Cost	Evidence strength	Impact (months)	Effect size
£££££		***+5***	***0.45***

What is it?

Mastery learning was originally developed in the 1960s. According to the early definition of mastery learning, learning outcomes are kept constant but the time needed for pupils to become proficient or competent at these objectives is varied.

Subject matter is broken into blocks or units with predetermined objectives and specified outcomes. Learners must demonstrate mastery on unit tests, typically 80%, before moving on to new material. Any pupils who do not achieve mastery are provided with extra support through a range of teaching strategies such as more intensive teaching, tutoring, peer-assisted learning, small group discussions, or additional homework. Learners continue the cycle of studying and testing until the mastery criteria are met.

More recent mastery approaches do not always have all these characteristics of mastery learning. Some approaches without a threshold typically involve the class moving on to new material when the teacher decides that the majority of pupils have mastered the unit. Curriculum time is varied according to the progress of the class. In other approaches, pupils are required to demonstrate mastery on a test to progress to new material, but there is not a specified threshold of at least 80%.

Mastery Learning should be distinguished from a related approach sometimes known as “teaching for mastery”. This term is often used to describe the approach to maths teaching found in high-performing places in East Asia, such as Shanghai and Singapore. Like “mastery learning”, “teaching for mastery” aims to support all pupils to achieve deep understanding and competence in the relevant topic. However, “teaching for mastery” is characterised by teacher-led, whole-class teaching; common lesson content for all pupils; and use of manipulatives and representations. Although some aspects of “teaching for mastery” are informed by research, relatively few interventions of this nature have been evaluated for impact. Most of the studies in this strand, should be distinguished from this related approach.

Key Findings

1. Mastery learning is a cost-effective approach, on average, but is challenging to implement effectively. Schools should plan for changes and assess whether the approach is successful within their context.

2. A high level of success should be required before pupils move on to new content – it is crucial to monitor and communicate pupil progress and to provide additional support for pupils that take longer to reach the required level of knowledge.

3. Mastery learning approaches are often associated with direct instruction, but many of the high impact studies identified included elements of collaborative learning.

4. There is large variation behind the average impact – mastery learning approaches have consistently positive impacts, but effects are higher for primary school pupils and in mathematics.

How effective is the approach?

The impact of mastery learning approaches is an additional five months progress, on average, over the course of a year.

There is a lot of variation behind this average. It seems to be important that a high bar is set for achievement of 'mastery' (usually 80% to 90% on the relevant test). By contrast, the approach appears to be much less effective when pupils work at their own pace (see also Individualised instruction).

Mastery learning also appears to be particularly effective when pupils are given opportunities to work in groups or teams and take responsibility for supporting each other's progress (see also Collaborative learning and Peer tutoring).

Mastery learning, despite being an effective intervention to develop students' achievement by considering their individual differences, is rarely explored in the Arab world. Very few studies investigated the impact of mastery learning on students' achievement. Furthermore, teachers opinions and understanding about this approach are still vague. In Algeria for instance, teachers refrained from implementing mastery learning approach because their syllabus and textbooks were not aligned together, nor were they aligned with this active learning pedagogy. Additionally, having large class sizes, a heavy syllabus, and lack of adequate teacher training programs hindered the implementation of differentiated instruction in the classroom.

Where studies have examined this approach, they have found evidence of effectiveness in developing students' academic and personal competencies. For instance, in an experimental study

conducted in 2017 among tenth grade students in Palestine, students who learned grammar through the mastery learning model showed better results on the posttest when compared with their peers using the traditional method. Not only that, students' interest about the subject matter improved and their self-efficacy levels increased.

Overall, mastery learning research in the Arab world is still scarce. A majority of these studies were mostly conducted among secondary school learners. That is why, researchers are recommended to investigate the most effective strategies through which teachers can apply mastery learning for both primary and secondary level. Further research is also recommended to look at teachers' perceptions and to investigate the best types of training programs that would prepare them for mastery learning implementation in their instruction.

Behind the average

Studies involving primary school pupils have tended to be more effective (+8 months) than for secondary school pupils (+ 3 months).

Mastery learning has been used successfully across the curriculum but particularly for reading, mathematics and science. Effects are higher in mathematics and science (+6 months) than reading (+3 months).

A high level of mastery of about 80% is associated with more successful approaches.

Mastery learning approaches that include collaborative learning can be effective.

Closing the disadvantage gap

Mastery learning approaches aim to ensure that all pupils have mastered key concepts before moving on to the next topic – in contrast with traditional teaching methods in which pupils may be left behind, with gaps of misunderstanding widening. Mastery learning approaches could address these challenges by giving additional time and support to pupils who may have missed learning, or take longer to master new knowledge and skills.

In order for mastery approaches to be effective for pupils with gaps in understanding, it is crucial that additional support is provided. Approaches that simply build upon foundational knowledge without targeting support for pupils that fall behind are unlikely to narrow disadvantage gaps.

How could you implement in your setting?

Mastery learning works through designing units of work so that each task has a clear learning outcome, which pupils must master prior to moving on to the next task. Core components of the mastery approach that schools should be careful to implement include:

- Effective diagnostic assessment to identify areas of strength and weakness
- Carefully sequencing topics so that they gradually build on foundational knowledge
- Flexibility for teachers on how long they need to spend on any particular topic
- Monitoring of pupil learning and regular feedback so that pupils can master topics prior to moving to the next
- Additional support for pupils that struggle to master topic areas

Mastery learning interventions are typically delivered over the course of an academic year, as choosing to take longer on topic or scheme of work requires flexibility in the planning and teaching of curriculum content.

Some schools may decide that certain topics are more suited to a mastery approach than others, and therefore the delivery time could be as short as half a term.

When introducing new approaches, schools should consider implementation. For more information see **Putting Evidence to Work – A School's Guide to Implementation.**

What does it cost?

Overall, the median costs of implementing mastery learning approaches are estimated as very low. The costs associated with mastery learning approaches mostly arise from professional development training for teaching staff, which is most commonly a start-up cost for introducing the new approach.

Whilst the average cost estimate for mastery learning is very low, the range in costs of professional development training, and the option to pay for ongoing training and additional staff to provider greater timetable flexibility, mean that costs can range from very low to moderate.

Implementing mastery learning will also require a moderate amount of staff time, compared with other approaches. School leaders should be aware of the extra staff time required and think carefully about other activities they might need to cut back on to provide this additional support.

Alongside time and cost, school leaders should consider how to maximise support for struggling learners and avoid some pupils getting bored or frustrated whilst they wait for others to master content.

How secure is the evidence?

The security of the evidence around mastery learning is rated as low. 80 studies were identified that meet the inclusion criteria of the Toolkit. Overall, the topic lost two additional padlocks because:

- A small percentage of studies that have taken place recently. This might mean that the research is not representative of current practice.
- A large percentage of the studies are not randomised controlled trials. While other study designs still give important information about effectiveness of approaches, there is a risk that results are influenced by unknown factors that are not part of the intervention.

As with any evidence review, the Toolkit summarises the average impact of approaches when researched in academic studies. It is important to consider your context and apply your professional judgement when implementing an approach in your setting.