

Journalling in mathematics

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Alex Neill (2005)

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What is Journalling?

Journalling involves students writing about their learning in mathematics. What they write can be based on a prompt given by the teacher – for instance, on a topic currently being covered in class. Alternatively, it can be more self-directed, with students choosing from a menu of prompts, or simply free-writing about their thoughts, feelings and ideas. Teachers will often read students' journal entries and respond with comments or questions. Sometimes this can evolve into an ongoing written conversation between student and teacher. Journalling can happen before, during, or after a session of mathematics learning.

The Benefits of Journalling

Journalling has benefits for students, teachers and the mathematics programme as a whole. These include: promoting understanding, promoting a sense of involvement with mathematics, promoting better informed teaching and promoting teacher student relationships.

Promoting Understanding

Journalling promotes understanding by building on the powerful links between writing and learning. According to one researcher:

... writing can engage all students actively in the deliberate structuring of meaning: it allows learners to go at their own pace; and it provides unique feedback, since writers can immediately read the product of their own thinking on paper" (Emig paraphrased in Borasi and Rose, p.384).

Journalling in mathematics allows students to:

- establish connections between mathematical ideas. For instance, by asking students to explore and write about various strategies for solving similar problems;
- focus on what they do and do not know;
- develop more precise ways of communicating;
- clarify, organise, and refine their thinking;

Promoting a Sense of Involvement with Mathematics

Researchers report that journalling can help students to deal with the struggles that are often involved in learning and doing mathematics. It can also allow students to examine the nature of mathematical knowledge and what it means to think mathematically.

Journalling promotes a sense of involvement with mathematics when it encourages students to:

- summarise goals, strategies, and reactions to mathematics;
- record their accomplishments and openly vent frustrations;
- consider the relevance of mathematics in their lives.

Promoting Better Informed Teaching

When teachers read their students' journal entries they are able to gain a new perspective on how individual students are coping with their mathematics learning. This information can be used to develop next learning steps.

Journalling promotes better-informed teaching by providing teachers with:

- formative data about students' understanding and dispositions, including students' emerging ideas about mathematical concepts;
- a basis for learning conversations (written and oral);
- an opportunity for feedback and feed-forward;
- information that assists in short and long-term planning.

Promoting Teacher Student Relationships

Journalling can also help teachers to make deeper connections with their students. It does this by:

- enabling students to actively participate in a dialogue with teachers through a private, non-threatening means;
- allowing students to share ideas, opinions and feelings about mathematics, the mathematics programme and their own learning styles;
- providing a permanent record for the teacher and student to examine.

Teaching tips for Journalling

Careful management is needed to maximize the potential of journalling. The following tips provide useful advice for using journalling as a learning technique in the classroom.

- Classroom organisation is important. Teachers need to have a manageable system, especially if they are going to take part in ongoing journal conversations with students. This might mean responding to one group of students at a time, rather than the whole class in order to give deeper levels of feedback.
- Daily journal writing is not a necessity. Journalling should be used strategically to complement the classroom programme.
- Journalling is a form of transactional writing. Students will need time and scaffolding to develop as journal writers. Teachers can assist students by modeling examples of journal entries.
- Like any classroom innovation, the success of journalling depends on the quality of student teacher relationships and the belief and commitment that both parties have to the journalling process. In particular, students need to know the benefits of writing in a journal.
- Provide feedback on what is important. Commenting on writing conventions such as spelling and paragraphing, is not as important as providing feedback on mathematical thinking.
- Students should look back and reflect upon their own journal writing experience. This may be done orally, or in writing. There is evidence that such reflection makes the students more aware of themselves as learners.

Click on [Reflecting on reflective journalling](#) for further discussion.

Writing Prompts for Journals

Journalling tasks fall into two distinct groups, self-directed, and teacher directed.

Self-directed journalling

Free-choice journalling is where students choose to write about whatever they wish. This can be informed by a checklist of possible starters. Such lists can be developed within the class. One particular list is referred to on ARB resource [Free journalling](#). The items on this list are not meant to be exhaustive. The teacher may encourage students to self-select different aspects from this checklist over time so that they reflect more widely on their learning.

Possible prompts for self-directed journalling

1. What mathematics did I learn?
 - Describe how a method works.
 - What are my opinions on the mathematical ideas I learnt today?
2. I was feeling ...
 - What did I enjoy or find good?
 - What didn't I like?
 - My feelings about mathematics
3. My favourite thing in maths is?
 - I find ... hard ...
 - need to practice ...
 - I need to remember ...
 - I need to improve at ...
4. Where did I learn new ideas from?
 - How do I learn best?
 - How is my learning progressing?

Teacher-directed journalling

Sometimes the teacher can choose the prompt or topic for journal writing. This might be a particular aspect taken from the journalling checklist above, or instead center on various aspects of the mathematics that the students are currently encountering. Some general suggestions follow, along with particular examples.

Possible journalling prompts regarding mathematical content

1. How it works: Students explain how a strategy works.
For example: Write instructions to a friend on how to do front-end estimation. (Go to the ARB resource [Journalling about estimation](#) for more information about this example.)
2. How-to's: Students explain in writing how to do something.
For example: Someone tells you that two thirds of the 80 cars in the parking lot are green. Is it possible to work out how many cars there are in the parking lot altogether?
How do you find 25% of a number? (Note the student is asked for a general explanation, that is how to find 25% of any number rather than 25% of a specific number.)
3. Definitions: Students write their own definitions of terms.
For example: What is a percentage?
When are two lines parallel?
What is a triangle?
4. Trouble shooting: Students explain errors they or their teachers have identified.
For example: Joseph was counting up in 0.1s. He went, "0.5, 0.6, 0.7, 0.8, 0.9, 0.10." What mistake did Joseph make?
5. Arguments: Students develop an argument to support a point of view.

For example: Think of two ways to find $\frac{3}{4}$ of a number. Which one do you think is the best and why?

6. Problem Posing: Students construct (and model answers for) their own problems.

For example: Write a problem, which involves finding the area of a shape.

7. Pre-writing: Students write before a maths session, looking forward to their learning.

For example: What can you do to day that will help you learn in mathematics.

References

Borasi, R., & Rose, B. (1989). *Journal writing and mathematical instruction*. Educational studies in mathematics 20(4): 347-365.

Key Ideas:

Journalling involves students writing about their learning in mathematics.

Resource List

- Journalling about estimation
- Free journalling
- Reflecting on reflective journalling
- Reflecting on mathematics journals: The kaleidoscope effect

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