TEACHING WITH CHALLENGING TASKS: DOES IT FIT WITH HIGH IMPACT TEACHING STRATEGIES?

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The purpose of this article is to consider the connections between teaching with challenging tasks and the 10 High Impact Teaching Strategies (H.I.T.S.) identified by the Victorian Department of Education and Training. We are often asked the question by Victorian teachers when providing professional learning around teaching with challenging tasks, how does this approach fit with the H.I.T.S., particularly 'explicit teaching' and 'worked examples'? The purpose of this short article is to highlight these connections.

OVERVIEWING CHALLENGING TASKS[1]

Challenging tasks can be viewed as a subset of problem-solving tasks that possess particular design characteristics. Summarising the work of Peter Sullivan and colleagues (e.g., Sullivan et al., 2015, 2020), at least five distinctive claims can be made about the design characteristics of challenging tasks.

1. Lessons involving challenging tasks tend to be structured into four distinct phases: 1) launch; 2) explore; 3) discuss/summarise; 4) consolidate. The consolidate phase involves repeating phases 1 to 3, and may occur in the same or subsequent lessons.

2. As students are expected to plan their own approach to the task and contribute to a collaborative learning environment, it is helpful if tasks have multiple solution pathways and perhaps multiple solutions, both to support student agency and to allow for students to compare and contrast their approach with peers.

3. As this pedagogical approach is premised on the idea that students learn best when provided with opportunities to struggle and spend time in the 'zone of confusion', all students should experience at least some important aspects of the task as mathematically challenging.

Figure 1. Year 1 students from Dohertys Creek College actively listening during the launch phase of a lesson.

Figure 2. Year 5 students from Dohertys Creek College attempting to design a 3D object with exactly 12 faces during the explore phase.

4. As a single task has been designed to function as the main focus of the lesson, it needs to meaningfully engage students in important mathematical work for a substantial period of time (e.g., 20 minutes).

5. As all students are expected to participate in the lesson regardless of their demonstrated (or perceived) mathematical ability, the task is generally prepared with accompanying enabling and extending prompts.

Enabling and extending prompts are a tool to support differentiated learning experiences whilst allowing all students to learn mathematics through problem-solving (Sullivan, Mousley, & Jorgensen, 2009).

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1. Note that this first section providing an overview of challenging tasks has been reprinted from the article: Russo, J. (2020). Designing and scaffolding rich mathematical learning experiences with challenging tasks. Australian Primary Mathematics Classroom, 25(1), 3-10.

Enabling prompts are designed to ensure a task is accessible to a larger range of learners through changing how the original problem is represented, helping the student connect the problem to prior learning, and/or removing a step in the problem. It is worth emphasising that following engagement with the enabling prompt, the general expectation is the student will then return to the main task. Extending prompts, by contrast, are designed for students who complete the original task. It exposes these students to an additional task that is more challenging; however that requires them to use similar mathematical reasoning, conceptualisations, and representations (Sullivan et al., 2009).

There is substantial evidence to support many of the assumptions underpinning the design characteristics of challenging tasks. For example, learning appears to be enhanced when students are provided with opportunities to construct their own approach to problems compared with being taught explicit procedures (Jonsson, Norqvist, Liljekvist, & Lithner, 2014). Such opportunities lead to larger gains in mathematical performance even when students do not arrive at a solution for a given task (Kapur, 2014). The power of challenging tasks is strongly connected to their capacity to support episodes of 'productive struggle' (Pasquale, 2016).

TEACHING WITH CHALLENGING TASKS AND THE HIGH IMPACT TEACHING STRATEGIES

The table on pages 18 and 19 explores the connections between teaching with challenging tasks and the 10 H.I.T.S. A traffic light system has been used to elaborate on these connections. Green indicates an obvious connection (a strong fit), orange indicates a less obvious connection (nuanced fit), and red indicates no connection (does not fit).

See the table on pages 18 and 19.

CONCLUDING COMMENTS

Hopefully the table on pages 18 and 19 helps to demonstrate that teaching with challenging tasks is generally well aligned with the 10 H.I.T.S. articulated by the Department of Education and Training. Although three of these connections are more nuanced (Setting goals, Explicit teaching, A worked example), we believe that when teaching with challenging tasks does diverge subtly from the H.I.T.S., it does so in a careful and deliberate manner that can be clearly justified by what we know from research of how children learn mathematics.

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