# Be deliberate, be explicit

**Marc North** explores decision-making in the classroom

## "If children are too busy trying to organise their learning world, then they simply will not be able to concentrate on the mathematics being taught."

This is the premise that underpins a key piece of work that we have been doing in several schools in our Trust. This article shares our experiences of this work.

For clarity, the word 'world' as used above refers to children having to make decisions about which information communicated by the teacher is important to listen to, remember and record; how and where to structure and record this information; and how and where to access resources and support if they do not understand or get stuck. Children are expected to make decisions repeatedly in lessons, both about the content that they are learning and about the processes that will support their learning. Higher attaining children tend to do this with ease and, even if they are not able to structure their learning world effectively (I'm thinking specifically of some boys here with incredibly messy books!), are able to rely on a strong working memory to support retention and recall. By contrast, lower attaining children tend to be overwhelmed by the number of decisions they have to make and their laboured efforts to structure their learning process distracts attention away from the mathematical content in focus.

## Executive functioning

The capacity to focus attention, remember instructions, plan, organize, complete tasks, and juggle multiple tasks successfully, is influenced by the strength of an individual's executive function
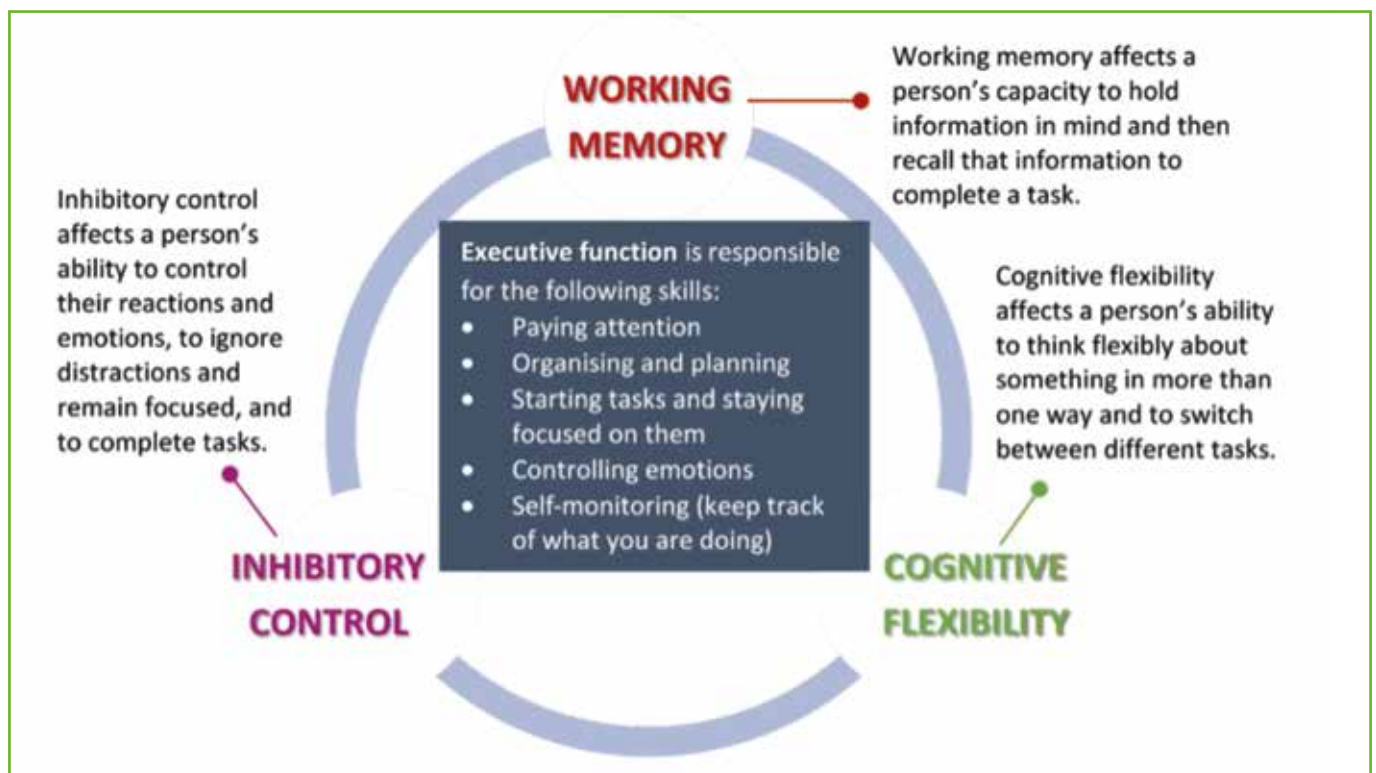


**Figure 1:** Categories of executive function skills (adapted from a graphic shown on **www.understood.org**.

skills. Executive function is the name given to the group of processes that enable children and adults to respond flexibility to the environment and engage in deliberate thought and action (Center on the Developing Child at Harvard University, 2011). Although these skills begin to emerge in infancy, they are among the last cognitive abilities to mature and continue to develop well into late adolescence. This means that teachers can and should continually support children at all levels of schooling to strengthen and developed their executive function skills.

Although there are numerous skills, there are three specific categories of skills that impact on performance in mathematics:

1.  working memory;
2.  mental or cognitive flexibility; and
3.  inhibitory control (including attention).

In practical terms, children who are not able to organise and filter relevant information while remaining focused on tasks (inhibitory control), retain and recall instructions, prior learning and key information (working memory), and move flexibly between different methods, representations and resources (cognitive flexibility), will struggle to learn successfully in mathematics. Simply doing *more* arithmetic or problem solving, or writing ludicrous statutory times-table tests, will not resolve this issue.

## Using structure to support children's executive function skills

Deliberate and well thought-through structure is a key component of our attempt to reduce the decision-making overload that some children experience in lessons. Our work with teachers has focused specifically on more deliberate content sequencing and structure, board-work structure, book-work structure and learning environment (external resource) structure.

## Concept structure

Teachers are encouraged to be explicit with children about the deliberate structure adopted to facilitate learning. For example, many of our schools follow a learning sequence similar to the one shown below (which is broadly representative of the 'Mastery' approach currently prioritised in many UK Primary schools):

We encourage teachers to be explicit with children about the learning phase they are busy with, when a particular phase ends and another starts, and links between different phases and concepts. PowerPoint or Whiteboard slides colour-coded to reflect lesson phases can support this.

Teachers are also encouraged to make a clear statement of expectations for roles and responsibilities of both teacher and children in each phase, which supports inhibitory control by making
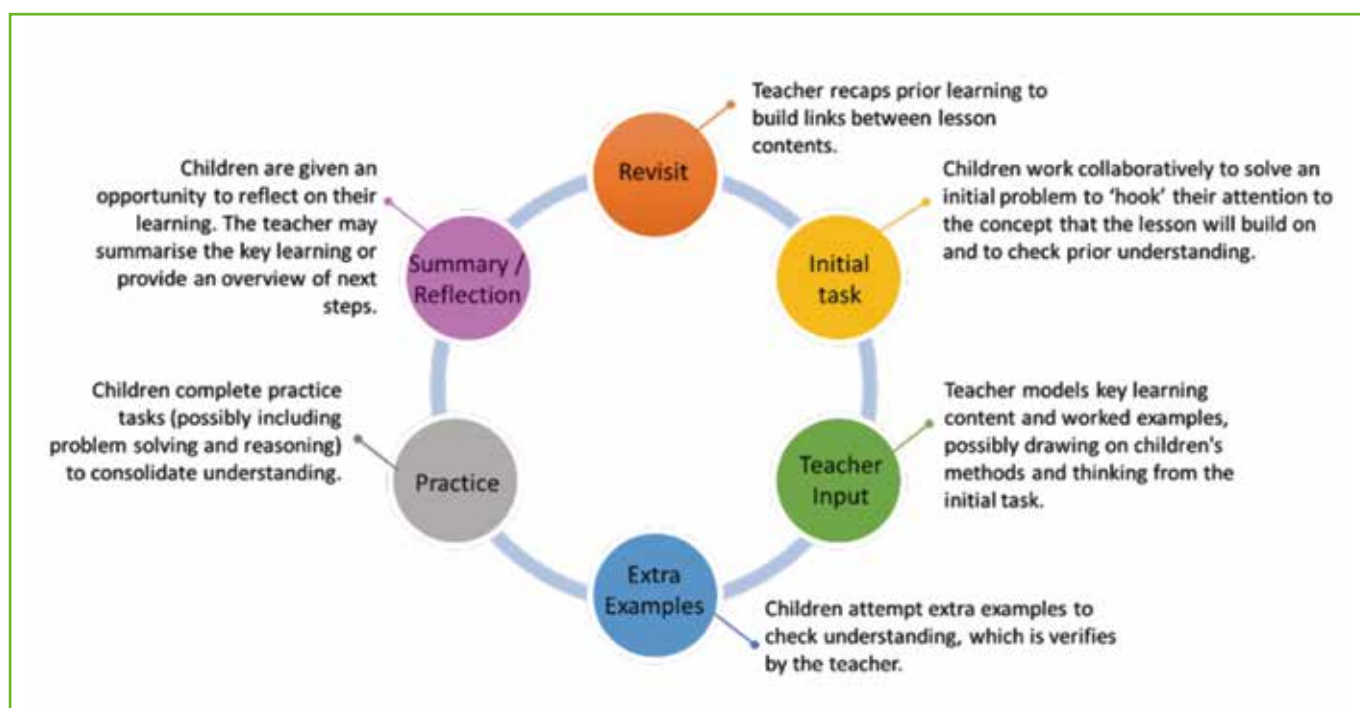


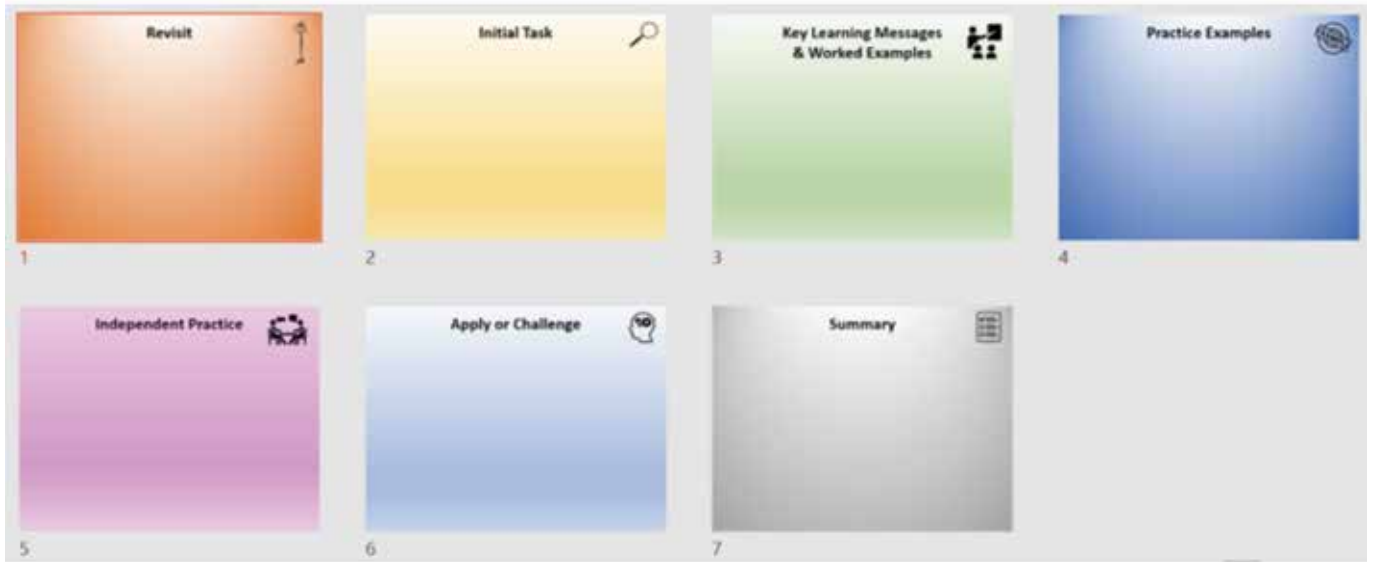**Figure 2:** Typical Mastery concept structure

**Figure 3:** Colour-coded slides to signal each lesson phase

explicit expectations for engagement, attention and concentration at different points in the learning process. Sufficient time must also be made available for transitioning between different phases and activities. This supports those children who struggle with cognitive flexibility by giving them time to complete current tasks, consolidate, prepare for change, and refocus their thinking.

## Book-work structure

If a particular sequence is followed to facilitate learning of a concept, then it follows that this learning sequence should be captured and reflected in the children's book-work structure. To illustrate, reflect on the two pictures of children's bookwork below and consider the following questions:

● Which of these books gives the impression of a more structured learning approach?
● Which of these books provides children with a useful resource (that they can refer back to, to support their learning)?

The book alongside is used, primarily, as a place to record answers and methods. There is no clear record of the key learning modelled by the teacher, which means that if the child ever refers back to this page they will have to decode the lesson contents. Furthermore, if the key learning from the lesson is not currently showing on the whiteboard or in the learning environment, then the child will have to rely on working memory to complete the practice questions. Although it is clear that there was an initial task and some practice, there is no
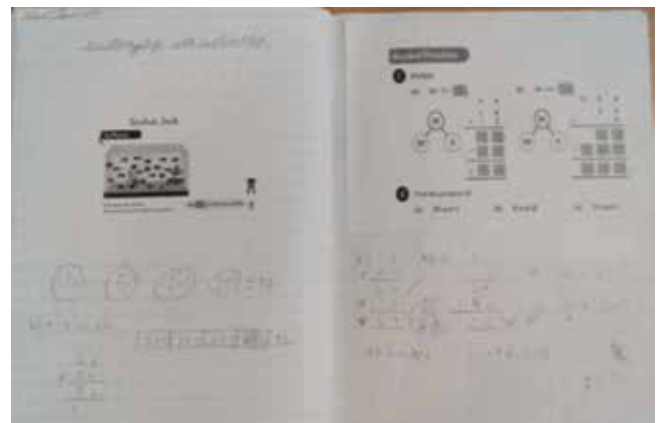


**Figure 4:** Less structured bookwork (Year 3)

evidence that the children were taught something in a structured way – an observation of teaching is needed to validate this.

By comparison, this book provides a clear roadmap of each of the lesson components – Starter, Task, Teacher Input (with a second example for children to attempt in their books to check understanding),
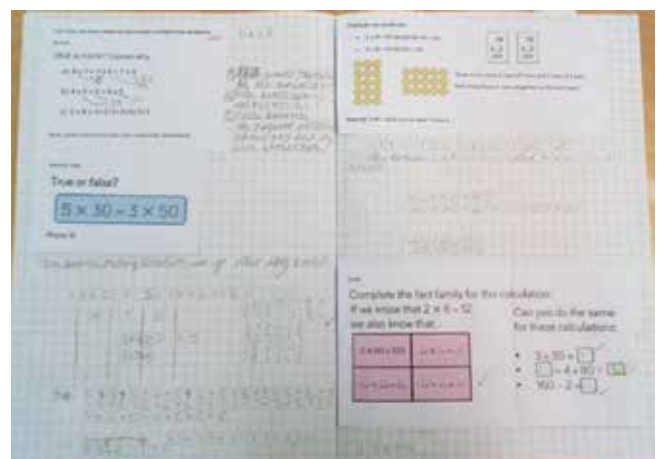


**Figure 5:** Highly structured book-work (Year 3)

and differentiated practice tasks. There is also clear consistency with the lesson structure – a strategy deliberately supporting cognitive flexibility, attention and inhibitory control. Reliance on working memory is downplayed through the provision (by the teacher) of an annotated summary of the key learning and methods from the lesson. This book provides both children and teachers with a valuable resource that they can refer back to, to support and consolidate practice, learning and revision.
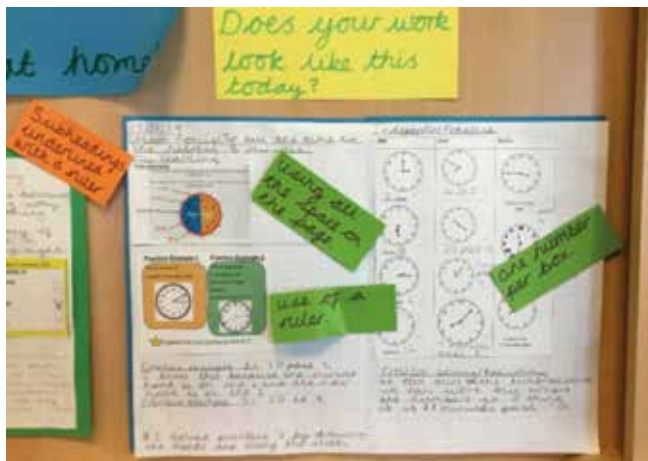


Figure 6: Setting expectations for book-work structure

As an aside, notice the 'double-page spread' approach – a concept or lesson always covered in two pages. This structure makes it easy for children to see when one lesson ends and a new lesson starts and, so, to navigate through their workbook as they use it as a resource. This approach can be supported by a 'splash page' at the start of a new topic to separate topics. Knowledge organisers, where used, can be pasted to the splash page to provide a broad overview, roadmap and destination for the topic ahead.

Teacher are also encouraged to make expectations for book-work structure clear for children by providing exemplars for them to model (see alongside).
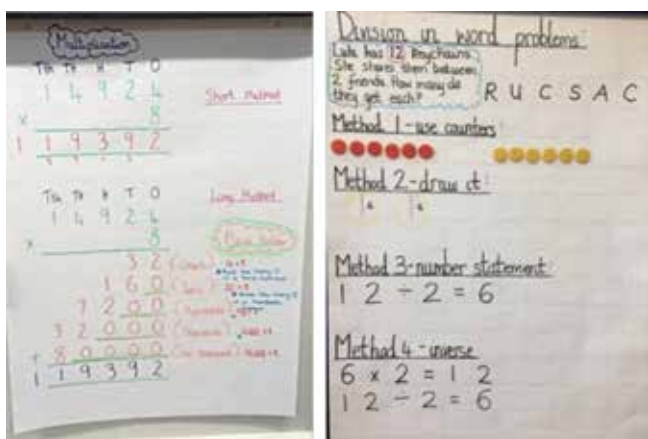


Figure 7: Board-work structure examples

## Board-work structure

Teacher modelling is a key component of any lesson and the quality of modelling is often a key determinant of whether substantial learning occurs. Specifically, modelled examples should be structured in a clear and logical way, with annotations, notes and colour available so that children can follow the explanation without having to follow the teacher's voice. This will ensure that they can make sense of the explanation independently later in the lesson (e.g. while attempting practice questions or following a lapse in concentration), or at a later stage in the year (e.g. while revising). Deliberate use of multiple representation and varied pedagogies to support symbolic representations will ensure that children can rely on visual models when memorisation of symbolic procedures and principles fail them, hereby further supporting working memory and cognitive flexibility. The explicit scaffolding and sequencing of modelled examples should be explicitly discussed with the children so that they understand the rationale for the learning flow. It is this explicit decision making around sequencing, scaffolding and variation that we expect teachers to prioritise in the their planning.

As mentioned above, a copy of this modelled practice is recorded in the children's books to reduce reliance on working memory. For older children (e.g. Years 4, 5 and 6) this may involve copying down off the board; for younger children (e.g. Years 1, 2 and 3) this will more likely involve sticking in notes (e.g. a screen grab) supplied by the teacher. To reduce the amount of decision-making that children have to make about what information to record and how best to record this, teachers must be explicit with children about the most important aspects of their modelling. If needed, a section of the board can be taped off to designate important notes and board-work; this serves as a trigger that anything written in that space is important and must be recorded. The teachers' marking and feedback of the children's book-work must then also include a commentary on the accuracy of the recorded notes, to support the development of the children's independent practices.

## Learning environment

As with children's books, learning environment is an invaluable space where resources can be included to support children's learning. Lesson notes recorded on flipchart paper and hung in the classroom after

**Figure 8:** Sequencing and supporting learning in the learning environment
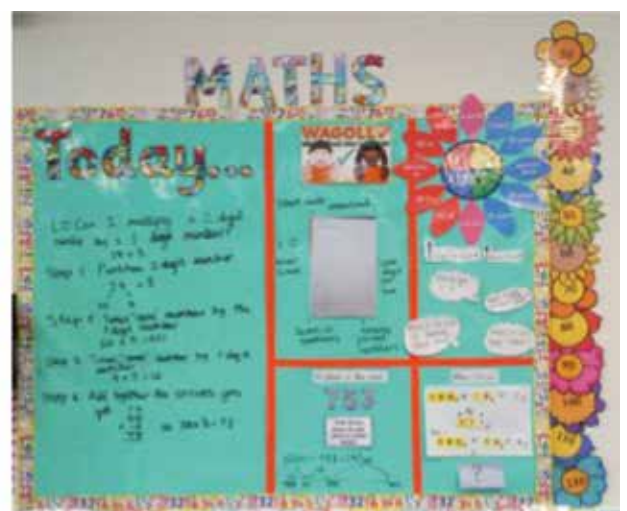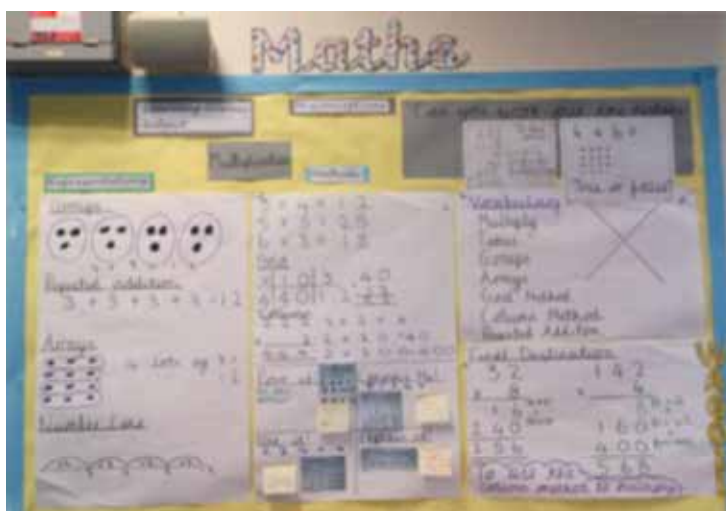


**Figure 9:** Supporting learning on working walls

each lesson provide children with an effective view of the deliberate learning sequence and with easy access to the key learning messages over a sequence of lessons.

Similarly, working walls can record current sequences of learning, key learning points and varied representations to reduce reliance on working memory and support recall, structured methods, and build continuity to modelled practices.

Other strategies include displaying large year-group specific number-lines across a wall in the classroom, pasting times-table grids to each desk, and making manipulatives and representations easily accessible. All of these strategies ensure that children do not need to rely on immediate memorisation of the lesson contents or procedures and can focus attention instead on securing understanding. When used in this way, the learning environment ensures continuity between the teachers' modelling, the board-work contents, and the work recorded in the children's books, and removes a further level of decision-making from the children about the links between concepts. This supports a view of learning as an interconnected sequence rather than as a set of individual lessons.

## The 'be deliberate, be explicit' mantra

The 'be deliberate, be explicit' mantra has become a catch-phrase in our work across schools and supports a simple but effective logic: as a teacher or teaching assistant, be deliberate about why you are choosing to sequence learning in a particular way, why you are using a specific method, why a particular representation is foregrounded, and how different methods and representations link together. Then, be explicit with the children about your reasoning for your choices and actions. If we make deliberate decisions to inform the content sequencing, lesson structure, board-work structure, book-work structure, and learning environment contents, and communicate these decisions to the children, we remove from them a level of uncertainty about the learning process and free them up to concentrate more fully and in a more informed way on the learning contents. In doing so, we shrink the burden on their working memory, support them to transition flexibly across tasks and activities, and focus their attention by creating clear expectations about when and how to participate in the learning process.

## Acknowledgements

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- Learning environment wash-line example – Lorna Glenn (Pear Tree Community Junior School)
- Working wall examples – Collette Talbot and Meghan Mackinnon (Pear Tree Community Junior School and Breadsall Hill Top Primary School)

## References and additional reading

Carey, L., and Koriakin, T. 2015 Improving Maths Performance by Supporting Executive Function, sourced from the Kennedy Krieger Institute website on 21 December 2018, **www.kennedykrieger.org/stories/improving-math-performance-supporting-executive-function.**

Center on the Developing Child at Harvard University. 2011 Building the Brain's "Air Traffic Control" System: How Early Experiences Shape the Development of Executive Function: Working Paper No. 11, Retrieved from **www.developingchild.harvard.edu**.

Cragg, L., and Gilmore, C. 2010 "Skills underlying mathematics: The role of executive function in the development of mathematical proficiency", Trends in Neuroscience and Education, 3, 63–68.

The Understood Team. 2017 Three Areas of Executive Function. **https://www.understood.org/en/learning-attention-issues/child-learning-disabilities/executive-functioning-issues/3-areas-of-executive-function**. Accessed 24 November 2018.

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