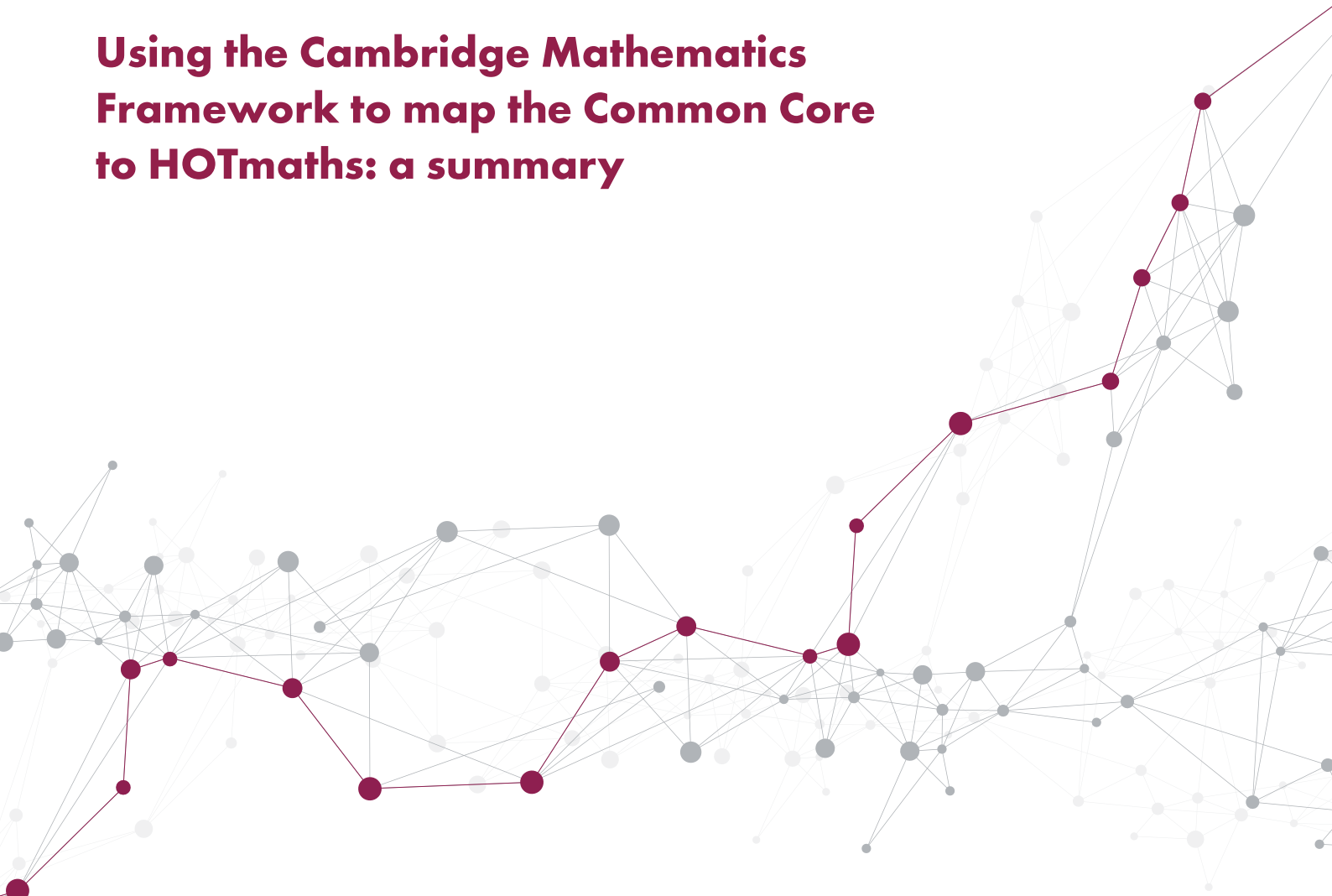


Case study report

Using the Cambridge Mathematics Framework to map the Common Core to HOTmaths: a summary



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Introduction and objectives

The Cambridge Mathematics Framework (CMF), an interactive, digital map of mathematics learning for 3–19-year-olds, has grown and developed in various ways as a tool since its conception. The Cambridge Mathematics (CM) team collaborated with HOTmaths (HM) in a project mapping a portion of the HM content to the Common Core (CC) content. The CMF has acted as an intermediary tool supporting this mapping.

The CMF is a “network of mathematical ideas which can be tied to teacher education and training, tasks and assessment. It is designed to ... serve as a representation of conceptual relationships in mathematics learning. Its structure and content are evidence- and research-informed” (Cambridge Mathematics, n.d.).

The Common Core Standards (CCS) are “a set of high-quality academic standards in mathematics and English language arts/literacy (ELA)” (Common Core Standards Initiative, n.d.-a). The standards outline what students should know and be able to do by the end of the grades, starting in Kindergarten (K) all the way up to the final year of high school (12). The CCS in mathematics aim to equip learners with skills and knowledge important for college, career and everyday life (Common Core Standards Initiative, n.d.-b).

HOTmaths “is a comprehensive mathematics learning system” which provides “an interactive online maths learning, teaching and assessment resource for students and teachers, for individuals or whole classes, for school and at home” (HOTmaths, n.d.). HM offers maths resources developed by a range of professionals, including educators, designers and technicians (HOTmaths, n.d.).

This short summary document will briefly present the HOTmaths–Common Core mapping project and its outcomes for both the HM and the CM teams.

Methods

At the beginning, both the HM and CM teams met to decide on the structure of the project, its aims and outcomes. An agenda containing the breakdown of weekly sessions was devised. It was decided that the pilot project would focus specifically on the fractions portion of content in the CMF, HM and CC. The HM team had already completed their own matching of the HM material to the CC standards, therefore they focused on mapping the HM content to the CMF content.

Throughout this collaborative project, the HM team informed the CM team of their thinking and the steps they took to carry out the mapping through the process of diarising (keeping an updated diary of the mapping process). This allowed the HM team to keep track of any questions, observations and difficulties they experienced during the mapping exercise. Both teams met twice a week for a duration of five weeks, with these following the agenda set out at the start of the project. Before each meeting, the writer from the CM team shared resources designed to support the HM team with navigating the CMF. During each of the first weekly meetings, the writer from the CM team trained members of the HM team in specific aspects of using the CMF, such as creating nodes and the connections between them. During the second weekly meetings, which occurred within 12 hours of each training meeting, the HM team shared their workings, findings and observations, including any issues experienced when using the CMF. These follow-up meetings were therefore used to solve difficulties and to check the progress of the project. Meetings were recorded to capture queries, problem-solving and decision-making, in order to be able to re-interrogate these at a later date. This information will be used by the CM team to inform continuing design decisions. The HM team also emailed questions throughout the project to solve any immediate issues, such as difficulties accessing the CMF.

Results and discussion

The long-term aim of this project is to investigate the use of the CMF as a tool for mediating the mapping of the CC content to the HM content. For the purposes of this short document, this section will present a summary of its more immediate outcomes:

- how the project informed the work of the CM team, including the functionality of the CMF, and
- how it informed the work of the HM team.

Table 1: A summary of how the project informed the work of the Cambridge Mathematics team

Issue, observation or finding	Outcome for the Cambridge Mathematics team
Technical issues, such as difficulties viewing waypoints in table form in full screen.	Any <i>technical issues</i> have been passed on to the Software Developer to be corrected.
When the HM team tried to delete a specific waypoint by clicking on the x button, no pop-up question was presented before the waypoint was deleted. When another, nearby waypoint was selected, the pop-up question was presented.	The writing team member tested this and found this was the same case for them. The identified issue is a result of an over-complicated <i>method of searching</i> in the current interface. This will be changed in the new interface.
Waypoint <i>mea1.0 Reading off measure</i> (Identify and use the correct measuring tool, and therefore unit, to measure angle, length, volume or mass) – the HM team questioned whether this waypoint should include area as information contained in this waypoint made reference to units of area.	The writing team member investigated the waypoint and suggested that this waypoint is concerned with reading off a scale, therefore area is not applicable as it is measured in 2D. The writer will explicitly <i>add in additional content</i> to reference scale reading in this waypoint.
The HM team could not find a waypoint that closely matched one of their curriculum nodes referring to “writing sub-sections of a group as a fraction of the whole group” (J. Angove, personal communication, November 17, 2020).	The two teams decided that an additional waypoint is needed. An in-depth discussion with the HM team supported the <i>new content</i> in a waypoint titled <i>Beginning to use fractions to describe part-whole situations (fra6.9)</i> , which addresses the issue identified.

Table 2: A summary of how the project informed the work of the HOTmaths team

Issue, observation or finding	Outcome for the HOTmaths team
Training received during the second meeting with the CM team focused on completing filling in between waypoints, showing highly connected waypoints and creating a saved search (J. Angove, personal communication, November 17, 2020).	The ability to <i>navigate around the CMF</i> and carry out actions listed on the left: saving a collection of waypoints, filling in paths and showing highly connected waypoints.
Training received during subsequent meetings.	Knowing how to <i>edit content in the CMF</i> (such as curriculum nodes).
When the teams discussed the content that will be mapped from the HM curriculum, it was unclear how review lessons should be treated.	Knowing how to <i>map single HM lessons</i> to the CMF content.
Final meeting between the HM and CM teams, which focused on a section mapping the CC content to the HM content using the CMF, highlighting similarities and differences.	Consideration for review lessons; introducing <i>additional tagging</i> of those lessons as “review” so they can be identified in a search.
	Clearer understanding of how to identify commonalities and differences between the mapping of HM lessons (HM–CMF) and the mapping of the CCS (CCS–CMF). This <i>developed the HM team’s mapping skills further</i> (J. Angove, personal communication, November 17, 2020).

This summary report demonstrates the initial outcomes of the collaboration. It shows that training and guidance in the use of the CMF can positively inform the work of external teams; for instance, when working with different curricula. Such collaboration can also benefit the CM team; for instance, addressing technical issues and adding additional information to waypoints.

It is important to note that this summary focuses on mapping a small selected set of content and future collaborations which address different or broader areas may highlight new challenges, findings and benefits.

Bibliography

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