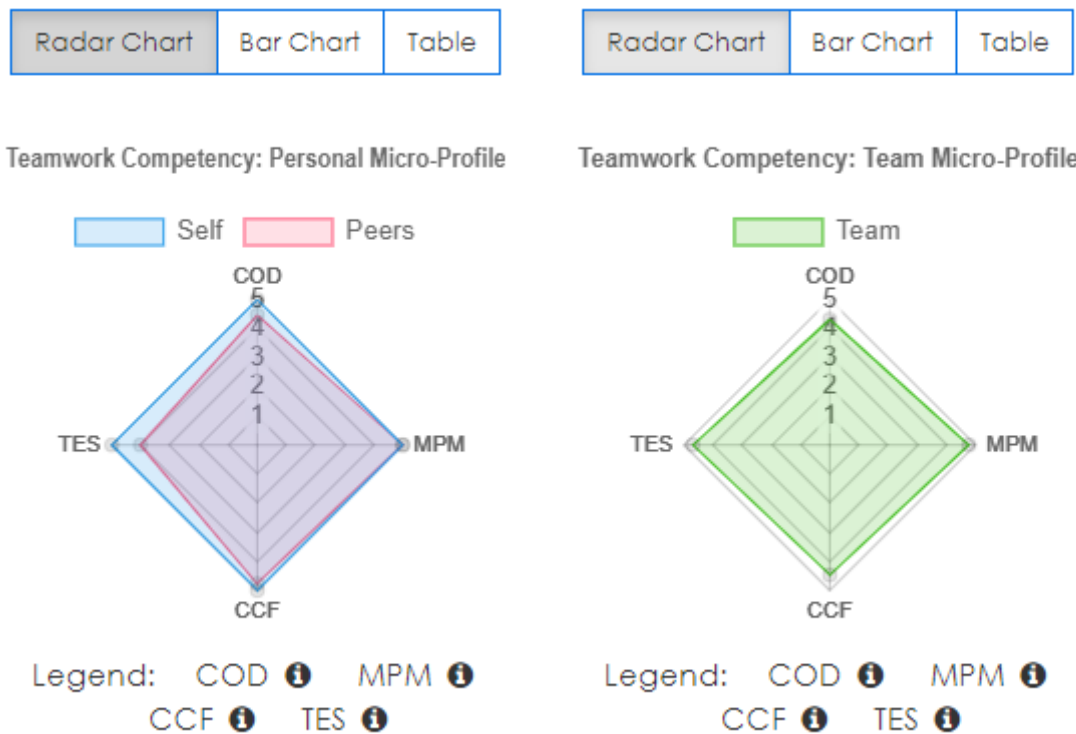


Figure 5. Personal (left) and team micro-profile (right) of teamwork competency

#### 4.5. Facilitating teamwork reflection and goal-setting

Following the visual feedback of teamwork provided in 4.4, students' need opportune time to digest the information and decide on what they should do. A facilitative process of student reflection and goal-setting is crucial. In reflecting, students can think about the feedback provided. Moreover, students can be encouraged to process the feedback in a constructive manner. This sensemaking can be channeled for positive actions through focusing students on future-oriented behaviors, which is goal-setting.

In MGBGeo, teamwork reflection and goal-setting is facilitated through channeling students to focus on a teamwork dimension of focus, typically a dimension identified as weaker or lower than other dimensions. Students are required to type their reflections of the dimension and look back at how that dimension affected their teamwork. Next, students are guided to set steps to improve that dimension of teamwork. This goal-setting process channels their reflection towards positive action. Figure 6 shows screenshots of the reflection and the goal-setting on MGBGeo system.

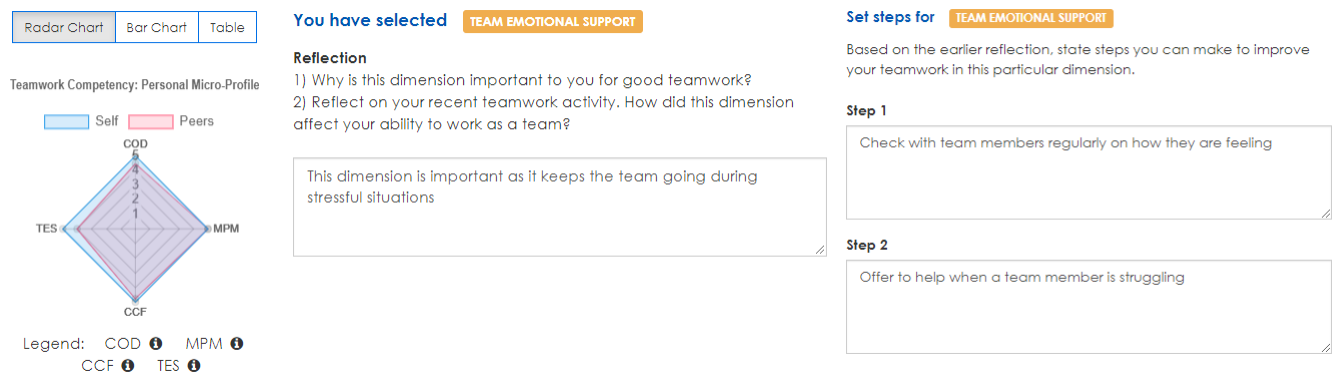


Figure 6. Reflection and goal setting space in MGBGeo system

#### 4.6. Encouraging and guiding teamwork status checks

To help students' regulate their own as well as their team's teamwork behaviors during the course of the GI project, students can be encouraged and guided to check on their teamwork status. This is basically a self- and team- assessment of where the team is in their set targets (section 4.5). This self and social regulation is a form of encouraging student agency, for them to take ownership of their teamwork behaviors. It is also a form of activating students' externalization of their learning process which is linked to team success.

In MGBGeo system, a monitor function of status checks is provided (Figure 7). Students can monitor their teamwork progress through status checks which makes teamwork more visible too.

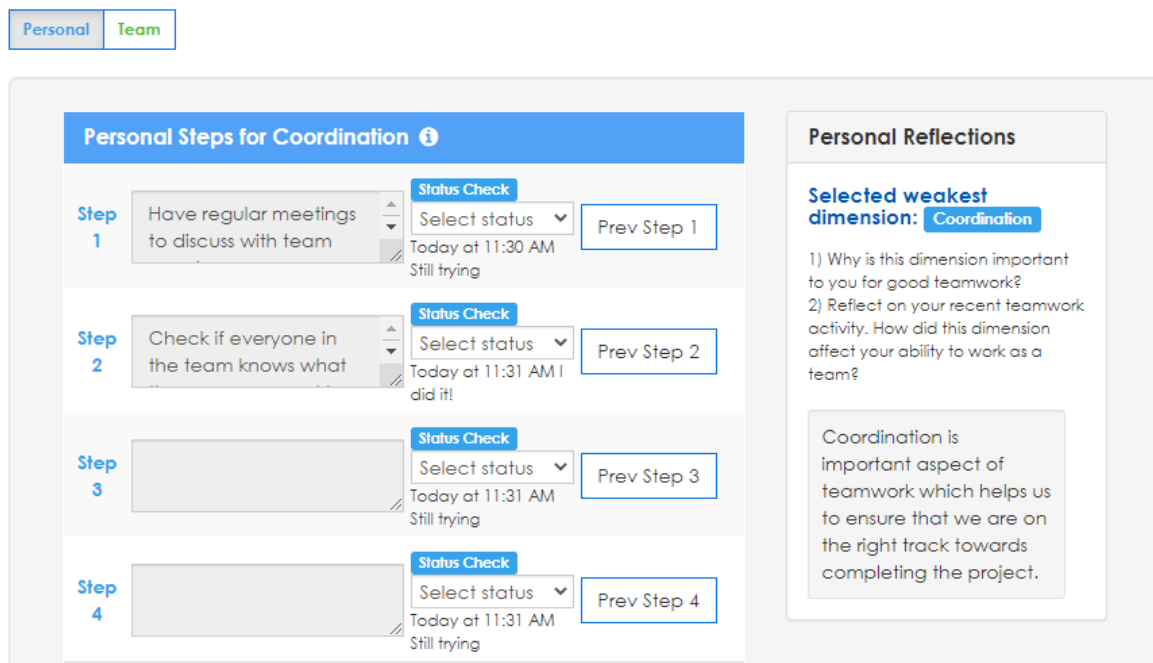


Figure 7. Status check function to monitor teamwork steps

#### 4.7. Prompting collaborative inquiry and teamwork

As another way of providing help to students for geographical and teamwork learning, prompts are needed. This is especially so for common pain points experienced by students in both GI content and teamwork. This can be added in the form of hints and tips.

In MGBGeo, geographical hints are indirect clues on the elements of the GI content (relating to declarative knowledge), to engage students in deeper thinking, whereas tips related to procedural knowledge, and are crafted to relieve students' pain points at certain parts of the GI. An example tip is provided at GI Stage 2 (Refer Figure 8), Construct hypothesis/guiding question, "A little time spent here will save you a lot of time later". Taking the student's perspective, this tip highlights the importance of this step by explaining the rationale of time saved.

For teamwork learning, teamwork tips are designed to be relatively generic to apply to most teamwork situations and relate to the dimension of teamwork that students wanted to improve on. Similar to the prompts for the geographical content, the tips employed motivating strategies such as taking students' perspective and using informational language. Example teamwork tip for mutual performance monitoring: Checking on your team's work may be hard. Take the initiative to ask your team members about the progress of the work.

**HYPOTHESIS: a prediction STATEMENT for the investigation**

- Includes the factor/ variables to be examined
- Similar to a conjecture or a guess
- Must be specific
- Allows for argument on both sides i.e. Allow for the statement to be accepted or disproved

**E.g. The proximity to amenities <variable to be examined> makes [redacted] a popular school in [redacted].**

*(Why is important to craft a good hypothesis? Hint: A good hypothesis gives your GI a clear direction.)*

Recalling the lesson on Hypothesis Crafting, come up with a hypothesis for your group's investigation.

*(Tip: A little time spent here will save you a lot of time later.)*

**Hint:**

**(a) Consider the factors in Activity 3**

**(b) Which factor will impact the popularity of your area to the largest extent?**

Figure 8. Learning prompts in the form of hints and tips

## 5. Lesson Package and Scheme of Work

The following is a GI lesson package that can be used for MGBGeo.

**Topic: Tourism**

**GI task: To investigate why some tourist destinations are more popular than others.**

As part of the task, students are to embark on a geographical investigation to find out the factors that affect the popularity of different destinations in Singapore. Thereafter, students are to design a heritage trail that would be of interest to tourists.

**CALLING FO(U)R INFLUENCERS**

**JOIN US @ STB**

**Be a promoter and influencer for STB**

Undergo a selection process to qualify as one of the four prestigious STB influencers

**YOUR TASK**

**Information about the selection process**

- Collaborate with three to four other members
- Design a heritage trail that you think will be of interest to tourists
- Get your creative juices going - the focus can be on history, food, photography or anything else (with our approval)!

**INVESTIGATE FIRST**

**Know what makes a destination popular**

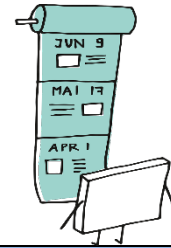
- Embark on a geographical investigation to find out the factors affecting the popularity of different destinations in Singapore
- More details in the package enclosed

**#LetsGoGI**

The scheme of work of this MGBGeo lesson package is shown below.

**Total Duration:** Minimally 360 minutes (60 minutes \* 6 sessions) of lesson time

**Level:** Secondary 3 students (but it can be adapted for other levels)



Week	Overview of Activities (GI activities in Orange; Teamwork activities in Blue)
W1	<ul style="list-style-type: none"> <li>• Introduction to Tourism GI and MGBGeo                             <ul style="list-style-type: none"> <li>○ Introduction to teamwork competency and 4 dimensions of teamwork</li> </ul> </li> <li>• Conduct Preliminary Research (<i>GI Stage 1</i>)</li> <li>• Team-based Concrete Experiences (<i>TSDL Cycle 1</i>)</li> <li>• Construct Hypothesis/Guiding Question (<i>GI Stage 2</i>)</li> </ul>
W2	<ul style="list-style-type: none"> <li>• Gather Data (<i>GI Stage 3</i>)</li> </ul>
W3	<ul style="list-style-type: none"> <li>• Continuation of Gather Data (<i>GI Stage 3</i>)</li> <li>• Self and Team Awareness Building, and Self and Team Reflection and Sensemaking (<i>TSDL Cycle 1</i>)                             <ul style="list-style-type: none"> <li>○ Build Self and Team Awareness I</li> <li>○ Reflect on Teamwork I</li> </ul> </li> </ul>
W4	<ul style="list-style-type: none"> <li>• Represent Data (<i>GI Stage 4</i>)</li> <li>• Analyse Data and Draw Conclusions (<i>GI Stage 5</i>)</li> <li>• Team and Self Growth and Change (<i>TSDL Cycle 1</i>)                             <ul style="list-style-type: none"> <li>○ Monitor Teamwork I.i</li> </ul> </li> <li>• Team-based Concrete Experiences (<i>TSDL Cycle 2</i>)</li> </ul>
W5	<ul style="list-style-type: none"> <li>• Evaluate the GI (<i>GI Stage 6</i>)</li> <li>• Team-based Concrete Experiences (<i>TSDL Cycle 2</i>)</li> </ul>
W6	<ul style="list-style-type: none"> <li>• Present the GI (<i>GI Stage 7</i>)</li> <li>• Team and Self Growth and Change (<i>TSDL Cycle 1 - complete</i>)*                             <ul style="list-style-type: none"> <li>○ Monitor Teamwork I.ii</li> </ul> </li> <li>• Self and Team Awareness Building, and Self and Team Reflection and Sensemaking (<i>TSDL Cycle 2</i>)*                             <ul style="list-style-type: none"> <li>○ Build Self and Team Awareness II</li> <li>○ Reflect on Teamwork II</li> </ul> </li> </ul> <p>*can occur in W5 too</p>

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