

Learning by Questions

Final report

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Executive summary

The goal of this project was to obtain feedback on the use of the beta version of Learning by Questions (LbQ) from 100 teachers and their pupils in 50 schools in seven clusters around the country. Teachers were trained by LbQ staff at one-day training events in their regional clusters. These were followed by three cluster sessions over the year - in autumn, spring and summer, during which detailed feedback was obtained from the teachers and they were trained in additional features and new developments of LbQ.

The Institute for Effective Education (IEE) tracked the teachers' completion of the feedback forms, and contacted those who were not doing so regularly to encourage them to do so. If a school submitted 100 online feedback forms over the course of the school year, their school would receive an interactive panel.

Teachers who did not run a minimum of three Question Sets and complete at least one feedback survey per week were contacted personally by email to remind them of their commitment to the LbQ project. Periodically throughout the year teachers were sent emails to let them know how they were progressing towards their target. Of the 50 schools that started the project, four withdrew and, of the 46 remaining, all but three achieved the target number of feedback surveys. Those that did not were given an extension to complete the required number.

The IEE framed the responses to the open-ended responses and then coded the number of teachers who supported and refuted those statements. In the tables in this report these are reported as percentages. Staff at LbQ then decided how to respond, if at all, to those supported and refuted statements. If there were supported positive statements, sometimes statements were simply used for marketing purposes. If there was a high number of supporting negative statements, then the development team would see if the issue could be resolved in the programming.

The overwhelming feedback from the teachers was extremely positive. Not only did teachers report that LbQ improved their pupils' motivation and achievement but it also made the teachers' jobs easier, saving them as much as 1-2 hours a week.

The biggest challenge to the implementation of this project was the lack of access to tablets by the teachers and pupils in some schools. Some schools did not obtain tablets until well after the project had started. In a number of schools classes had to share tablets, which interfered with optimal use of LbQ. The LbQ team did what it could to encourage schools to provide tablets to the classes.

Because LbQ was so responsive to the needs of the teachers and to correcting errors, a lot of the changes were made in the course of the feedback project.

Conclusion and recommendations

Key conclusions

Teachers love using LbQ

Teachers gave overwhelmingly positive responses to the questions on the final cluster survey. In the open-ended questions teachers frequently referred to LbQ as a great tool or resource and a number of them said they would not want to teach without it.

Primary school teachers are slightly more positive about LbQ. They think it saves time and improves pupil attainment. Many primary teachers think LbQ compliments traditional teaching methods and some describe how using LbQ has improved or changed their teaching, giving them a different approach.

'I have changed my mind over using technology in the classroom. It has given me a fresh new boost to my teaching' – primary teacher

Secondary teachers also value LbQ for saving them time and improving their pupils' attainment but they are generally much more focused on the classroom experience, how it has positively affected pupil engagement and how the differentiated learning assists with classroom management.

'LbQ increases pupil engagement, enjoyment and, above all, learning. I spend a lot less time at the board and more among the pupils. I can easily and quickly identify pupils requiring help and intervene effectively' – secondary teacher

Pupils love using LbQ

Responses to the pupil survey were slightly more mixed than responses to the teacher survey but it is clear that pupils very much enjoy using LbQ and strongly feel it increases their confidence. They value the feedback and find the opportunity to make and learn from mistakes very beneficial.

There does not seem to be a great deal of difference between the feeling of primary and secondary pupils. On the majority of questions the pupil survey offered pupils the chance to answer yes, no, or not sure. Primary pupils tended to respond positively more often than secondary students but there was almost no difference in their negative answers. Secondary pupils were more likely than primary pupils to say they were unsure of their answer.

The only point on which primary and secondary pupils markedly differed was whether LbQ made maths more enjoyable. Primary school pupils were much more likely to respond positively, whereas just under half of secondary pupils agreed this was the case. More than twice the number of secondary pupils responded negatively.

LbQ reduces teacher workload

94 percent of teachers agree that LbQ reduces their workload. Comments from the open-ended questions strongly support this with one teacher commenting:

'It has changed my life! I work less at home on planning and preparing resources yet the resource means that each child, regardless of ability, is being challenged or supported'

The majority of primary and secondary teachers report saving 1-2 hours per week when using LbQ. Only three percent of secondary teachers report saving more time than this but 30 percent of primary teachers say they save more than 2 hours per week. Teachers describe saving time marking, assessing pupils and, finding or creating resources.

Teachers value the quality of LbQ

Both primary and secondary teachers rate the quality of LbQ very highly. They appreciate the quality of the questions and compare LbQ favourably with other products they have seen or used.

'LbQ has been systematic and diligent in their research and trialling of these Question Sets. The range available is vast and the questions themselves offer lots of visuals to support learning and progress for all pupils. I would highly recommend using them as starters to practise or plenaries to challenge'

They also believe that the pedagogy used in LbQ is the way forward for teaching.

'LbQ is not a flash in the pan, it's the start of how teaching will look in the future. It's a resource that children take to instantly and are motivated to learn from the very beginning of the lesson. The live feedback during the lesson means that misconceptions or misunderstandings can be reacted to straight away and teaching can be concentrated where it needs to be'

Recommendations

Barriers to use

Teachers reported that the main barrier to use was access to tablets. LbQ should continue its work to offer schools discounted or low cost tablets and charging trolleys as access to the appropriate technology is key to embedding use in classrooms

The second largest barrier to use teachers reported was needing to provide evidence of work in books for Ofsted. This was heavily affected by individual school policy. Possible ways to mitigate this issue would include the following:

- Making clear in promotional materials aimed at senior managers that electronic evidence is acceptable to Ofsted. Include examples of how and when Ofsted accepts this as evidence.
- Creating marketing materials or simple tutorials that show teachers quick and simple ways to create in-book evidence when using LbQ. These could include

demonstrating how to print results or testimony from teachers on how they have managed this issue.

- Developing elements of the platform to make it easier to evidence work.

Spreading the word

As part of the final cluster sessions teachers were asked to suggest ways in which LbQ could help other teachers to use LbQ.

Teachers feel strongly that if potential users see it in action they will instinctively understand the benefits of LbQ and want to use it themselves. Suggestions included:

- Asking current users to demonstrate the product for interested teachers in a classroom setting
- Running information and training sessions similar to the cluster sessions in the trial
- Running information sessions for senior leadership teams

Teachers also felt that the LbQ's selling points such as its ability to save teachers time, the instant feedback for both teachers and pupils, and its ease of use speak for themselves. Publishing case studies online and creating talking head videos with teachers from the trial are possible ways to communicate the benefits of the product to new or potential users.

There is a risk that whilst teachers in the trial clearly value and enjoy LbQ, new users will not have the same incentives to engage with the product. To mitigate this risk LbQ should continue and expand its work to create online training resources such as webinars, how-to guides and videos, newsletters and top tip tweets. It may also wish to consider creating a user forum where users can seek support, ideas and answers from each other. This will all help new users to embed LbQ in their classroom practice.

Method

Data collection

Before the project began, participating schools were recruited from seven regional clusters (Belfast, North West 1, North West 2, The Wirral, Newham, Hackney and Waltham Forest). At the beginning of the project, there were 103 teachers in 50 schools.

Initial training was conducted by LbQ, with support from the IEE, in September 2017. A full-day training event was held in each regional cluster with mop-up sessions provided where necessary by LbQ. These sessions introduced participating teachers to the LbQ platform and demonstrated ways in which the software could be used to benefit teachers and their classes. At least one member of the IEE team attended each of the training sessions to ensure that teachers understood the feedback requirements of the project.

Over the year of the project teachers attended three termly 'cluster sessions'. The first two of these sessions were facilitated by LbQ with support from the IEE. The sessions consisted of a series of small workshops focused on a particular topic of interest to the LbQ development team. Part of the time was used by LbQ to introduce new features of the programme. Freeform notes were taken at both sessions and at the second session the facilitators administered a number of questionnaires comprised of both open and closed questions. The third cluster session was facilitated solely by LbQ as the workshops were not relevant to the IEE feedback. A questionnaire was administered at the final cluster session, the design of which was influenced by the evaluation work done up to this point in the project. The survey contained mainly closed questions and some open questions. The survey was analysed by the IEE.

In addition to the cluster sessions teachers were asked to complete feedback surveys on a minimum of 50 Question Sets across the evaluation year (a total of 100 submitted surveys per school). These were designed by LbQ and analysed by the IEE. A total of six different surveys were run over the school year and each survey contained a series of set questions that appeared in all surveys, and a series of questions that changed with each survey and focused on a specific topic of interest to the development team.

Non-participatory classroom observations were conducted in 10 schools, some by IEE staff, some by LbQ, and one school by both. Observations were included in the feedback project to gauge how the programme is delivered in a real-world situation, acceptability by teachers and pupils, and barriers and facilitators to delivery. A semi-structured observation form developed by the IEE was used to ensure consistency of the observations across schools and observers. Where feasible, observers conducted an informal interview with the teacher immediately after the session. The schools chosen for observation spanned all seven regional clusters. Specific schools

in each cluster were chosen in agreement with LbQ and reflected a range of fidelity and buy-in to the project.

Usage of Question Sets and completion of feedback surveys was monitored on a weekly basis by the IEE. Teachers who did not run at least three Question Sets and submit at least one feedback survey during the previous week were contacted by email to remind them of their commitment to the LbQ project. Teachers were encouraged to contact the IEE team if, for any reason, they were unable to use LbQ during a particular period because of absence, technology issues or other commitments. Periodically throughout the year all teachers were sent emails to let them know how they were progressing, individually and as a school, towards the target to receive an interactive panel.

Data analysis

Thematic analysis was used for the analysis of qualitative data. This involved six stages of coding to establish meaningful patterns:

- familiarisation with data,
- generating initial codes,
- searching for themes within codes,
- reviewing themes,
- defining and naming themes, and
- converting defined themes to actionable statements in a final report for the development team to use as they developed and marketed LbQ.

Final reports were created by the IEE for all six content surveys, and for the first two cluster sessions.

Data collected at the first cluster session was largely qualitative which made it difficult to provide numbers to back up our observations. The other cluster sessions used surveys containing specific questions to which the teachers all responded, making definitive statements easier to create. The surveys from the spring cluster session focused on how teachers search for content, and were used to inform changes to the LbQ search functions that were carried out during the course of the project and therefore have not been included in this report. However, one survey catalogued barriers to use and is included here as the findings continue to be relevant.

The tables below show the outcome statements from the IEE analysis organised by data source.

The outcome statements from the content surveys were largely derived from thematic analysis of the open questions on the six content surveys. The numbers represent the percentage of respondents in each of the six surveys that made comments that either support or refute the thematic statements. Where a closed question supports the thematic analysis the data was analysed per respondent (as oppose to per survey response). Data from the closed questions is marked with a star.

The percentage of respondents who supported or refuted a statement may sometimes seem low but in the context of the thematic analysis they can still be meaningful. However, the results from content survey 6 may be slightly skewed. It was clear that some teachers were entering cursory answers and/or skipping questions probably in an attempt to complete enough surveys to qualify for the screen. This had the effect of making the percentages for this survey less reliable.

The outcome statements from the barriers-to-use survey arose from a largely closed question survey administered by LbQ at the spring cluster sessions. The survey asked teachers to agree or disagree with a series of statements regarding any barriers to use that teachers may have encountered during the project. The questions were derived from answers made to open-ended questions as part of content surveys 1 and 2 and from the notes taken at the autumn cluster sessions.

The outcome statements from the final cluster session were created in response to closed questions on a single survey, meaning that teachers provided only one response to a definitive question. This survey was carried out at the final cluster session held at the end of the year-long project and can therefore be considered an accurate representation of what teachers reported feeling at the end of the project.

The survey was administered separately to primary and secondary school teachers. The results are presented so that any differences in response by the two groups of teachers can be seen. The numbers here are represented as percentages.

Table 1. Outcome statements from the content surveys

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Students are engaged when using LbQ	15.6	1.6	36.3	1.1	23.5	1.2					23.4	0.0	Teachers routinely report high student engagement. This is supported anecdotally by conversations at cluster sessions and observed first-hand during classroom visits. <i>'The children in my class really enjoy using it. They get excited when they see the i-pads arrive in the room as they know we will be using LbQ during the lesson.'</i>

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by	% Supported by	% Refuted by	% Supported by	% Refuted by	% Supported by	% Refuted by	% Supported by	% Refuted by	% Supported by	% Refuted by	
Students are swiftly moved to questions that challenge them (where appropriate)	45.3	21.9	81.3	¹ 34.1	25.9	7.1	19.4	13.9	25.0	11.8	17.0	0.0	In content surveys one and two teachers were asked to rate the quality of questions sets. Answers in the first content survey were mixed and just under half of the teachers felt students were appropriately challenged. By the second content survey this had risen to over 80% of teachers who supported the statement. This is probably because LbQ was now more embedded in teaching and more content was available. Content surveys 3-6 did not ask specifically about the quality of the questions.

¹ Teachers may have supported the statement for one question set and refuted it for another. Hence a total of >100%.

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Students find the diagrams clear and helpful	60.9	20.3	33.0	8.8	12.9	5.9			8.8	2.9	6.4	0.0	<p>In content survey one teachers were asked to rate the quality of the diagrams. More than half the teachers commented that the diagrams were clear and helpful. When directly asked to rate how helpful the diagrams were 93.9% of teachers rated them as either helpful or extremely helpful.</p> <p>Content surveys 2-6 did not explicitly ask about the quality of the diagrams but teachers routinely commented on the helpfulness of the diagrams.</p>
Students of all abilities find this pedagogy effective	21.9	20.3	29.7	13.2	24.7	9.4	13.9	6.9	19.1	11.8	12.8	2.1	<p>Teachers were never specifically asked to comment on the suitability of LbQ for all abilities of student, however teachers routinely commented on this. More teachers feel LbQ is suitable for different abilities but negative comments centred mostly around LbQ being less suitable for low ability students. Once more content was available the proportion of negative comments reduced.</p>

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Students read and apply incorrect answer feedback	28.1	31.3											The first content survey asked teachers to comment on the incorrect answer feedback. Almost a third of teachers reported that students read the feedback, whilst slightly more teachers reported they did not.
Teachers think the incorrect answer feedback is helpful ²	*94.9	*5.1											When asked directly if the incorrect feedback was helpful almost 95% of teachers rated it as either helpful or extremely helpful.

² An asterisk indicates that the survey statements were framed in a closed question.

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Teachers are able to identify gaps in their students' knowledge	43.8	0.0	71.4	0.0	68.2	0.0	69.4	0.0	66.2	0.0	68.1	0.0	<p>In each content survey teachers were asked what they had learnt from this session of using LbQ.</p> <p>A high proportion of teachers reported that they had identified gaps in their students' knowledge; they also routinely reported that they had identified areas of competence. Less often, teachers reported that using LbQ had allowed them to identify whole-class misconceptions. Numbers for this statement seem low but are supported anecdotally by conversations with teachers at the cluster sessions and classroom observations.</p> <p>A high proportion of teachers also reported gaining an improved understanding of their class. By the third content survey teachers began to report that students were gaining confidence and were demonstrating higher levels of independent learning. Also by the third survey teachers were beginning to report that students' learning was progressing as a result of using LbQ.</p>
Teachers are able to identify whole class misconceptions			31.9	0.0	10.6	0.0	12.5	0.0	10.3	0.0	6.4	0.0	
Teachers are able to identify areas of competence in the their students	14.1	0.0	30.8	0.0	47.1	0.0	47.2	0.0	48.5	0.0	44.7	0.0	
Teachers gain an improved understanding of their class	43.8	0.0	56.0	0.0	58.8	0.0	20.8	0.0	32.4	0.0	23.4	0.0	
Teachers report an improvement in student confidence and independent learning					25.9	0.0	13.9	0.0	17.6	1.5	8.5	0.0	

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Teachers value the variety of questions in each Question Set			65.9	3.3	10.6	0.0			14.7	1.5	12.8	2.1	Content survey 2 showed a markedly higher rate of positive comments on the variety of questions. Despite the decrease in positive comments in further content surveys anecdotal evidence from the cluster sessions and classroom observations supports the claim of this statement with one teacher remarking: <i>'I find the range of questions highly effective as a teaching tool for the teacher, and enjoyable as a learning experience for pupils'</i>
Teachers think the Question Sets are adaptable to variety of teaching methods	*75.0	*0.0	*90.1	*0.0	*91.8	*0.0							As part of the first three content surveys teachers were asked to say in what way they had used each Question Set. The results showed that the majority of teachers use questions sets in a variety of ways. The most popular ways to use the Question Sets are for independent learning, as a post-teach assessment and as a starter. The number of teachers using the Question Sets for different purposes increased rapidly between the first two content surveys and remained high for the third.
Teachers can and do use LbQ as a plenary	*14.1	*0.0	*29.7	*0.0	*20.0	*0.0							
Teachers can and do use LbQ as a post-teach assessment	*54.7	*0.0	*71.4	*0.0	*76.5	*0.0							
Teachers can and do use LbQ as a pre-	*32.8	*0.0	*44.0	*0.0	*51.8	*0.0							

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
teach assessment													
Teachers can and do use LbQ as a starter	*40.6	*0.0	*47.3	*0.0	*51.8	*0.0							
Teachers can and do use LbQ for independent working	*67.2	*0.0	*81.3	*0.0	*74.1	*0.0							
Teachers can and do use LbQ for small group working	*34.4	*0.0	*45.1	*0.0	*55.3	*0.0							
Teachers find that using LbQ reduces time spent marking					77.6	5.9							
Teachers find that using LbQ saved time planning					74.1	4.7							
Teachers find that using LbQ saved time assessing student					63.5	0.0							

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
and class ability													<p>reported that time saved was spent planning lessons or on focusing their attention where needed during their lessons. One teacher commented:</p> <p><i>'So much time saved creating resources at three levels of differentiation. Analysis and marking time saved too'</i></p>
Teachers find that using LbQ saved time finding and creating resources					55.3	0.0							
Teachers find that using LbQ allows them to spend more time teaching					18.8	0.0							
Teachers report that time saved was spent focusing their attention where is was most needed					14.1	0.0							
Teachers report that time saved was spent planning					14.1	0.0							

Statements	Content Survey 1		Content Survey 2		Content Survey 3		Content Survey 4		Content Survey 5		Content Survey 6		Notes
	% Supported by	% Refuted by											
Teachers feel they can find content easily using the LbQ search function							63.9	19.4					The fourth content survey asked teachers to rate the search function. Over half the time teachers rated it as good and just under a third of the time they rated it excellent. The most frequent comment was that content could be found easily with almost two-thirds of teachers agreeing that content was easy to find.

Table 2. Outcome statements from the barriers-to-use survey

Statement	% Supported by	% Refuted by	Notes
Tablets not available/no tablets	50.7	49.3	The most common barrier to use, with over half of respondents agreeing that the lack of available tablets reduced their ability to deliver LbQ. Over a quarter of respondents also agreed that charging tablets caused problems when they wanted to use LbQ.
Difficulty charging tablets	26.8	73.2	
Time taken to set up: location and storage of tablets	32.9	67.1	The time taken to set up LbQ in the classroom was another issue. Related to the availability of tablets, one third of respondents found that the location or the storage of their tablets made using LbQ more difficult. Only a fifth of respondents had problems with students logging on. Equally a fifth of respondents had other start-up issues (comments on this barrier centre almost solely on technical issues with tablets e.g. "chromebooks not allowing the entering of info").
Time taken to set up: pupils logging on	20.6	79.4	
Time taken to set up: other start up issues	21.1	78.9	
Poor internet connection	27.4	72.6	Poor internet connection was a barrier for more than a quarter of respondents but only a small number of teachers reported that a lack of IT support had hindered their use of LbQ.
Lack of IT support	9.9	90.1	

Statement	% Supported by	% Refuted by	Notes
Questions too difficult	38.9	61.1	Content-related barriers were a problem for some respondents. Most notably, two-fifths of teachers thought the difficulty of the questions was a barrier to use, although the comments from respondents talked about this as an occasional problem rather than a chronic one. For example, one respondent noted that this was the case "only for certain Question Sets". More than a quarter of respondents felt that the wording of questions made them inaccessible for the pupils in their classes. This seems to be a problem mostly for children with low literacy. A quarter of respondents felt they were not always able to find content that reflected their school's scheme of work.
Wording in questions/feedback inaccessible for pupils	27.8	72.2	
Can't find content related to school scheme of work	23.3	76.7	
School policies require evidence of pupils work in their books	44.4	55.6	Individual school policies and culture can be a barrier to use. The second most common barrier to use was concern over meeting the evidence requirements of the school. Teachers commented on how much emphasis was put on evidence in books at their school e.g. "Evidence in books is very important at my school. They want to see evidence in books". The majority of respondents felt that their use of LbQ was well supported by their senior management team and did not feel the SLT was a barrier to using LbQ.
Lack of senior leadership team support	11.4	88.6	

Table 3. Outcome statements from the final cluster survey

Statement	% Primary Agree	% Primary Disagree	% Secondary Agree	% Secondary Disagree	Notes	Supporting evidence from open questions
Teachers enjoy using LbQ in their lessons	100.0	0.0	97.0	3.0	There was virtually no difference (less than 5% points) between the support of primary and secondary teachers for these statements	<i>'I have found it to be an amazing teaching and learning resource - I wouldn't want to ever be without it now!'</i>
Teachers feel that students enjoy learning maths more when using LbQ	98.1	1.9	93.9	6.1		<i>'Kids genuinely enjoy using the software and it makes maths fun'</i>
Teachers feel that LbQ helps them differentiate within their classes	98.1	1.9	97.0	3.0		<i>'Differentiation is quick and easy'</i>
Teachers believe they are able to intervene more effectively when using LbQ	98.1	1.9	97.0	3.0		<i>'It's a tool that empowers you to intervene quickly and effectively'</i>
Teachers report that LbQ reduces their workload	94.2	5.8	93.9	6.1		<i>'I love how it has reduced my workload'</i>

Statement	% Primary Agree	% Primary Disagree	% Secondary Agree	% Secondary Disagree	Notes	Supporting evidence from open questions
Teachers find it easy to use LbQ in their lessons	100.0	0.0	93.9	6.1	Responses to the survey show a high level of agreement (5-10% points of difference) between primary and secondary teachers for these statements	<i>'It's easy to use, saves time and helps pupils to complete more work each lesson'</i>
Teachers believe the pedagogy used in LbQ is the future of teaching	100.0	0.0	93.9	6.1		<i>'I absolutely love it. I definitely think this is the future for education'</i>
Teachers report that LbQ saves time marking	98.1	1.9	90.1	9.1		<i>'Have spent less time marking maths books but got great assessment information'</i>
Teachers find that the quality of questions in LbQ compare favourably to other resources	96.2	3.8	87.9	12.1		<i>'The quality of the Question Sets is better than other resources on the market, especially in preparation for KS2 SATs, it has been invaluable'</i>
Teachers feel their lessons are more effective when using LbQ	94.2	5.8	84.8	15.2		<i>'My teaching has become sharper, I teach what I need to teach to the children who I need to teach it to'</i>
Teachers report that students using LbQ have gained in confidence	98.1	1.9	87.9	12.1	Responses to the survey showed differing levels of support (10-15% points) for this statement from primary and secondary teachers	<i>'I would encourage the use of LbQ as it increases children's confidence in maths and decreases the fear of failure'</i>

Statement	% Primary Agree	% Primary Disagree	% Secondary Agree	% Secondary Disagree	Notes	Supporting evidence from open questions
Teachers feel their students have achieved greater academic progress as a result of using LbQ	98.1	1.9	78.8	21.2	There was a notable difference between responses from primary and secondary teachers for these statements (15-20% points)	<i>'It has revolutionised the teaching in my classroom. The progress, attainment and engagement of pupils in my class has vastly improved'</i>
Teachers find they are better able to plan and prepare lessons using LbQ	94.2	5.8	75.8	24.2		<i>'It has made planning lessons much easier. It takes hardly any time to plan but is still very effective at promoting pupil progress'</i>
Teachers find LbQ helps with classroom management	92.3	7.7	75.8	24.2		<i>'The mastery style questions stretch high ability kids ... more challenging kids stay focused in class instead of being off task'</i>
Teachers report that LbQ saves up to 1 hour each week	17.3		27.3		Primary and secondary teachers felt differently about the amount of time saved each week by using LbQ. The modal average of time saved for both sets of teachers was 1-2 hours per week. However, primary teachers were far more likely than secondary teachers to report larger time savings. Only three secondary teachers reported saving 3-4 hours per week and no secondary teachers reported saving over 4 hours per week.	<i>'I love the way that it has given me time back. Not having to produce resources, plan or mark as much has helped massively with my work / life balance.'</i>
Teachers report that LbQ saves 1-2 hours each week	51.9		69.7			
Teachers report that LbQ saves 3-4 hours each week	19.2		3.0			
Teachers report that LbQ saves over 4 hours each week	11.5		0.0			

Table 4. Outcome statements from the pupil survey (closed questions)

Question	% Primary agree	% Primary not sure	% Primary disagree	% Secondary agree	% Secondary not sure	% Secondary disagree	Notes	Supporting evidence from open ended questions
Pupils value the LbQ feedback and feel it helps them to learn	63.2	26.8	10.0	58.5	29.9	11.6	Positive answers to these questions had little variation (5-10% points) between primary and secondary pupils. For those questions that offered the opportunity to answer "not sure" pupils had even lower levels of difference for negative answers (1-2% points). Pupils answer more positively when asked questions about how using LbQ makes them feel. They answer slightly less positively when asked questions about how LbQ affects their learning.	<i>"some questions are challenging but the feedback when you get something wrong makes you want to try again and not want to give up"</i>
Pupils report that using LbQ has made them feel like they are better at maths	82.5	-	17.5	75.7	-	24.3		<i>"Because of LbQ I now feel much more comfortable with my strategies and I feel like I have become better at maths"</i>
Pupils enjoy using LbQ in lessons	77.4	21.6	1.0	69.3	28.1	2.6		<i>"I can learn this stuff in normal lessons but it is fun using LbQ"</i>
Pupils feel they learn more using LbQ than they would otherwise have done	60.7	32.4	6.9	52.2	40.3	5.5		<i>"It helps you learn a lot more than you doing it on paper would"</i>
Pupils think that using LbQ has the power to positively change peoples' minds about their natural aptitude for maths	88.5	-	11.5	79.0	-	21.0		<i>"They can change their minds about what they thought about maths in the past"</i>

Question	% Primary agree	% Primary not sure	% Primary disagree	% Secondary agree	% Secondary not sure	% Secondary disagree	Notes	Supporting evidence from open ended questions
Pupils think they are better at maths because of LbQ	62.8	29.0	8.2	51.3	40.0	8.7	Positive answers to these questions showed a slight difference between primary and secondary pupils (10-15% points). Negative answers again show only minor differences between the two age groups (1-2% points).	<i>"It makes them better at maths and reasoning and problem solving"</i>
Pupils value the opportunity LbQ gives them to learn from their mistakes	77.5	14.4	8.1	69.3	20.6	10.1		<i>"I think they should use LbQ in lessons because it helps them learn (from) their mistakes"</i>
Pupils report that LbQ has improved their confidence in maths	74.4	17.7	6.9	61.4	29.3	9.3		<i>"Because of LbQ I feel lot more confident in my ability in maths lessons"</i>
Pupils agree that using LbQ makes maths more enjoyable	62.8	24.4	12.8	46.4	35.5	19.1	This question showed a greater difference in the positive opinions between primary and secondary pupils (16% points). It also showed a greater difference between the negative answers of the two age groups (6% points). This suggests a definite division between the two groups. Primary school students are more likely to agree that LbQ makes maths more enjoyable than secondary pupils are.	<i>"it is great fun and makes maths more enjoyable"</i>

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