



Department
for Education

Developing a method for obtaining pupil insight for Building in Use reviews

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Outline

This report details exploratory research undertaken by Newcastle University from November 2022 to May 2023. The aim of this exploratory project was to develop, trial and evaluate approaches to providing indications of how outdoor space is being perceived, used and valued by students in four schools – to ascertain which approach (or approaches) may be best suited for use as part of Building in Use (BiU) reviews.

The report details the three digital methods tested, as well as the enablers and barriers encountered while using them.

The digital tools developed can be used individually to obtain limited data, but a combination of several methods is most and can be combined with information from the BiU site visit and staff survey in providing an overall BiU assessment. However, there are barriers to this including financial outlay, support from schools, and the time and effort required to create the data collection tools, even with the templates and prototypes that we detail in the report.

We recommend initial discussions between the BiU technical adviser (TA) and school about tools, so that these can be chosen to fit with school procedures, especially relating to online access, and also fulfil particular needs of a specific BiU review. This would form part of a developed relationship between TA and school, beyond the existing one of schools accommodating data collection using pre-specified methods, which would also include feedback from the TA to the school.

Executive Summary

This report details exploratory research into how different digital approaches and technologies could be used to gain insight into how outdoor space is being perceived, used and valued by students in a sample of four schools and to ascertain which approach(s) may be best suited for use as part of DfE Building in Use (BiU) reviews.

The overarching aim was to answer the following research question: What is the most appropriate and efficient method of obtaining views from secondary school pupils (KS3 and KS4) on how school ground space is used and valued by them?

Digital approaches to explore and test were developed to minimise the need for expensive experts on the ground or technical apparatus, as students themselves collect the data. Success of the approaches were judged on the basis of the value of the data and understandings they generated, the ease of utilising them within the normal Building in Use (BiU) process and the extent to which they fitted within normal school procedures and practices.

Four partner schools were identified, two in the North of England (NE1 and NE2) and two in the Midlands (BM1 and BM2). Initial inquiry consisted of meetings with school leaders and site staff at NE1 and NE2 to establish potential digital methods of data collection. Focus groups were then held with a diverse range of year groups from two schools, exploring three elements: (i) outdoor locations (dis)likes; (ii) digital technology use and options to gather opinions; (iii) development of poster designs. Based on the data analysis from the focus groups, the team developed and trialled three digital tools to generate and collect student views that could be used in any combination.

The table below highlights the five digital approaches considered during initial development work. Three approaches were felt viable to test: online questionnaire, PosterVote and use of QR codes.

Table 1: Digital approaches considered during initial development work

Workshop 1: 6th form	Workshop 2: years 9-11	Workshop 3: years 7-8
Mobile phones School wi-fi on own devices and via computer rooms, laptops, iPads.	No mobile phones School wi-fi only in/on school's computer rooms, laptops, iPads.	No mobile phones School wi-fi only in/on school's computer rooms, laptops iPad access depends on teacher.
Online questionnaire Distributed via school channel. Done during lesson/form time.	Online questionnaire Distributed via school channel. Done during lesson/form time.	Online questionnaire Distributed via school channel. Done during lesson/form time.
Location-based: Posters Only if officially by school.	Location-based: Posters Placement important Additional notification needed.	Location-based: Posters Placement important. Additional notification needed.
Location-based: QR codes Yes, but no QR stickers (misuse).	Location-based: QR codes No, because no phone use.	Location-based: QR codes No, because no phone use
Online forum/discussion Yes, Teams or Discord. Caveat: school policy.	Online forum/discussion Kahoot mention (game-based).	Online forum/discussion Fear of arguments (bullying?).

Approach 1: Online questionnaire

The questionnaire's aim was to collect views on the specific outdoor locations, informed by surveys previously developed to collect student views of school space in Portugal (Coelho et al., 2022), but also to enable respondents to express ideas about other places that are important to them.

The questionnaire's five outdoor locations included entrance areas, a sports area and three circulation/social spaces (a second sports area was included by two schools resulting in six locations). The schools supplied photographs of these locations. The questionnaire had a series of questions replicated for each location, again informed by the survey of Coelho et al. They were designed to be completed independently by students in a short amount of time and were accessible for all ages. All schools opted to use try this approach.

Approach 2: PosterVote

PosterVote is a low-cost electronic voting system for communities and activists (Vlachokyriakos et al., 2014). The approach allows questions to be asked using a physical poster at a specific location. The system collects votes for each answer electronically, and the results can be downloaded using a mobile phone. Posters were designed in collaboration with the schools, giving each school an element of control in the design. The structure of the poster was the same in each location and each school. All schools opted to try this approach, also.

Approach 3: QR codes

QR codes can be used to collect views at specific locations, but also enable more discursive commentary about the place. Codes are placed in the locations and scanned by a pupil using their mobile phone. This directs them to a website which uses prompts to collect open text responses. The pupil can respond to questions, leave comments about the location on the map, and respond to previous comments linked to that location.

Only one school (BM2) chose to use the QR codes. The two northern schools (NE1 and NE2) were actively involved in the development of the tools, through the student focus groups and staff offering suggestions on the poster design and the wording of the online questionnaire. All the schools provided photographs of the specified locations, and supplied additional information such as how the questionnaires would be distributed.

Findings

This project succeeded in generating information about pupils' perceptions and values of their schools' outdoor space, as well as providing indications of how specific locations are used. The research process initiated discussion within the schools and was seen by school leaders as contributing useful information while also providing recognition of student views in a way that they found valuable. Students seemed pleased to be included in the conversation. Some of the partnership working was unique to this exploratory stage research and would not be required for scaled up use of this approach within BiU. Some collaboration, however, would continue to be required: providing images for the questionnaire, school logo for PosterVote and QR codes and installing PosterVote and QR posters on the school site.

Although there were clear overlaps of their experiences with reports from staff about how students used spaces, there were details revealed in all the schools that had not otherwise come to light. Overall, the approaches enabled information to be generated that could be combined effectively with staff views and our own observations of the school, creating a more complete understanding of how school external space is

experienced and used. The approaches trialled could be extended to consider other areas of the school used by students, such as indoor social spaces, formal learning space and specialist provision such as libraries, laboratories and craft rooms.

The approach best suited to Building in Use reviews

No single approach emerged as a clear “fit” for DfE BiU reviews, but all three can be used in combination, working with the school having a review to select the most appropriate approach(s) for their specific context, circumstances and policies.

The online survey produced a substantial body of data, sometimes corroborating other information, but also providing additional detail. PosterVote provides a revealing approximation of actual frequency of usage in the number of button presses at each location, particularly highlighting areas that appeared under-used, which could be useful to schools and school designers. The QR codes produced further pupil comments, but these were similar to responses to open questions on the survey. Although the least successful tool during our trialling, due to school policies about online access and limited engagement, QR codes could be very suitable in a school or college with student Wi-Fi. Implementing this approach is straightforward for schools and reviewers so could be incorporated into BIU easily.

The online survey suggested that all the spaces across all the schools were overwhelmingly used by students in pairs or groups. In contrast to the questionnaire, the posters recorded considerably more instances of being ‘on my own’, with this being the most common response, often overwhelmingly so. This difference is due to demand characteristics of the methods of data collection, in that pressing the buttons is more likely to be an individual activity, while surveys rely on self-report by students who see school as an essentially communal experience.

Insights from pupils on use of external space

Most of the spaces were visited frequently, with virtually all the spaces being experienced either ‘several times a day’ or ‘every day’ by more than three quarters of the students who answered the questionnaire. Responses recorded by the posters tended to amplify the slight differences in frequency of visits evident through the survey, but most were similarly suggestive of busy places. That the outdoor places are important to the students is frequently evident in the open responses on the survey, with general liking for most spaces also shown here and through the questionnaire star ratings. Younger students tended to be slightly more positive about all the spaces than older ones.

Broadly, the data suggests that there are two types of spaces: active spaces where students either ‘just pass through’ or engage in physical activities, but some students ‘rarely’ or ‘never’ visit, and mixed spaces that appear to be used frequently across the

student body for a more diverse mix of activities. In two of the schools, entrance areas were not active areas but mixed areas where students reported that they did most, if not all, of our range of activities 'often' or 'always'.

Recommendations

We recommend including student views within the existing BiU process, using the tools we have trialled.

We also recommend a more developed relationship between the Technical Adviser (TA), who is contracted to conduct the review, and school, beyond the existing one of schools accommodating data collection using pre-specified methods. This would recognise the existing reliance on school cooperation and give more ownership to the school. The developed relationship would include initial discussions between the TA and school about data collection tools, so that these can be chosen to fit with school policies and procedures, especially relating to online access, and also fulfil particular needs of a specific BiU review (e.g., PosterVote could be chosen where the review is concerned with use, or underuse, of particular places). Although the least successful tool during our trialling, due to limited engagement, QR codes could be very suitable in a school or college with student Wi-Fi. The approach could be extended to evaluate other areas of the school and can be incorporated into the existing BiU surveys. Combining digital tools enables triangulation of views, but there are barriers to this, particularly relating to school policies and practices, but also to the time and budget available for the review.

Also recommended is adding a feedback loop from TA to school so that changes can be implemented from an educational and organisational perspective to how existing spaces are used based on the findings.

Introduction

Context of the research

Post-occupancy evaluation (POE), investigating a building once in use to see if it is working as intended, requires a balance to be struck between depth of evaluation and costs (financial, but also in terms of time and the expertise required). POE is impoverished if it focuses on physical performance without understanding the social values and intentions the built environment might, or might not, be serving (Cooper, 2001; Hay et al., 2018). Any omission of these social aspects in a school building is particularly problematic since education is a complex and value-laden process, and schools involve many different types of user, all with different roles, needs, perspectives and priorities (Woolner et al., 2010). Yet, because users' choices, behaviours and routines are essential to understandings of space, these different perspectives also hold the potential to enhance POE, if they can be accessed and brought together. As a main, diverse, group of users, students are important to a complete evaluation, but are not currently directly involved in the DfE's Building in Use (BiU) reviews. Furthermore, there is some research evidence that students' POE views might differ in some respects from those of teachers (Newton and Cleveland, 2015; Woolner et al., 2022).

The intention therefore of this research was to investigate possible ways to include students' experience within BiU reviews of recent school builds. This report focuses on students' experience of school grounds since there is very little understanding of how schools are using their outdoor spaces, despite enthusiasm for getting children outside to improve physical and mental health, and previous findings of secondary school students using, and valuing, outdoor space more than staff do (Woolner et al., 2010). It considers whether and how this additional information contributes, on the one hand, to increase overall understanding of the success of the building (in both physical and educational terms) and, on the other, to offer qualitatively different judgements from those produced by other means (i.e. BiU site visits, meetings with key staff and surveys of staff).

Aims, objectives and methodology

Our overarching aim was to answer the following research question: What is the most appropriate and efficient method of obtaining views from secondary school pupils (KS3 and KS4) on how school ground space is used and valued by them?

We trialled a number of approaches to the digital collection of student-generated data about their use and experience of outdoor space in four recently completed school builds or refurbishments. Digital approaches were developed to minimise the need for expensive experts on the ground or technical apparatus, as students themselves collect the data. Success of the approaches were judged on the basis of the value of the data

and understandings they generate, the ease of utilising them within the normal BiU process and the extent to which they fit within normal school procedures and practices. Strengths and weaknesses of the approaches are reported and discussed, with recommendations for future use, in relation to school grounds and other areas of the school site, presented.

Research methods

We worked with the DfE to establish four partner secondary schools: two in the North East of England (NE1 and NE2) and two in the Midlands (BM1 and BM2). Data was collected on the needs of the individual schools and their responses to the trialling from headteachers, and appropriate school staff (including teachers, IT support and site management staff) through interviews and observations (during site visits and via video conferencing and email). Focus groups were conducted with students before and during trialling to discuss the use of mobile and more static digital technologies as ways to enable students to generate data.

Stage 1: Meeting school staff

To investigate what approaches to POE student views appear viable for schools, the team held meetings with the headteachers and staff with technology responsibilities across all four schools. Discussion centred on gauging the schools' interest in participating as well as identifying benefits of and challenges to the project, including school policies related to the use of digital technology in school.

Stage 2: Student focus groups

The research team then ran three focus groups at NE1 and NE2 in December 2022, focused on identifying questions about outdoor spaces and ideas on use of digital technology. Three focus groups were run separately with students from Years 7-8, 9-11 and the 6th form, using site plans, visual prompts and, in the case of Years 7-8, a short poster design session. The focus groups had three parts: (i) outdoor locations (dis)likes; (ii) digital technology use and options to gather opinions; (iii) development of poster designs.

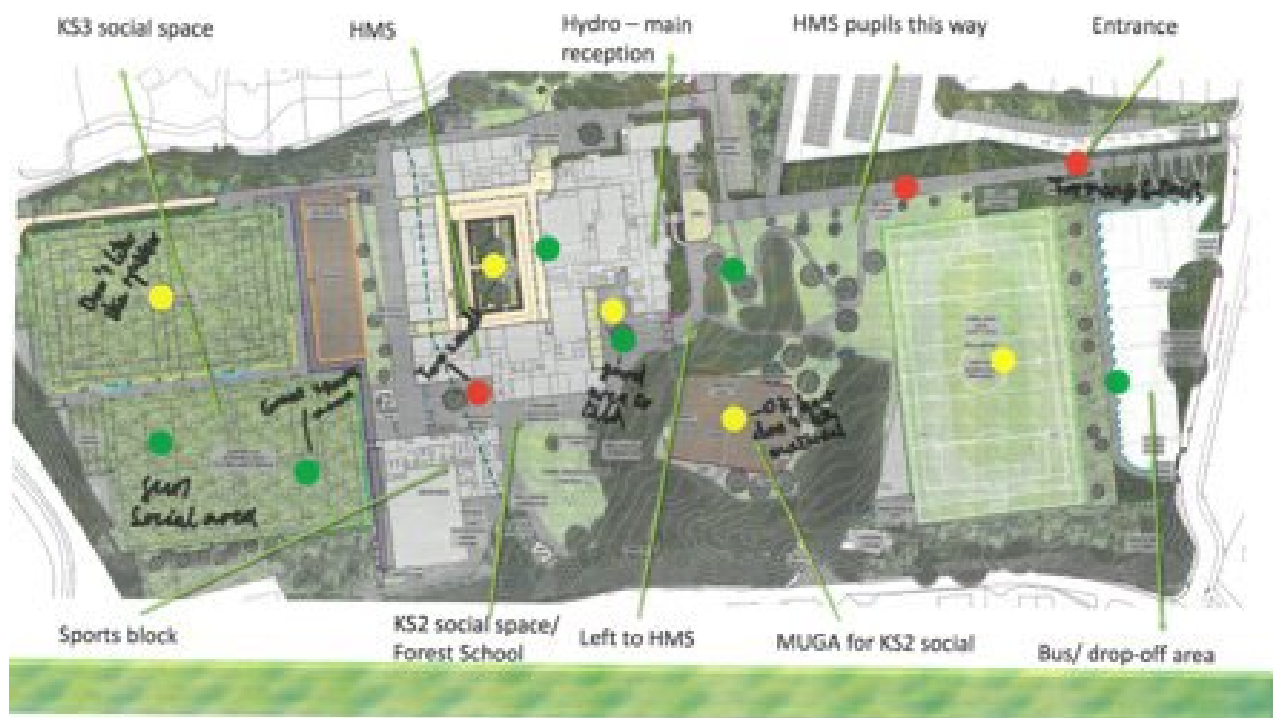
Focus groups are useful in generating a rich understanding of participants' experiences and beliefs (Gill et al, 2008: 293). Group size is important, and the research adhered to the guideline of 6-8 participants to ensure effective discussion. A disadvantage of focus groups can be that the group is influenced heavily by one or two dominant individuals, and other members may be discouraged from participating due to a lack of confidence or weaker communication skills. The focus groups were led by a moderator from the research team, who asked questions to the group, monitored the time, and ensured that one participant did not dominate the group, that focus group guidelines were adhered to, and that all participants felt safe and secure. Data collection can also be impacted by the

environment and setting of the focus group, so care was taken to conduct the focus groups in an art classroom which was known to most of the participants, with a known art teacher in the room.

The team analysed the data gathered through the focus groups, consisting of audio recordings of the discussions; observer fieldnotes (two members of the research team who did not act as moderator); annotated plans; and poster designs. Thematic analysis was used to establish key viewpoints from across the three focus groups and the findings were used to help inform the next steps of the research.

The young people described diverse experiences and uses of outdoor space, within and beyond school. Their views on places within the grounds intertwined their experiences of the physical places with organisational aspects, particularly restrictions. This complexity was captured by the discussion and the stickers (red for dislikes, green for likes and yellow for ambiguity) and comments added to the school plans. An example of these annotated plans is shown in Figure 1.

Figure 1: Annotated school plan showing pupil views of external spaces

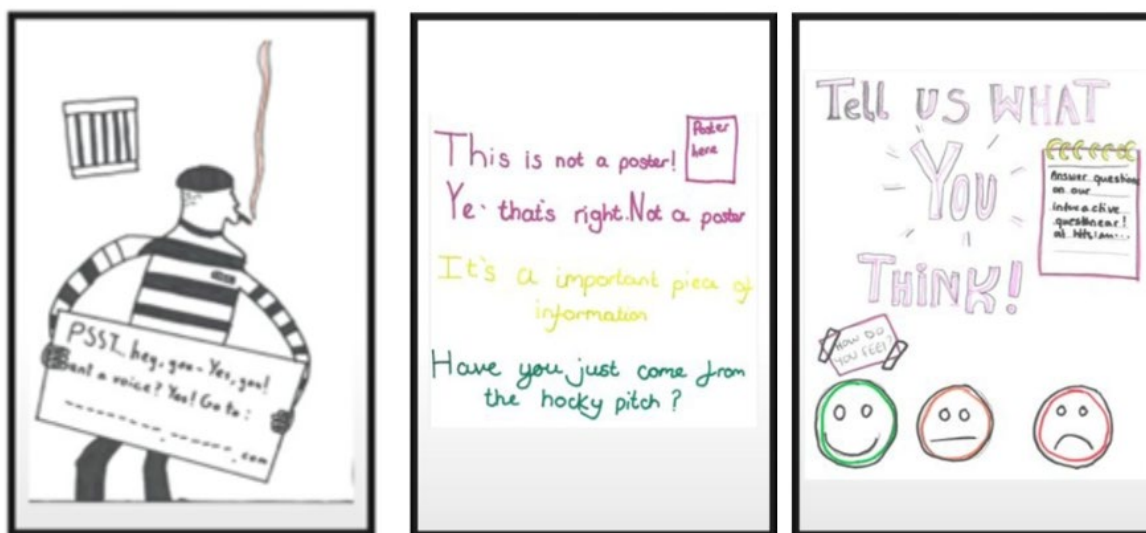


Regarding technology, the students relayed the school rules on use of electronic devices, which would limit the digital approaches to student voice, but they were positive about alternatives, such as online surveys and stand-alone digital data collection using posters. The students also suggested ways for the schools to distribute information about and

encourage use of such digital tools, which we offered up in conversations with school leads, who later implemented some of them.

Through the poster designing activity, the students provided us with priorities and ideas for the posters we developed to collect data. The students' suggestions for poster design centred on being eye-catching and the avoidance of being 'just another poster' (as shown in Figure 2 for designs, including some subverting poster conventions), while also needing to look officially sanctioned so they would not be removed. These intentions were incorporated into our final poster designs, although we opted for simpler graphic design.

Figure 2: Pupil poster designs



Development of digital approaches to obtain pupil insight

The team developed three digital tools to generate and collect student views that could be used in any combination.

Approach 1: Online questionnaire

The questionnaire's aim was to collect views on the specific outdoor locations, informed by surveys previously developed to collect student views of school space in Portugal (Coelho et al., 2022), but also to enable respondents to express ideas about other places that are important to them. The questionnaire was hosted at Newcastle University Open Lab using SurveyMonkey. This platform was chosen because it allows the incorporation of images, which are needed to pinpoint the places being discussed, while also adhering to GDPR regulations through data storage being within the EU. Each school was able to

decide how to distribute a link to the survey to their pupils, making use of school communication methods and class time as appropriate.

The questionnaire's five outdoor locations included the entrance area, a sports area and three circulation/social spaces (a second sports area was included by two schools resulting in six locations). Photographs of these locations were supplied by the individual schools. The questionnaire had a series of questions replicated for each location, again informed by the survey of Coelho et al. Figure 3 shows, for one school and one location, the opening pages of questions. A generic version of the survey is available at the following location: [Student opinions on outdoor spaces](#)

Figure 3: Pages from online survey

* 1. Do you know this place?

Yes
 No

NEXT

0 of 39 answered

* 4. When I'm here I...

	Always	Often	Sometimes	Rarely	Never
... am just passing through	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... read or think	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... talk with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... play a game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... do school work on my own	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... do school work with my friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... do some sport	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... play active games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For each location, the image page was followed by questions about frequency in the place, who the student is usually with and options for activities, with an indication of frequency for each. Finally, the respondent was asked, 'How many stars would you give this place?' (closed question with options from one to five) and 'Is there anything else you'd like to tell us about this place?' (open question that did not require an answer)

Figure 4: Using school plan to ask about favourite place

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	KS3 social space		HMS			Hydro – main reception			HMS pupils this way				Entrance			1
2																2
3																3
4																4
5																5
6																6

Favourite place(s):

- Please use the grid coordinates to show us the place in the image. For example: D4 for the MUGA.
- Please explain why you like this location

After the specified locations, respondents were asked to identify their favourite place(s) and least favourite place(s) by using simple grid coordinates to pinpoint areas on either a plan (Figure 4), used with two schools, or an aerial photo (Figure 5) taken from Google maps and used with the other two schools.

Figure 5: Using an aerial view to ask about least favourite place

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1																1
2																2
3																3
4																4
5																5
6																6
7																7
8																8

Least favourite place(s):

- Please use the grid coordinates to show us the place in the image. For example: E6 for the chess boards.
- Please explain what is wrong with this place and what could be done to make it better

The questionnaires were designed to be completed independently by students in a short amount of time and were accessible for all ages. They were piloted with two students from KS3 and KS4 at other schools. The multiple-choice responses were required answers, and it was necessary to select one before moving on, but respondents could move to the next location by selecting 'no' in answer to 'Do you know this place?' or 'never' in answer to 'how often are you here?' The activity options for each location included 'just passing through' for only two of the schools as this was a later addition.

Approach 2: PosterVote

PosterVote is a low-cost electronic voting system for communities and activists (Vlachokyriakos et al., 2014) developed in a collaboration between OpenLab at Newcastle University, Microsoft Research, Northumbria University and City University of London. The developers suggest that it is a simple and cost-effective place-based way of collecting local opinions or testing out an idea with a community, and more engaging than an online survey. The approach allows questions to be asked through a poster at a specific location. The system collects votes for each answer electronically, storing them locally without the need for internet access, and the results can be downloaded using a mobile phone. For this project, PosterVotes were placed at specific outdoor locations tailored to each school, enabling pupils to give their views about that specific place whilst in that location.

The posters were designed to accommodate somewhat the views of both the leadership team and pupil focus groups, attempting to be both striking and 'official'. Colour schemes and logos were adapted to suit each school. This gave each school an element of involvement in the design. The structure of the poster was the same in each location and each school, as shown in Figure 6, which shows an initial design and the final designs, after discussion with staff, for two of the schools.

Figure 6: Developing a design for PosterVote



Each poster collected pupil views at the specific locations by asking three closed questions: 'Who are you here with?'; 'What are you here to do?'; and "How would you rate this location?" These questions had a series of multiple-choice options, with an LED and button strip on the back of the poster, sandwiched between poster and backing

acrylic which recorded the buttons pressed. Students were asked to rate the location by selecting the appropriate number of stars on a Likert-style scale. These were essentially the same location questions as used on the survey, but without the frequency of use aspects as these are captured by the quantities of presses recorded.

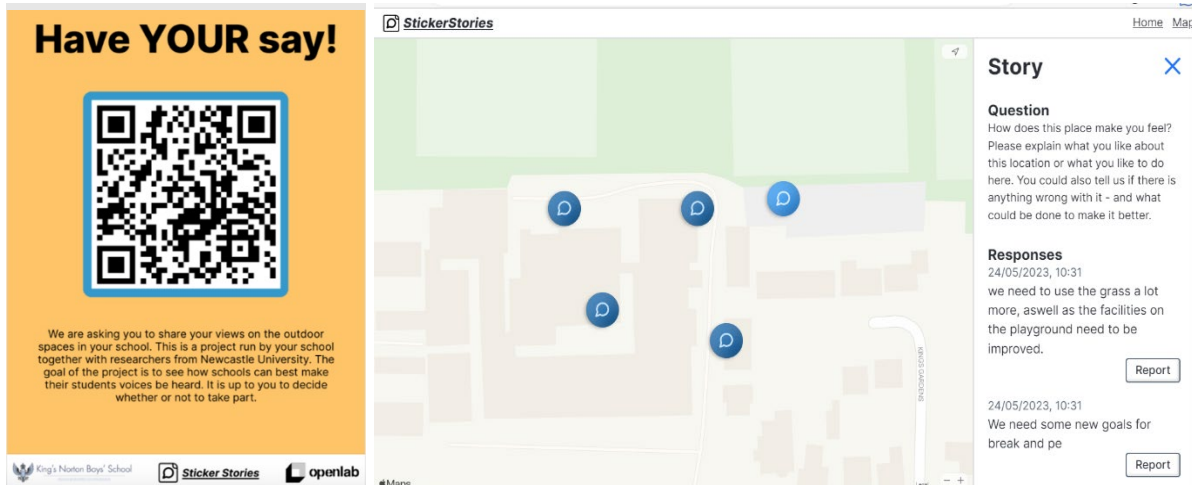
The posters can be ordered through the website (<https://postervote.openlab.ncl.ac.uk/>), but for the trialling they were printed, laminated and attached to pieces of backing acrylic that incorporated plastic brackets for fixing. They were then physically delivered or posted to the schools who placed them in the required locations.

For the trialling, the research team printed and assembled the posters. Instructions were given to the schools on how to place the posters and the schools sent back a what3words coordinate for each poster so the collected data could be matched with the correct location. Some school staff initially struggled with what3words and found it easier to send an aerial view of the school with positions marked. Even when schools sent what3words coordinates, small errors in the words (e.g., tenses or plural/singular) were observed.

Approach 3: QR codes

QR codes can be used to collect views at specific locations, but also enable more discursive commentary about the place. Codes were placed at locations around the site which could be scanned by a pupil using their mobile phone. This directed them to a website which uses prompts to collect open text responses about the locations, which are displayed as points on a map (as shown in Figure 7). Pupils could respond to questions asked about their experiences, leave comments about the location on the map, and respond to previous comments linked to that location. Pupils were also given an option to report comments. All comments were moderated, first by Artificial Intelligence (AI) with additional moderation by the research team as required.

Figure 7:A QR code poster and the website revealed when scanned



Use of these tools with the four pilot schools

All four schools opted to trial the online survey and the posters, but only one school (BM2) chose to use the QR codes. The other three schools were not able to accommodate it since they prohibit student use of phones in school unless expressly directed by a teacher during a lesson. Even in the school that trialled QR codes, where phone use was permitted at break times and outside the building, there was no student Wi-Fi. These limitations on student use of digital devices have clear implications for approaches to POE data collection from students.

The two northern schools (NE1 and NE2) were actively involved in the development of the tools, through the student focus groups and staff offering suggestions on the poster design and the wording of the online questionnaire. In contrast, the research team were able to adopt a hands-off approach with the two schools in the Birmingham area. This gave the opportunity to see how much direct assistance and support the schools needed to implement the data collection tools.

All the schools provided photographs of the specified locations for the tools to be tested. The methods were mainly rolled out in stages to schools due to development issues and school requirements. An online link to the questionnaires was provided to each school, while the posters which were either delivered in person or posted to the schools, and finally the QR codes were sent electronically, as PDFs, to the school trialling these. In all schools, the questionnaires were made available at the same time as the posters.

Findings

Assessment of the three approaches trialled

There are characteristics of each data collection tool that need to be considered when judging which tool or combination of tools is appropriate. There were differences in the data collected by the different tools, which is to be expected given what is known in social science about the way a range of research methods will reveal different aspects of the experiences of a group of young people (Darbyshire et al., 2005). It is necessary to consider when the information from one approach might be consistently more useful, when and where each have particular strengths, and if more than one tool is needed to provide a more complete understanding.

In the following sections we present each data collection approach and consider their effectiveness in terms of the value of the data and understandings they generate, the ease of utilising them within the normal BiU process and the extent to which they fit within normal school procedures and practices.

Approach 1: Online questionnaire

The survey produced a substantial body of data, sometimes corroborating other information, but also offering additional details to produce a more complete understanding of the use of the spaces. Online surveying of students could be fitted in a straightforward manner alongside the online staff surveys already conducted within BiU reviews, although the inclusion of images supplied by the school, which we recommend, can cause delays. Online questionnaires are particularly simple to fit with normal school practices, but school policies about online access will affect when and how the survey is completed.

For the trialling, a questionnaire was preliminarily designed by the research team, and suggestions were sought from the schools, particularly NE1 and NE2 who were involved from the early stages of the project. These suggestions led to some changes and demonstrated that an element of 'insider knowledge' of the school and the students was useful when designing the survey questions. For instance, a 'just passing through' option was suggested, and this proved to be a sensible addition. It was made in response to particular concerns about students lingering in entrance areas but was chosen by students across the range of locations and would have been useful to include across all the schools.

Questionnaires were drafted more quickly for the Birmingham schools (BM1 and BM2), who were offered less opportunity for feedback on question wording, and, in fact, seemed very satisfied with sending five photos, as requested, featuring the sorts of space we

described (an entrance area, a sports space and three social or circulation spaces). BM1 used photos taken professionally of their new building, which the head teacher had easily to hand, but which were not always the most suitable view to pinpoint a particular location. At BM2, new photos were taken, which enabled the questionnaire to reflect much more precisely the spaces that the school was concerned about, but which caused a delay as they needed to be produced.

The questionnaire generated a lot of data, providing insights into student experiences of the specific locations and a sense across each school of how the outdoor spaces are valued and used. Despite our aim of producing a survey of appropriate length, there were quite a number of unfinished questionnaires. Answers given to the optional open question about each space showed that many students had not realised that it was optional, which might have contributed to the questionnaire being experienced as over-long. Referring to five locations, instead of the six requested by two schools, certainly seems sensible. For the students who reached the end, the request to provide grid coordinates of favourite and least favourite places worked well to generate responses. These mainly corroborated answers given to earlier questions, but also provided information about additional spaces and more detail about students' values and views. It seems that the vast majority of students were able to understand and use the co-ordinates system, both on school plans and on aerial views.

Responses also suggested that all the spaces across all the schools were overwhelmingly used by students in pairs or groups. For example, responses from BM1 followed this pattern, although the proportion of 'in a group' to 'with a friend or two' varied across the places, the percentage of 'on my own' responses was generally less than 10% and never more than 20% (with this highest percentage found for the entrance area, Q1). As will be discussed in the following section, this was not the pattern found in the PosterVote data.

Across the schools, the spaces where at least some students report being 'usually' alone were not always predictable (e.g., the steps just inside the entrance at BM1 that are used by 20% of students on their own and to do schoolwork). Spaces that seem designed for quiet didn't seem to be used that way, with areas of benches being used for various active games and sport, mainly in company. The centrality of friends to the student experience comes through in both the popularity of the questionnaire options to be with someone and in many of the free text answers. For example, a student identifies their favourite place and explains, "*I sit at the bench there with my friends every break and lunch*" (BM2).

Unlike PosterVote, the questionnaire can be used to ask students about areas that the school does not like them lingering in or which are inaccessible during the school day. This proved useful during the trialling and makes the questionnaire more appropriate for generating student views about other school spaces, particularly formal learning spaces.

It would be possible to ask students about spaces that students rarely or never use, such as school offices, but schools might resist this. It is also arguable whether pupils could offer the desired insights about spaces they do not regularly use.

A limitation of any questionnaire is that it relies on self-report, what people think they do rather than what they actually do. As will be seen in the next section, this difference could produce misleading conclusions, most notably in relation to whether students are alone or in company. Yet the questionnaire responses remain valuable as indications of student perceptions, if not always of pure usage of space.

Online surveying is familiar and well-understood, with many available platforms that could be used to produce an online questionnaire. It must be noted, however, that free versions of these platforms generally do not allow images to be added or do not embed them well enough (this is the case with Microsoft Forms). Some other platforms do allow images, but a strict interpretation of GDPR regulations suggests that they should not be used (e.g. Google Forms embeds images effectively, but data may be stored outside the EU).

Many schools have a 'no phones' policy for all students, with concerns of distraction from learning and bullying via social media. This means that online questionnaires can only be completed using a school-authorized device or in students' own time. As might be anticipated, supplying a link to the survey did not produce the quantity of responses that was generated when schools organised completion by whole classes. With voluntary completion, responses also tended to be skewed to the younger students, probably as they were more responsive to encouragement from both school staff and parents.

Approach 2: PosterVote

PosterVote collects data that are less immediately explicable than a questionnaire and proved the most practically challenging of the methods, due to the process of creation, positioning in the right places in the schools outside space and maintaining. Yet it could be fitted within a BiU review relatively easily as it requires less active collaboration with the school. Furthermore, it appealed to school staff and students, and was easily accommodated within school procedures, particularly as it does not need any online access or connections.

Posters were delivered by the research team to NE1 and NE2, and they were therefore on hand advise on poster fixing and positioning. For BM1 and BM2, the research team sent the posters by mail, and the schools then put the posters up in the required locations and sent what3words coordinates to identify these. This method of 'post and put up' was relatively successful, but better guidance was needed for fixings and positioning, which can now be provided due to this trialling.

There were practical barriers to the use of the posters. Poster fixings broke and so a mixture of alternative fixings was used by the schools, including tape and screws. Posters were not always placed as first intended due to limitations on fixing and suitable surfaces to fix to. BM1 lost several posters through strong winds but was able to retrieve them, one of which was returned by a member of the public who found it in the school vicinity. This illustrates the importance of putting a school's logo on the posters. BM2 lost one poster, possibly due to weather conditions, which could not be found, and one poster at BM1 was too badly damaged for data to be retrieved. There were also gaps in the data from NE1 and NE2, which the staff member reported as due to damage or faults.

Across the schools, staff made attempts to show students how to use the posters 'properly' and expressed reservations about how they were using them. Comments from NE1 and NE2 (email 12.5.23) stated that "*feedback from staff (particularly in NE2) have suggested that students haven't always been completing these [posters] as instructed, with some students just pressing buttons randomly, or students standing and pressing a number repeatedly. I don't think this method has worked as well as I had expected it would*". However, there was also lots of positive feedback from the schools involved. The posters were seen as a "novelty" (all schools) and they "*provoked conversation*" (BM1 and BM2).

A distinctive feature of PosterVote is that the posters are located. This provides both the benefit that there is no confusion about the place being considered, which could be a problem with the questionnaire, but also the limitation that student responses might be too specific.

Two of the questions used on the posters produced data that varied quite dramatically from the questionnaire responses to similar questions. As noted above, across the schools, the questionnaire suggested that students were using the spaces in groups or with 'a friend or two'. Yet, in some contrast, the posters recorded considerably more instances of being 'on my own', with this being the most common response on nearly all of the recovered, operational posters, often overwhelmingly so (NE1: chosen 81%, 78%, 66% and 70% of the time on four posters; NE2: chosen 70%, 71% and 62% of the time; BM1: chosen 98%, 74%, 86% and 18%). This big difference is almost certainly due to demand characteristics of the PosterVote method of data collection, in that actually pressing the buttons is more likely to be an individual activity.

Yet, at BM1 there was one poster (P5) where 'on my own' was not the most common response, which shows that this tendency can be overcome and demonstrates the importance of precisely where posters are positioned, since it has important implications for the continued use of this tool. Poster 5 was fixed to the inside wall of a shelter, also containing bike hoops, which is located beside a sports area (as shown in Figure 8).

Figure 8: Poster 5 in the shelter next to the sports area at BM1



Perhaps because the intimate, enclosed location made them more aware of being in company, students here pressed buttons to record being in a group (64% of presses), with a friend or two (18%) or alone (18%).

On the survey, students at all the schools were quite positive about all the locations, but the posters recorded dramatically different ratings. For example, at BM1, where we were able to make the most direct comparison between the two approaches, the questionnaire recorded average star ratings ranging from 3.1 to 3.5 across the locations. The posters ratings were very different, with 1 star being most commonly chosen in all locations (percentage of 1star presses ranged from 67%, P4, to 82%, P5), with an average across all the locations of just 1.8. We initially wondered if the students were starting with the first button (1star) and then pressing along till they reached their final rating instead of choosing a rating and pressing the corresponding button once. However, the percentage of presses for 2 stars was not similarly high with presses then subsiding through the stars; instead, there was a tendency for 5 stars, and sometimes 3 stars, to be the next most popular choice. We also did a sample check to see if the button strips were registered the right way round (or if we had accidently registered a 5 star button as a 1 star) but found no indication of a mistake. The students might have felt less polite when pushing buttons than when completing the online survey, which many of them did in school time, but responses overall to all methods do not suggest this level of dissatisfaction with the outdoor areas at BM1. We can only conclude that the students were taking the provided opportunity to joke and subvert our intentions, with the result that data for this specific question with this tool is distinctly untrustworthy.

This problem might suggest caution with all the data produced by this tool. It remains, however, that students have to be at a poster to press the buttons, even if they are not being entirely serious in their choices (the star rating) or rather literal about who is

responding ('on my own'). The numbers of presses for each button is revealing as there are considerable differences in these raw numbers across the posters (see Table 1).

Table 2: Presses recorded by each poster for each question at BM1

Poster	Who with?	Activity	Stars	Total
2	134	442	1235	1811
3	39	93	115	247
4	123	557	1384	2064
5	118	87	316	521

Ignoring for the moment the choices made for each question and any possible meanings conveyed, it is possible to see that two of these posters were positioned in places that appeared to be more frequently used than the other two. One of these posters (P4) was fixed to wire fencing at one end of the sports area (pictured previously in figure 12), an area that the survey found to be used frequently by most students (visited by 70% every day or several times a day, 19% 'a few times a week', 6% once a week or less and only 5% reported never being there). Here the button presses recorded would tend to corroborate the survey respondents' sense that they use this space frequently.

Similar conclusions can be drawn about the large number of button presses recorded by poster 2. It was positioned near to the mixed activity area featured as the second place on the survey (Q2), which suggested it is a successful place of mixed activities, mainly appreciated by students, and well-used by nearly all students (the full set of responses are discussed in a later section and shown in Figure 13).

Figure 9: Location of posters 2 and 3 and the image presented in the survey

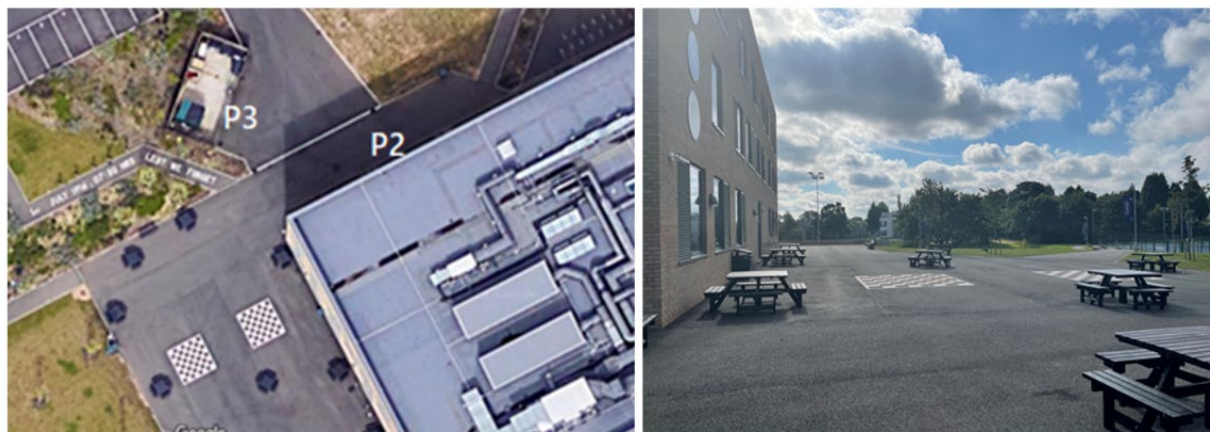
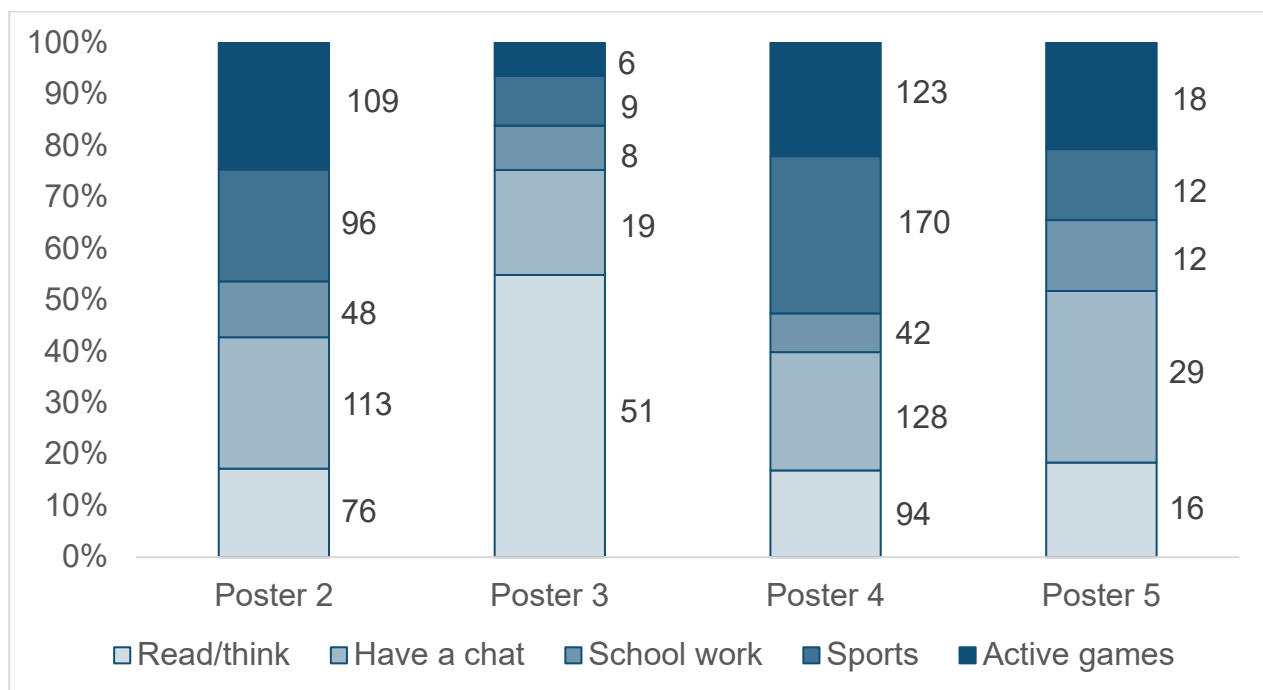


Figure 9 shows the location of the two posters and the image used of the area. Although neither poster is squarely within the area pictured (due to fixing challenges), the frequency of button presses recorded by P2 suggests it was found by students within this busy area. Meanwhile, P3, although not far away, was interacted with much less, suggesting a passing place rather than space of social interaction and activity. Overall, the two posters and the questionnaire responses convey a nuanced understanding of the patterns of usage of this area, as well as making clear the importance of the decision about exactly where to position a PosterVote.

Finally, the number of presses recorded for the activity question (more than for ‘who with’ but fewer than for the star rating) implies that students were choosing more than one activity. Looking at the range of activities recorded by each poster (Figure 10) and given that survey responses often showed mixes of activities, these data appear more reliable. Thus, they add to our understanding about how different places are used, sometimes corroborating the survey data, occasionally extending it if a poster is placed somewhere not surveyed and also adding nuance through the connection to a very specific location

Figure 10: Range of activities recorded by each poster



As our trialling demonstrated very clearly, PosterVote does not produce ‘good data’, in the sense of reliable figures for types of use or numbers of students. In particular, the opportunity to give a satisfaction rating was used to award a low one, with the 1star button being pressed repeatedly. Small changes to poster location made considerable

differences to the quantity of responses recorded. Although revealing of detail of how an area is being used (or not), this specificity amplifies issues of choice of location, with decisions about location being influenced, in addition, by the practicalities of fixing. Yet, a revealing approximation of actual frequency of usage was generated, particularly highlighting areas that appeared underused, which could be useful to the schools and to school designers. As anticipated, the posters generated conversations in the locations so are of value to the schools. This is one of the strengths of PosterVote identified previously (Vlachokyriakos et al., 2014).

Currently, PosterVote is freely available, and it is possible to use the website to design posters with one question. Although during trialling we used three questions, the most useful of these was the question about student activity in the location, so, in future, using just one carefully worded question would be effective.

Approach 3: QR codes

The QR codes were designed to facilitate more discursive responses but during trialling, responses were limited in quantity, and similar in style to those collected by the open questions on the survey. QR Codes were easy to install, making fewer demands on schools than the other methods so could be managed easily within a BiU review. They were, however, the least popular of the methods, accepted for use by only one school. The key issue with using QR codes was student access to mobile devices during social time at school, when they would be able to scan the codes independently at the places where the QR posters were displayed. Schools have differing policies on when and if students are allowed to have their mobile phones with them on school premises, and this will have an impact on whether this tool is an appropriate one for data collection.

The codes were sent to the school that opted to use them (BM2) as PDF documents by email, along with instructions for how to place and activate them. This involved putting up a poster and obtaining coordinates using what3words, which the school needed to then relay to the research team. This not only enabled the data gathered to be matched to a location, but also allowed the locations of the five posters to be featured on the map that was revealed when the QR code was scanned. Small errors with what3words, noted above, needed to be corrected before these locations could be marked on the online map. This process worked relatively smoothly and the QR codes were made live some weeks after PosterVote, placed at the same locations.

In practice, the QR codes failed to generate the intended discussion, with all the comments being limited to statements about the space or wider school issues, as collected through the online questionnaire (e.g. “Great place but we need another one of the big cornilleau table tennis table (the blue one) because one of them broke at the start of the year.”). Many of the comments, like this one, sought to report a specific problem

with equipment or maintenance, which could be useful to the individual schools, but is of less interest from a building POE perspective.

It is also worth noting that in addition to failing to produce the quality of responses we had anticipated, this approach did not generate quantity either. Even at this school, where students were allowed to use their phones at break times, this under-engagement could still relate to decisions made by the school about access to online media in that there was no student Wi-Fi available. If students need to use their own mobile data, rather than having free access to Wi-Fi to leave comments, this will be restrictive and also poses equity issues. A possible solution would be for students to scan the codes and then access the website later when they have internet access, but the days and times when comments were made shows that this did not happen.

School policy on electronic devices and online access most severely impacts the QR codes tool, as shown by the very limited acceptance of this method by our sample of schools. Some schools have a slightly more relaxed 'no phones' policy which only applies to some students, for instance allowing older students to use their phones. However, in our research, this led to concerns about younger students seeing older ones using their phones to engage in the project and being encouraged to use their own. Other schools have a 'phones at break' policy, and although this allowed students to engage in this project, it would present challenges for collecting student views of learning spaces. Finally, response rates can be very limited if schools do not have student Wi-Fi.

Enablers and barriers to using one or more of the approaches

Some over-arching enablers and barriers to the data collection process were identified. Aspects of these will continue to be relevant if including pupil insight becomes part of BiU surveys, but their significance will be reduced with a more standardised approach.

Enablers

- Schools were able to shape the exploratory research to ensure useful information. This was mainly through choice of locations. Although, for this exploratory research, two of the schools also participated in the design of the survey this did not provide particular benefits and would not be necessary in future.
- School leaders are interested in how school spaces are viewed and used by students, particularly the informal places.
- Different methods held different appeal, both to school leaders and students. PosterVote is appealing as it is non-standard and can be placed in a specific locations to gather instant data. Conversely, online questionnaires seem practical because of their familiarity. In the school where they were trialled, the QR codes were interesting to the head teacher for their potential to produce different ideas.

Barriers

- As well as being an enabler, it became clear that schools shaping the data collection process could be considered a barrier. There is a risk that schools may become overly concerned with detail of choices (locations, wording, means of data collection) which can slow the process. Fortunately, now that prototypes for each tool have been developed, the higher level of school involvement is not needed.
- The more limited partnership required with schools, choosing locations and supplying the images for the online questionnaire, can slow down the process.
- The constraints of school life can impact the process, holding up communication or data collection. This includes planned seasonal constraints (holidays, exams) and unforeseen events such as industrial action, school changes or Ofsted visits).

Practical issues associated with using the approaches

Schools were keen to learn and apply findings

In initial meetings, head teachers and other staff were enthusiastic about receiving information specifically about how students were using the external spaces, but also pleased with any additional feedback on their building.

Similarly, students in both the initial focus groups and the meetings during trialling seemed positive that their views were being sought. Pupils certainly used the opportunity of the online survey's open questions to 'voice' their opinions on various issues.

Constraints of working with schools

After initial positive conversations with schools, we encountered both static and unexpected barriers to communication and data collection. Static barriers included school holiday periods, when schools were closed; exam periods, when teachers and leaders prioritised this over data collection; technological difficulties; and staff movement, as in one case when the key liaison staff member left the school and their replacement needed to be brought up to speed on the project at a critical point. Unexpected barriers included a prolonged period of industrial action, and an external event at one school which impacted the entire school community and again, forced a reprioritisation of the project's importance.

Insights on space use by pupils

The approaches we trialled succeeded in generating data about pupil use of outdoor spaces and bringing their views together to achieve insights that could enhance a BiU

review. The following sections present some of these findings to indicate the understandings that were produced.

The use and values attached to school outdoor spaces

As expected, most of the spaces were visited frequently with virtually all the spaces being experienced either 'several times a day' or 'every day' by more than three quarters of the students who answered the questionnaire. Responses recorded by the posters tended to amplify the slight differences in frequency of visits evident through the survey, but most were similarly suggestive of busy places. That the outdoor places are important to the students is frequently evident in the open responses on the survey ("I play sport here and hang out with my friends it's really fun"; NE2, Q6, all-weather sports pitch) with general liking for most spaces also shown here and through the questionnaire star ratings, which produced averages above 3 (out of 5) for nearly all the places. Younger students tended to be slightly more positive about all the spaces than older ones. For this reason and others relating to student characteristics, it would be unwise to try to compare between schools on star ratings, but within one school it is possible to identify any particularly successful or unsuccessful spaces, which could provide useful information for school architects and/or school leaders (as problems may arise due to the way a space is used as much as how it is designed).

Across the spaces and the schools, there were lots of different student groupings and activities, which are considered in more detail below. There is a tendency, however, for those outdoor spaces available to students at break times to fall into one of only two types of usage. Broadly, our data suggests that there are active spaces where students either 'just pass through' (where that option was available on the questionnaire) or engage in physical activities, but some students 'rarely' or 'never' visit, while there are mixed spaces that appear to be used frequently across the student body for a more diverse mix of activities. Although sports spaces (including specialist all-weather pitches as well as playgrounds equipped for sport through the provision of basketball hoops or football goals) were mostly used as active spaces, other places that might similarly be expected to be associated with physical activity (e.g., a shelter near a specialist sports space) instead seemed to be used for a range of activities. Conversely, places where provision of benches might have suggested lingering, perhaps to 'read or think' seem to be used instead more like active spaces, with questionnaire responses reporting passing through, and both posters and questionnaires suggesting a lack of use by some students.

Outdoor spaces at this sample of schools appear almost never to be used for doing schoolwork, either individually or with friends, perhaps reflecting schools making indoor areas such as libraries available for reading or doing homework. The only exception to this finding was in School BM1 where steps inside the entrance were reported by the site manager, who also did playground duties, to be used by students for reading or other

quiet activities. Questionnaire responses corroborated this observation but the poster that could have recorded such activities was torn down and damaged. On the other posters at BM1 and across the other schools, the option of doing schoolwork was generally pressed less often than other activities at a frequency that ranged from 8% (BM1: P5, shelter near sports pitch) to 17% (NE2: P1seating area).

Rules and regulations restrict use of outside space

Entwined with the student experiences of the physical spaces was their awareness of the school rules and regulations that govern their use, mainly relating to restrictions to student access (“You are told off for going up a ramp”, BM1, Q4: pathway; “Because we are never allowed on it”, NE1, as a reason for a least favourite place; “we need to use the grass a lot more”, BM2, QR code near school field) or to running in particular places (“Why is running banned”; NE2, Q3, courtyard area), and occasionally to other local restrictions (“They don’t let you sit with your friends here”; NE2, Q4, undercover walkway).

Whether pupils report being alone or with friends depends on the data collection mechanism

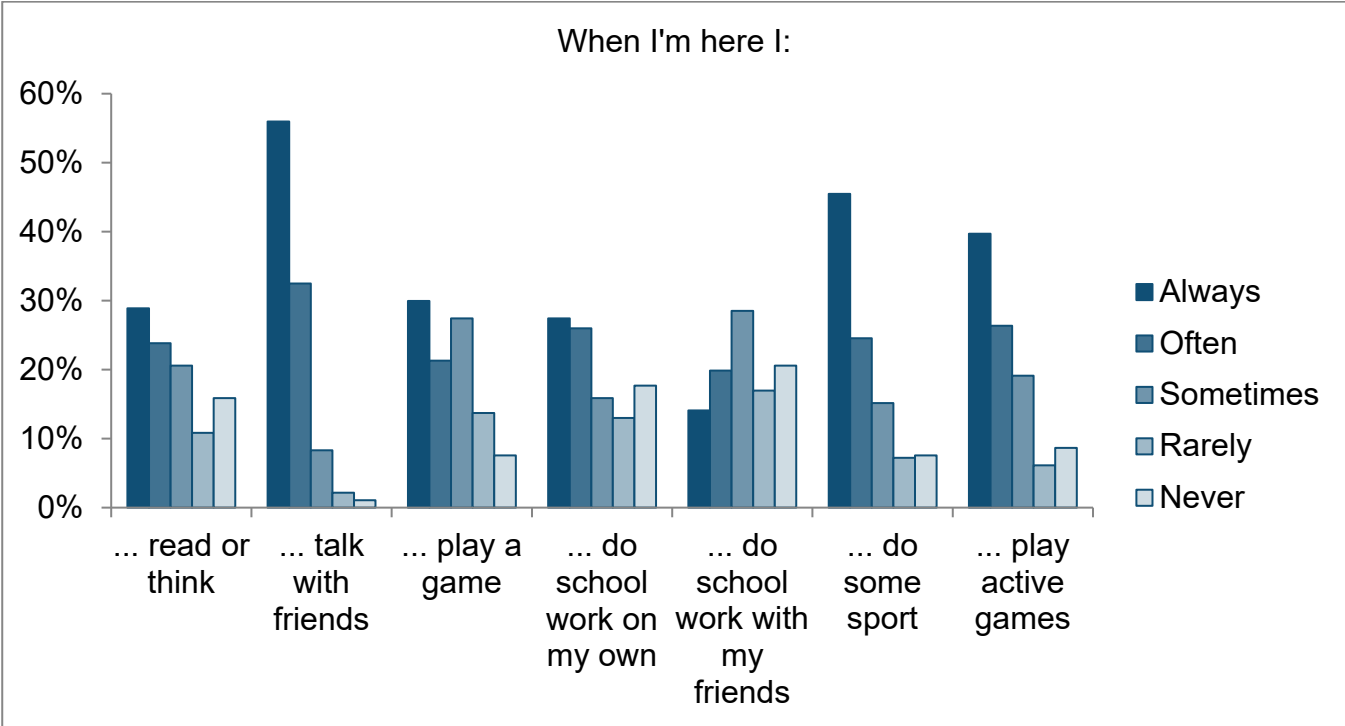
On the questionnaire, the option of being ‘on my own’ to the question of ‘who are you usually here with?’ was much less commonly chosen than the options to be ‘with a friend or two’ or ‘in a group’. Across all the spaces and all the schools, this option was often chosen by less than 10% of respondents with this proportion only rising slightly at two of the schools in entrance areas (Q1: 14% at NE2; 20% at BM1), where students might be expected to be alone. The option was only chosen with any frequency in one very specific space, which was the way to the visitor entrance at BM1 that students only use if late, where 47% responded that they were usually alone.

The questionnaire responses certainly point to students perceiving school as an essentially communal experience, even if the posters indicate that they do sometimes get some time to themselves.

Entrance areas aren’t just for entering

Two of the schools had entrances where some of the space was available for students during break times as well as at the beginning and end of the school day. In both schools these places were not active areas but mixed areas where students reported that they did most, if not all, of our range of activities ‘often’ or ‘always’. This was most pronounced for the steps area at BM1 (as shown in Figure 11), where even schoolwork was done, but an eclectic mix was also reported at the other school.

Figure 11: Responses to activity question for location 1, entrance area, at BM1



This tendency for an entrance to be more than an entrance was found even in the schools where none of the entrance area was accessible during the school day (“It’s just the front of the school people just walk through here”; NE2, Q1). Although the option of ‘just passing through’ was provided in the questionnaire for these schools, and most students used it for this location, respondents still reported being in groups or with friends, and just under 70% described what they were doing as either ‘always’ or ‘often’ talking with friends.

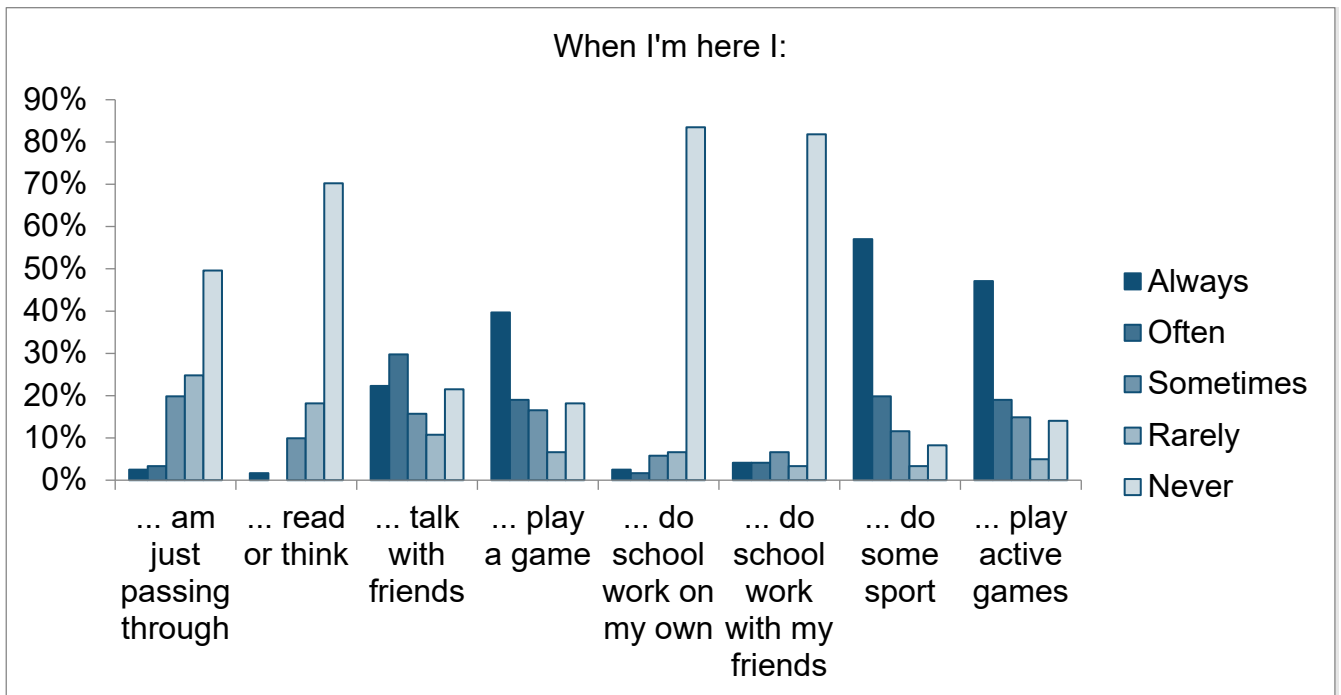
Sporty spaces for talk and sport in groups

As was mentioned above, the outdoor areas equipped for sport and exercise were clearly used for both more organised ‘sport’ and ‘active games’. Connected to this usage, students reported through the survey being there much more often as part of a group rather than ‘with a friend or two’. This use for sport and games, however, was paralleled across the schools by ‘always’ or ‘often’ talking with friends while in these places. This pattern can be seen in Figure 12, which shows responses for a specialist sports space that, perhaps because of its location, was less often ‘passed through’, but certainly not used for other activities.

The sports areas, as well as other active spaces were notable for not being visited at all, or very rarely, (‘never’ or ‘less than once a week’) by a sizeable minority of students. In

the case of the specialist sports spaces, this is due to a number of the young people not wanting to participate in sport during free time (“I only use it for PE”; NE2, Q5 and Q6) and perhaps feeling slightly resentful of the people who do (“To many people there and they play football and i don’t so i don’t a reason to go there”; BM2, least favourite place). The posters suggested additional differences in frequency of use, with the location of specialist sports areas being important, and some tendency for pitches further from the school building to be less well-used during break times.

Figure 12: All-weather pitch at NE2 that is used for sport and talk

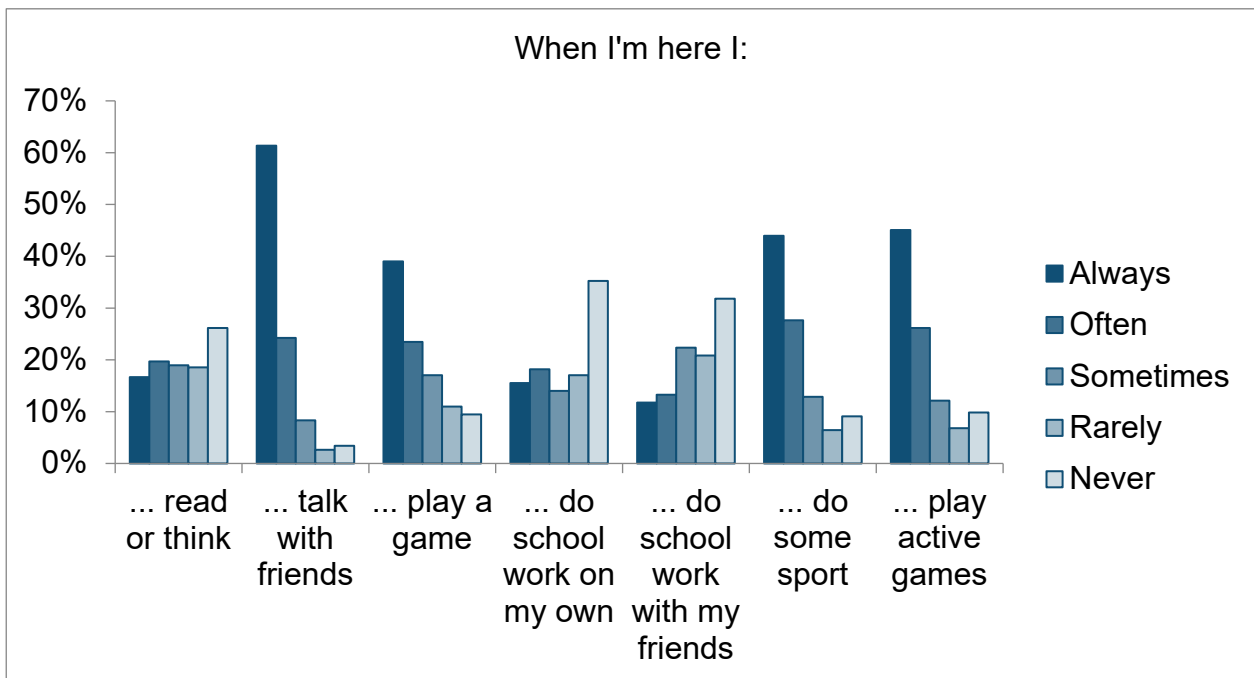


Spaces to do a range of things

All the school exteriors included spaces that had clearly been designed or fitted out for a range of uses, sometimes including facilities for both active and sedentary activities (e.g. football goals and picnic benches, respectively). There was also a contrast between spaces that were visited by most students fairly frequently and those that a sizeable minority (25-30%) reported visiting only ‘once a week’ or less often.

A well-used space designed is used for a range of activities. To illustrate, location 2 of the BM1 survey was a playground area containing picnic benches and painted areas for outdoor chess, but there is also space to move and an adjacent grassed area. This area was well-used, visited frequently by most of the students, with 75% reporting that they are here ‘everyday’ or ‘several times a day’. Figure 13 shows a good range of activities being carried out here and the mixed appeal is summed up by this response to the open question about this location: “it’s wonderful as you can sit down and relax or you can play some football, basketball or you can just run around playing tag.” (BM1, Q2)

Figure 13: Responses to location 2 at BM1 show a mix of activities



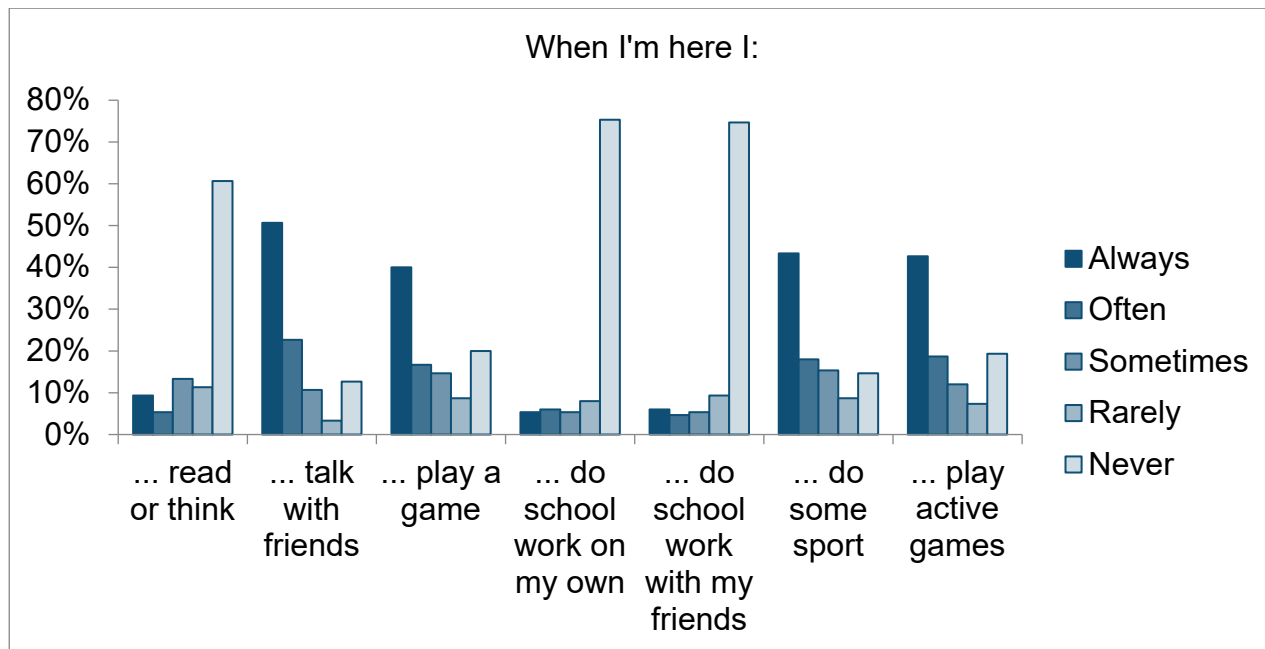
In common with other popular spaces across the sample of schools this area could be a victim of its own success becoming crowded. There were also other critical comments suggesting the challenges of managing spaces where all students could pass time in different ways: *“One thing that I would like to tell you about the North courts is that it is very limited. I say this because the back you cannot go. You have stay around the areas with the tables. Also, you cannot play with a ball here because the teachers say that it might hit the window”* (BM1, Q2).

Hits and misses on a mix of activities: As noted above, spaces could be equipped with benches or appear designed for lingering, but students reported fewer different activities, used the ‘just passing through’ where available on the survey and posters presses were considerably fewer than in other parts of the school space (e.g. NE2’s social area with seating and natural space adjacent did not appear as well-used as the courtyard area).

In BM2, there were distinct areas, each with different provision, mainly for active games, all of which seemed to be used in slightly different ways, and not equally frequently by everybody. Even the space with benches provoked active play but is also *“a great place to eat with your friends if you have packed lunch”*, although it could become *“full of chaos”* due to its proximity to the football pitches. Perhaps surprisingly, the playground equipped for football next to this bench area achieved a better mix of activities (see Figure 14), including, but not limited to, active games and sport. Of the five BM2 locations

on the survey, this one achieved the highest star rating (average of 3.7), and the open responses reflect this satisfaction: “I’m here everyday of school and this is where I always hang out with my friends”.

Figure 14: Mix of activities at location 5, a playground equipped for football at BM2.



Reflections and recommendations

This project succeeded in generating information about pupils' perceptions and values of their schools' outdoor space, providing indications of how specific locations are used, and demonstrated ways that these pupil views can be included in BiU reviews, through the use of one or more of the data collection tools trialled.

The process, using these digital data collection tools, tended to initiate discussion within the schools and was seen by school leaders as contributing useful information while also providing recognition of student views in a way that they found valuable. Students seemed pleased to be included in the conversation, although some used the opportunity to voice much more general ideas, and frequently irritations, with schooling. Although there were clear overlaps of their experiences with reports from staff about how students used spaces, there were details revealed in all the schools that had not otherwise come to light. Overall, the approaches enabled information to be generated that could be combined effectively with staff views and our own observations of the school, creating a more complete understanding of how school external space is experienced and used.

Some information generated could also be useful to the DfE and school architects as they seek to improve schools being built. For example, there is a tension between providing easily accessible space for sport and ensuring provision for students who are not sporty. More specifically, we identified areas that were functioning particularly well for all students, supporting a mix of activities, and design features of these places could be applied in future. Much of the information, however, will be more useful to the schools, enabling tailored adjustments to be made to the spaces or how their use is organised. All schools are keen to have feedback, which we will be providing. In one school the head teacher plans a student-led development of the external spaces, passing our findings to the school council and assigning a budget for them to allocate.

The approaches trialled could be extended to consider other areas of the school used by students, such as indoor social spaces, formal learning space and specialist provision such as libraries, laboratories and craft rooms. The advantage, as for the external space, would be that students use all these areas in a way that most school staff do not. The larger number of students also reduces the risk of a review being prejudiced by a small number of staff with particular concerns or complaints.

Each data collection method had features that made the process or products of their use appealing. No single method provided perfect process or products. The conclusions that we have drawn mostly require information generated across the methods, and the responses from school staff and students demonstrate interest in all. Each tool also had challenges, often centring on the contributions required from schools that were busy with other demands, so that communication slowed. Some of this partnership working, such as the discussions about wording, was unique to this exploratory stage research and

would not be required for scaled up use of this approach within BiU. Some collaboration, however, would continue to be required: providing images for the questionnaire, school logo for PosterVote and QR codes and installing PosterVote and QR posters on the school site. Each makes a demand on school staff and delays can occur.

Recommendations

Opportunities and risks involved in obtaining pupil insight

It is possible to generate data about student experiences of school spaces and we have shown the value in doing so. Pupil insights added to, and extended, information gathered through site visits and discussions with school staff. Quantity of data provides an advantage over data from online surveys of staff, which will tend to be more limited. In terms of quality, ideas from pupils add nuance, achieving more complete understandings of school spaces.

Due to the technical side of POE, the site manager is already involved in BiU site visits and will likely be able to offer other insights about how staff and students use school space. The extent of this knowledge, however, varies depending on how the role is undertaken. In some schools, it might be other members of staff, particularly non-teaching staff, who understand most completely how the premises function educationally and socially. Given this variation across schools in who can provide the best information, the inclusion of students' views will be beneficial, as will encouraging responses to the staff survey from as wide a range of staff as possible. As we have seen, pupil insights can fill gaps and avoid making unwarranted assumptions about how a space is used.

Even within the existing BiU process, the technical adviser (TA) needs to work with the school being surveyed, requiring specific cooperation for the site visit and staff survey. The additional requirement to include pupil insights would make further demands on the school, whichever methods are used, which schools might perceive as onerous. However, this risk of increasing demands could instead become an opportunity if the relationship between TA and school is developed beyond the existing one of schools accommodating data collection using pre-specified methods.

Choice of tools and how to use them

The digital data collection tools we have developed can be used individually to obtain limited or specific data, but this research shows that a combination of several methods is most effective to gain a balanced and rich view, which can then be combined with information from the BiU site visit and staff survey to complete understanding.

Each tool has benefits and barriers and school input is needed for all. PosterVote needs no initial input from schools, beyond a school logo, and can be produced by the TA. Thought is needed about locating posters, which must be done by the school. Online surveys are straightforward to produce, using our template, and will fit well with the existing BiU staff survey. However, the school needs to provide the images and then circulate the survey. For the TA, QR codes have many of the advantages of PosterVote, needing less school contribution, and easy to provide as they can be sent electronically, but they rely most heavily on school policies on electronic devices and online access.

We therefore recommend initial discussions between TA and school about the data collection tools, so that these can be chosen to fit with school procedures, especially relating to online access, and also to fulfil particular needs of the BiU review (e.g. PosterVote could be chosen where the review is concerned with use, or underuse, of particular places). Although the least successful tool during our trialling, due to limited engagement, QR codes could be very suitable in a school or college with student Wi-Fi.

Adding a feedback loop

As we have seen, schools are interested in POE, especially after building work, and might be able to improve the use of their premises in response to data generated by the BiU. Although the current priority of BiU is to provide information to the DfE to guide future investment in school infrastructure, providing a feedback loop between schools and TA could improve the BiU process and products to the benefit of all. As noted above, cooperation is needed from the schools, both for the existing BiU process and to include pupil views, so there are benefits in recognising this and enhancing the school's sense of ownership and agency in the process. The feedback could be achieved in a range of ways including staff-student-TA panels where new ideas could be generated and further nuances in the information understood.

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