DEVELOPING STUDENTS' ABILITY TO WORK TOGETHER USING TEAMWORK COMPETENCY PROFILES

For Secondary students in the Design & Technology classroom

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WHY

Students not working effectively in teams

There are students who can work individually but are unable to collaborate well within a team. Functioning as an effective team member requires the development of teamwork competencies (Salas, Rosen, Burke, & Goodwin, 2009) which are separate from the knowledge, skills and attitudes possessed by individuals working alone.

Students who cannot work well with one another might lack awareness or understanding of these four teamwork competency dimensions (Koh, Shibani, Tan, & Hong, 2016):

- **Co-ordination:** Ability to organise team activities to complete a task on time,

- **Mutual performance monitoring:** Ability to monitor performance of teams by giving, seeking and receiving feedback to help improve team performance,

- **Constructive conflict:** Ability to deal with differences in interpretation between team members through discussion and clarification,

- **Team emotional support:** Ability to bond emotionally and provide psychological support to other team members.

Teachers might also be unclear how they can better design and facilitate classroom activities to contribute towards building and assessing students' teamwork competency.

HOW

Facilitate awareness, reflection and sense-making of teamwork processes

This practice involves students in self and peer assessment of the four teamwork competency dimensions based on how they have been engaging in teamwork processes. These self and peer ratings are done through a web-based platform, My Groupwork Buddy (MGB), which utilises visual analytics to inform students of the progress they have made in their teamwork abilities over time. Coupled with teacher-facilitated reflection and discussion, this empowers students to determine which of the teamwork competency dimensions to develop and how they can achieve the intended outcomes.

Comprising four key stages, teachers can integrate the cycle of individual reflection, group reflection and sense-making with the use of MGB for curricular lessons that require intensive teamwork collaboration:

- **Stage 1: Team-based Concrete Experience**
  Students first participate in a team-based activity at the start of a series of curricular lessons. The activity provides the team with the concrete experience on which they will base their self and peer assessment of the four teamwork competency dimensions in MGB.

- **Stage 2: Self and Team Awareness Building Using Analytics**
  The MGB platform generates a Personal Teamwork Micro-Profile (Figure 1) of each student using that student's self and peers' ratings. In addition, each team also receives its Teamwork Micro-Profile (Figure 2) that combines all team members' individual profiles. These profiles help to build a greater awareness among the team members on how effectively they have been working together.

- **Stage 3: Self and Team Reflection and Sense-making**
Using these two types of profiles, the teacher facilitates a class reflection and discussion to help students make sense of the profiles and guide them in setting goals to improve individual performance in subsequent team-based activities.

- **Stage 4: Self and Team Growth and Change**
Timely target checks with self and peer assessments serve to consolidate students' learning, provide opportunities for affirmation, feedback and planning of next steps for students to work effectively in teams. The teacher may also use the profiles as evidence to support instructional adjustments (Popham, 2011) of subject lessons in ways that complement students' efforts to grow their teamwork abilities.

A typical learning experience includes:

1. a team-based activity at the start of a series of curricular lessons for students to create their initial teamwork dimension profiles,

2. teacher-facilitated discussion and reflection of students' teamwork competency dimension profiles, leading to students setting goals to improve selected dimensions,

3. a mid-point reflection and goal progress check,

4. an end-point reflection and goal progress check.

REFERENCES

Koh, E., Shibani, A., Tan, J. P. L., & Hong, H. (2016). A pedagogical framework for learning analytics in collaborative inquiry tasks: An example from a teamwork competency awareness program. In *Proceedings of the Sixth International Conference on Learning Analytics and Knowledge* (pp. 74-83). New York: ACM.

Popham, W. J. (2011). *Transformative assessment in action: An inside look at applying the process*. Alexandria, VA: ASCD.

Salas, E., Rosen, M. A., Burke, C. S., Goodwin, G. F. (2009). The wisdom of collectives in organizations: An update of the teamwork competencies. In E. Salas, G. F. Goodwin, & C. S. Burke (Eds.), *Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches* (pp. 39 -79). New York, NY: Routledge/ Taylor & Francis Group.

TECHNOLOGICAL TOOLS

1. My GroupWork Buddy web-based system

mygroupworkbuddy.sg

PROJECT SCHOOLS

Anglican High School
Pasir Ris Secondary School

21ST CENTURY COMPETENCIES DEVELOPED

Effective Collaboration
Effective Communication
Metacognition
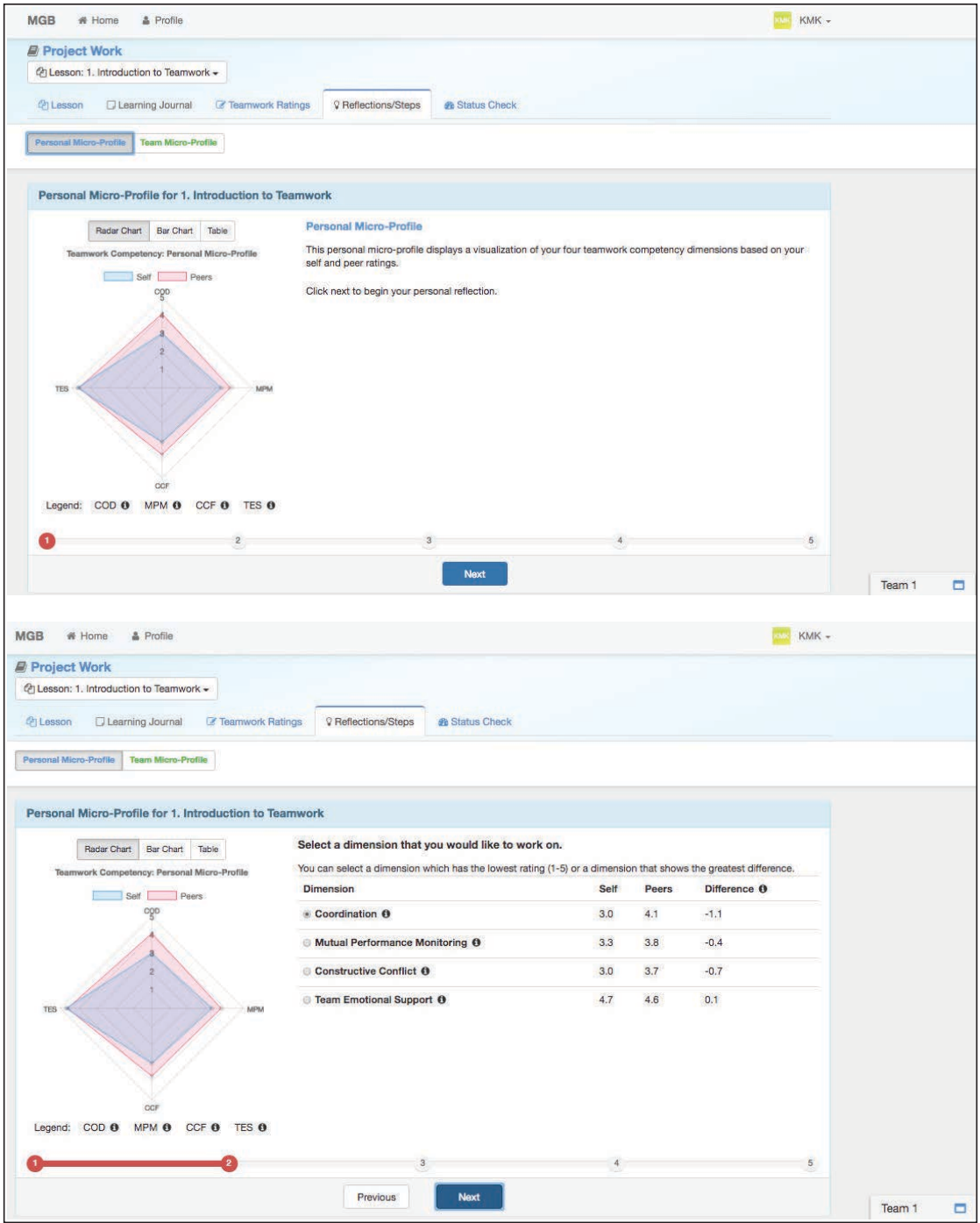Responsible Participation in the Information Landscape

FIGURES

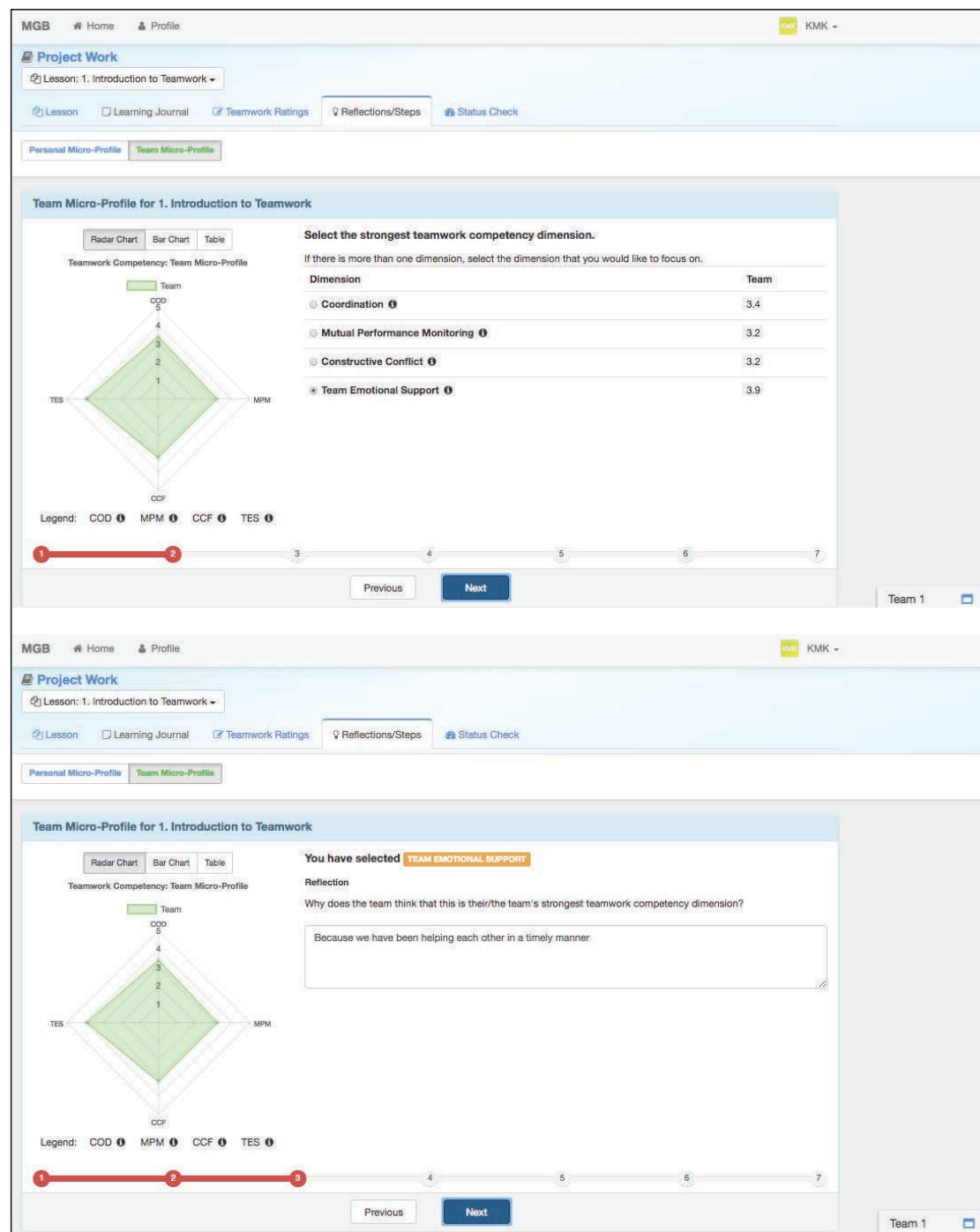Figure 1 - Personal Teamwork Micro-Profile and Goal Setting

Figure 2 - Team's Teamwork Micro-Profile and Goal Setting

QUOTES FROM PRACTITIONERS

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It has always been a challenge to get students to contribute evenly and effectively when they are collaborating as a team. With the use of MGB where students working in teams can self and peer rate one another, the leverage of peer influence will yield higher levels of commitment and result in more positive learning outcomes. The ability to choose a particular teamwork competency dimension and list active steps as remediation helps to stimulate critical thinking and problem solving for both the individual and team.

Patrick Tay, Anglican High School

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Prior to the use of MGB, there were few tools available for students to self-assess their teamwork ability. Teamwork is an abstract concept, and many teachers find it hard to foster it among students. It is often through project work that we attempt to build different teamwork competencies in our students. However, this is usually done without clear ways for teachers and students to assess how well these competencies have been developed.

The MGB platform helped my students to assess their own ability as well as their team members' ability to work together. Over time through better self-understanding as well as feedback from team-mates, I observed that many students were better able to contribute as team members to complete the group activities. In the long term, I believe the use of the MGB platform can help students build a better understanding of themselves as a team member as well as strengthen their ability to work effectively in future group projects.

Rebecca Neo, Pasir Ris Sec

SAMPLE LESSON PLAN

| Duration | : | 130 minutes | Subject | : | Design and Technology |
| Level | : | Secondary 2 | Topic | : | Building Models of Design Solutions |

Learning Objectives

At the end of the lesson, students should be able to:
- Explain the importance of the four teamwork competency dimensions
- Describe how they can develop their ability to work in a team to complete their projects

Duration	Activity	Rationale	Resources
	Tuning In: Initial Team-based Activity and Rating on Teamwork Competency		
	Step 0 | In teams, students build models of their design solutions with given materials (e.g. foam boards) as an initial activity for their D&T project. After students have completed the model building activity, they individually complete the self and peer teamwork competency ratings on the MGB platform.	Provide team-based learning experience as a basis for reflection and growing teamwork competency dimensions Encourage students to reflect and offer feedback on their teamwork experience during the model building activity	Laptops for all students to access MGB
	Lesson Development: Micro-Profile Feedback and Reflection		
5 min	**Step 1 |** Teacher requests students to sit in their teams and explains the lesson objectives and procedure.		
5 min	**Step 2 |** Teacher invites students to access the MGB platform to view their Personal Teamwork Micro-Profile (Figure 1). Teacher demonstrates how to interpret the Micro-Profile.	Provide clear explanation to set the context and encourage learner engagement	Laptops for all students to access MGB
15 min	**Step 3 |** Teacher explains the importance of the four teamwork competency dimensions using real-life examples and elicits other examples from students: - Coordination - Mutual performance monitoring - Constructive conflict - Team emotional support	Arouse students' interest by connecting to what they already know	Slides on the teamwork competency dimensions and real-life examples relating to these dimensions

Duration	Activity	Rationale	Resources
	A real-life example can be the search-and-rescue operation for flight MH370: • **Coordination:** Need for rescue personnel to exchange information on one's task progress with others clearly • **Mutual performance monitoring:** Offering as well as receiving task-clarifying feedback • **Constructive conflict:** Resolving disagreements through discussion and clarification • **Team emotional support:** Showing care and valuing contributions of team members		
5 min	**Step 4 |** Students individually reflect on their Personal Teamwork Micro-Profile by selecting one teamwork competency dimension to address the following questions in MGB: • Why is this teamwork dimension important to you for good teamwork? • How did this dimension affect your ability to work as a team?	Encourage students to take greater ownership of their learning and support student reflection through the use of question prompts	Laptops for all students to access MGB
5 min	**Step 5 |** Students set personal steps to grow the selected teamwork competency dimension. This is done by indicating, in MGB, the concrete actions that students can carry out during subsequent course of their team project (Figure 1). For example, a student may plan to check team members' morale proactively to grow the team's emotional support competency.		Laptops for all students to access MGB
10 min	**Step 6 |** Students gather in their teams to view their team's Teamwork Micro-Profile and discuss their strongest and weakest competency dimensions (Figure 2). As a team, students also record their reasons for selecting those two competency dimensions on MGB.	Ensure that there is a team consensus on the common goals that everyone should work towards to improve teamwork competency	Laptops for all students to access MGB

Duration	Activity	Rationale	Resources
5 min	**Step 7 |** Students set specific goals (who, what, when) for their team to improve in their weakest teamwork competency dimension, and record their goals in MGB.		Laptops for all students to access MGB
10 min	**Step 8 |** Teacher invites students to share their thoughts on the micro-profiles and the setting of goals to grow the teamwork competency dimensions. Possible facilitation questions • What have we learnt… 　○ About working in teams? 　○ About ourselves? 　○ About how we work with others? • What steps can we set to improve our teamwork? Students may refine their earlier goals if needed. They will continue to work on their D&T project. Based on the discussion of the students' team goals, Teacher may wish to make suitable instructional adjustments to subsequent D&T lessons (e.g. modify an existing lesson activity or provide just-in-time instruction on building a particular teamwork competency dimension) to support students' plans in growing their teamwork abilities.	Make thinking visible and provide feedback to ensure there is a common understanding of teamwork competency among students	
Lesson Development: Mid-Point Check		
30 min	**Step 9 |** *This two-part activity is carried out around the mid-point of the D&T project.* For part one of the activity, students individually complete the mid-point check for their Personal Teamwork Micro-Profile on the MGB platform. Steps taken to achieve the personal goals may be refined. For part two, students in their teams indicate their progress towards the goals to improve group performance and discuss what they can do to achieve the team goals. Following this activity, students continue to work on their D&T project.	Ensure that the goals set by students are realistic and they are able to work towards achieving them	Laptops for all students to access MGB

Duration	Activity	Rationale	Resources
	Lesson Closure: End-Point Check		

40 min	**Step 10 |**
	
	This two-part activity is carried out when students have completed their team-based D&T projects.
	
	For part one, students individually reflect on their steps to grow their teamwork competency and complete the personal end-point check. In their teams, students also reflect and record in MGB how well they have achieved the goals to improve group performance.
	
	For part two, Teacher facilitates team-based or whole class discussion on what they have learned about their teamwork competency.
	
	Possible facilitation questions
	• How have we progressed in teamwork?
	• What have we learnt…
	    o About working in teams?
	    o About ourselves?
	    o About how we work with others?
	• Is there anything you would like to share?
	
	Following this activity, Teacher reflects and decides if particular instructional adjustments can be incorporated in future D&T lessons to give continued support on development of students' teamwork competencies.
			Laptops for all students to access MGB

Possible MGB activity distribution based on an 8-week project schedule

Week 1/ 2:	Step 0	Initial Team-based Activity and Rating on Teamwork Competency
Week 3:	Steps 1 - 8	Micro-Profile Feedback and Reflection
Week 5/ 6:	Step 9	Mid-Point Check
Week 8:	Step 10	End-Point Check