



# BMJ Open A qualitative evaluation of the impact of a medical student school outreach project on both medical students and school pupils

Megan E L Brown <sup>1,2</sup>, Neha Ahuja,<sup>1</sup> Vanessa Sivam,<sup>1</sup> Alisha Khanna,<sup>1</sup> Ravi Parekh <sup>1</sup>

**To cite:** Brown MEL, Ahuja N, Sivam V, *et al*. A qualitative evaluation of the impact of a medical student school outreach project on both medical students and school pupils. *BMJ Open* 2023;**13**:e070508. doi:10.1136/bmjopen-2022-070508

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-070508>).

Received 28 November 2022  
Accepted 31 October 2023



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

<sup>1</sup>Medical Education Innovation and Research Centre, Imperial College London, London, UK

<sup>2</sup>School of Medicine, Newcastle University, Newcastle, UK

## Correspondence to

Dr Megan E L Brown;  
[megan.brown@newcastle.ac.uk](mailto:megan.brown@newcastle.ac.uk)

## ABSTRACT

**Objective** To explore medical student and school pupil experiences of an outreach school teaching project.

**Setting** Community engagement is increasingly commonplace within medical school. Secondary schools offer ample opportunities for community engagement as medical students teach and engage in service learning.

There is a lack of research regarding the impact of school community engagement projects and the impact on pupils, as critical stakeholders in the service medical students provide. In this qualitative study, we explore the perspectives of medical students and school pupils involved in a school teaching project.

**Participants** Ten medical students participated in individual interviews, and 17 school pupils across three schools participated in group interviews. Data were analysed using thematic analysis and the concept of service learning.

**Results** For medical students, the project fostered communication and teaching skills, but a lack of reflection hampered further benefit. For school pupils, experiences varied – learning about careers in medicine could be inspiring, but content pitched at the incorrect level disengaged some pupils. The conflict between session timing and medical students' exams negatively influenced engagement.

**Conclusions** To shift the focus of community engagement projects that promote service-learning towards mutual benefit, designing in partnership with relevant community stakeholders and integrating opportunities to reflect on these experiences are critical.

## INTRODUCTION

The Greek philosopher Socrates is famously quoted as declaring, 'education is the kindling of a flame, not the filling of a vessel'. While vessels are fixed objects, flames grow, suggesting that the role of an educator is to spark and cultivate interest and development rather than deliver knowledge in a didactic manner. This view underpins much contemporary thinking within medical education. One area in which educators' focus should be flame kindling is in the design, development

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ To the authors' best knowledge, this is the first study exploring the impact of a medical student school outreach project from school pupil perspectives.
- ⇒ This study offers rich qualitative data across stakeholder perspectives.
- ⇒ The theoretical framework of service learning used casts new light on the ways how school outreach projects influence learning.
- ⇒ The impact is limited by unanticipated changes in project delivery, which reduced participating medical student opportunities for reflection.

and facilitation of community engagement. Community engagement projects are increasingly commonplace within medical curricula, as academic institutions recognise their importance in improving the health of, and building relationships with, local communities.<sup>1</sup>

Community engagement can be defined as when 'the medical school and the community establishes an interdependent partnership through which the community is actively involved with the medical school in education, research and community development activities'.<sup>2</sup> Within medical education, community engagement may involve medical students participating in service that benefits the community.<sup>3</sup> The collaborative nature of problem-solving is critical to community engagement; institutions and community partners must work alongside one another; solutions should not be imposed by institutions without community input. Such problem-solving projects can enable educators to 'kindle the flame' of their students, encouraging interest in community-engaged medicine.

Community engagement has been embraced by medical schools globally.<sup>4</sup> Within Longitudinal Integrated Clerkships

(LICs; types of clinical placement that promote relationship building over time), for example, Hirsh *et al*<sup>5</sup> reported that community engagement develops ‘bonding ties’ (p.550) with local communities that can influence a student’s career aspirations. School teaching projects are an emerging method of community engagement. Pilling *et al*<sup>6</sup> reported that medical students engaged in primary school teaching projects have an increased awareness of social accountability and improved communication skills, while teachers highlight the benefits for pupils regarding role modelling. However, research on the impact of community engagement projects is underdeveloped, and additional exploration is necessary to build a more expansive picture of how and why community engagement projects influence those involved.

By definition, community-engaged medical education requires mutual benefit for medical student learning and community benefit. Given that most research in this field has focused on medical student experiences, there is a lack of research exploring the impact on community partners, including within school teaching project research. Within longitudinal clerkships, where community engagement often features,<sup>7</sup> there is a similar lack of community evaluation. Considering this, this research aims to explore the impact of a school outreach project, conducting within an LIC, on medical students and school pupils. In doing so, we generate transferable messages regarding how school projects should be implemented to maximise benefits across stakeholders.

## METHODS

### Context of the Schools Project

In 2021, we established the ‘Schools Project’ in collaboration with three local schools. To inform project design, we invited Imperial College Health Partners Trust, our local council, and other community organisations to share their understanding of local priorities.

The Schools Project formed a compulsory part of a new LIC curriculum within year 5 of the Imperial MBBS curriculum. This project aimed for students to develop and deliver two sessions on mental and sexual health for secondary school pupils. These topics were chosen in collaboration with key stakeholders while aligning with the year 5 curriculum. The project was also designed to meet General Medical Council (GMC) and Medical Licensing Assessment (MLA) outcomes.

The aim and proposed learning outcomes were loosely predefined by schoolteachers in all three schools. It was envisioned that the project would address a public health learning need for secondary school pupils, potentially inspiring pupils to consider higher education while enhancing medical students’ skills and understanding of health inequity.

In their LIC, medical students spent 1 day a week throughout the year in a General Practice clinic in the morning and educational sessions in the afternoon. As shown in [figure 1](#), the Schools Project formed one of

	Week 1	Week 2	Week 3	Week 4
AM	GP clinic			
	Selected patients with a focus on Yr. 5 specialities			
	Debrief			
PM	LUNCH			
	Central teaching	GP Tutorial	Cluster teaching	Schools Project

**Figure 1** Structure of the Imperial Longitudinal Integrated Clerkship.

four regular educational sessions lasting 2–3 hours and conducted every month.

The structure of the Schools Project is illustrated in [figure 2](#). The project’s design was based on another school community engagement project at Imperial<sup>6</sup> but differed, in that this project was of a longer duration and mandatory rather than voluntary (based on positive feedback from the other project).

Medical students were given two broad topics to help them design lessons for school pupils – mental health and well-being; and sexual health and well-being. These priority areas were agreed upon through discussion with the schools involved as areas of need for school pupils and in alignment with the medical students’ curriculum. Medical students worked in groups to develop their lesson plan for the school they were attached to and delivered their lesson plan in pairs. Students were guided on possible content areas for each topic (eg, within mental health and well-being, they were advised that they needed to cover variation; in mental health, spotting signs when someone isn’t well, coping strategies, and where to seek help); but there was flexibility in detailed content and delivery methods, depending on each student group.

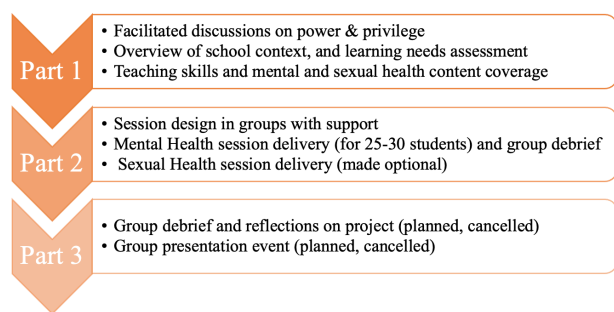
Unfortunately, due to logistical challenges with the new LIC (space within the medical school curriculum, scheduling issues, and negative student feedback), a decision was made with our school partners to end the Schools Project early after the first teaching session in secondary schools on mental health (Session 6). The second session on sexual health was made voluntary and, thus, a much smaller group participated. Owing to these changes, the presentation event and debrief were cancelled. However, strong collaborative relationships still exist between the schools and university, including community-engagement projects for year 2 medical students, which remain ongoing.

### Research approach

Given a lack of research on how community engagement projects influence medical students and school pupils, we used an interpretative, inductive, qualitative approach to root our conclusions regarding impact on the reports of our participants.<sup>8</sup>

### Theoretical framework

We used service learning to conceptualise how community engagement projects (such as teaching projects)



**Figure 2** Schools Project structure.

are theorised to influence learning. We identified and applied this framework during data analysis.

Many define service learning as education through participating in roles that serve community needs and intersect with learners' formal academic curricula.<sup>9</sup> Sigmon<sup>10</sup> describes service and learning as existing on a spectrum, with service at one end and learning at the other. Service learning involves the balance of both, including involvement in delivering essential services, such as teaching, while aligning with students' curriculum and creating opportunities to learn through reflection. Service learning also involves cocreation with local communities and the development of mutually beneficial partnerships with community stakeholders.<sup>11</sup> This Schools Project was intended to engage medical students in service learning – the project was designed in collaboration with local young people and schools and aligned to the needs identified, national school pupil curricula, and medical student curricula in terms of the content focus.

### Data collection

Based on available funding and reviews of similar research, we interviewed ten medical students and held three group interviews, one per school, with five to six pupils per group (a total of 17 school pupils). Group interviews were selected for scheduling convenience with the schools and because we were interested in pupil discussion. All medical students participating in the mental health session (n=40) were contacted by email with study details. Interested students were sent participant information and completed online consent forms to participate in a one-to-one, online semistructured interview with a member of the research team not involved in medical school teaching (MELB/AK). Prompts (online supplemental material 1) were open-ended and concerned participants' experiences of the project, what went well/could have been improved and lasting impressions.

All pupils participating in the mental health sessions received information about the study. Interested pupils received participant information and consent forms for parental approval. School teachers coordinated this process. Group interviews were facilitated by two researchers (NA/VC/MELB) and included a

schoolteacher in case of safeguarding concerns. Group interview questions mirrored medical student prompts (online supplemental material 2). Both medical student and school pupil interviews were transcribed verbatim by MELB.

### Patient and public involvement

This research was conducted without patient involvement, as it does not directly involve patients as research subjects. Patients were not invited to comment on the study design nor consulted to develop patient-relevant outcomes or interpret the results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

### Data analysis

Medical student and school pupil data were initially analysed separately, and then together, using Braun and Clarke's reflexive approach to thematic analysis.<sup>12</sup> All transcribed data were read in-depth, uploaded into Dedoose (v.9.0.17, 2021) and coded descriptively. The research team met to discuss initial codes, reflecting on their own perspectives and project context. Similarities, differences and connections between medical student and pupil data were discussed. Following coding and discussion, themes were created, reviewed, revised and named. When producing the report, we reviewed relevant literature and integrated insights from our inductive data into the concept of service learning as we felt our medical student data spoke to the balance between service and learning, and our pupil data spoke to the need for mutually beneficial engagement. MELB wrote memos throughout the analysis to monitor evolving interpretations.

### Reflexivity

Four researchers (NA, VS, AK, RP) are practicing clinicians (general practitioners or trainees), and one is a researcher with a background in medicine (MELB). Two authors (NA/VS) organised and taught on the Schools Project. Hence, they were not involved in medical student data collection and only accessed data once anonymised.

## RESULTS

Each transcript is labelled with a participant number (P1,2, etc.) and role (medical student – MS or school pupil – SP). For school pupils, the number of their group interview is indicated by G1, G2 or G3.

We constructed three themes: (1) reciprocal benefit of connection, (2) critical role of reflection in transforming service into learning and (3) influence of organisation and implementation on experience.

### The reciprocal benefit of connection

Both medical students and school pupils discussed the impact of the Schools Project on their personal learning. These considerations were rooted in interacting with a new group within society.

For medical students, the project appeared to foster communication and teaching skills, which were felt to have wide applicability. Teenagers were noted as a missing demographic within the current placement experiences and so the opportunity to engage with teenagers and learn more about their needs was valued.

... you see young children, then you see adults, but then there's a gap in-between where they don't come in so often. So, seeing teenagers for the first time in a long time, it was a bit of a, not a shock, but, like, yeah...

P4, MS

It is a different interaction to an adult, especially covering topics like mental health and sexual health... those conversations have to take a different tone... I hadn't thought... how I would cope with that and deal with that in a way that maybe young person would relate to and understand.

P5, MS

Positively, many students voiced an increased likelihood of involvement in school outreach in their future studies or careers.

I'd be more likely to take part in similar events because of the Schools Project... seeing the impact...having that open honest conversation was important...

P3, MS

For many school pupils, interacting with medical students was also valuable. Learning about careers in healthcare and seeing medical students in action reaffirmed some pupils' aspirations and inspired others.

I was kind of interested in mental health and helping people. So, after their session, I ...started to think about going into...therapy...it helped me look at something I want to do so I am very thankful...

P22, SP, G3

Through interactions with medical students, some pupils better understood doctors' role. Before the project, this participant was unaware that doctors dealt with mental health.

I just find it a bit weird that doctors or medical students are trying to learn more about mental health. I'm starting to learn why they're doing that.

P16, SP, G1

Pupils became aware of the physical manifestations of mental health and voiced more empathic approaches to others' experiences. Pupils also voiced an increased likelihood of seeking support if they experienced difficulty.

If I'm going through something... I [will] try to get help from other people instead of just closing up and nodding "Yeah, yeah, I'm good."

P22, SP, G3

However, the perception that medical students brought something unique and valuable to the project was not universal. Pupils from two schools (G1, G3) responded positively in the group interviews to the role of medical students and the value of their teaching, while pupils from one school (G2) disagreed. The cause of this variation concerned the level at which the teaching session was pitched. In one school, pupils had previously experienced similar mental health teaching and wanted the teaching provided by medical students to include greater breadth and depth.

It was a bit boring. There wasn't any new information or anything that we haven't had before.

P20, SP, G2

As medical students were seen as experts, their contribution was not valued when they fell short of this mark in pupils' eyes. Although the participant in the quote below recognises the *possible* value of medical student input, this was not realised owing to the level of content in their session.

Especially with mental health...you want to hear more about it from people like doctors... when you go to a doctor, you think they know everything about medicine... it was just a bit of a disappointment.

P21, SP, G2

For connection to be of reciprocal benefit, school pupils' prior learning must be acknowledged and built on. Where this happened (eg, for pupils without prior exposure to mental health teaching), the sessions were very well-received.

...mental is not really something that is always being portrayed or being told to anyone nowadays... this really opened my eyes to see how important this is.

P24, SP, G3

### The critical role of reflection in transforming service to learning

It was apparent within medical student transcripts that this project was seen as an opportunity to serve a genuine learning need within the community.

[The project] highlighted to me the gap in knowledge that a lot of teens might have... things that to me, even as a teenager, I probably would[n't] have known about... a lot of even more basic things a lot of people didn't know about...

P4, MS

Fulfilling this unmet need is a form of service. However, for service to become learning, it must align to students' curriculum, and there must be opportunities to reflect on one's experiences.

Several medical students felt the focus on mental health aligned with their end-of-year examinations, though this

was not universally acknowledged. Where perceived, this focus was appreciated as content revision.

It's a useful thing to do...the mental health side of things related to 5th year and teaching and stuff.

P9, MS

However, opportunities for reflection were limited due to organisational changes in project delivery. Some students' experiences appeared to challenge them in ways they struggled to make sense of and articulate fully. Had reflection on these experiences been facilitated, additional doors may have been opened for learning about community challenges, and the role of a doctor. The interviews, being reflective in nature, acted for some students as a space to consider the learning resulting from their experiences. During their interview, this participant began to think through the differences in their experiences at school, and the knowledge and experiences of the pupils they taught. Their shock and realisation of the importance of interacting with people from different backgrounds to delivering sensitive clinical care is palpable in the below excerpt:

The problem was... about their friends smoking to deal with stress and they were asking... is it okay to smoke when you're stressed... I remember having this feeling that by teaching people who... come from different walks of life, actually, you can get a very fresh perspective... in my school I didn't encounter anyone who coped...by smoking or drinking...I wouldn't have thought about asking those things... experiencing first-hand makes you remember it a bit more and understand that anything is actually possible...

P10, MS

This quote also suggests the power of experiencing inequality in action – teaching school pupils in underserved areas was seen as more impactful than only reading about inequality. This experience helped several medical students realise the importance of not making assumptions regarding the level of prior knowledge patients bring.

You've really got to not assume anything when you're explaining things and start at the basics and not come across when you're surprised ... because that might be might seem a bit judgmental...

P1, MS

It is important to note that not all students felt they had a challenge or challenging moment to share.

I think we make a massive impact, but I wouldn't think that this experience enlightened anything.

P6, MS

Those who did share challenging moments did not seem to have had a chance to reflect, and some struggled to vocalise exactly why they had identified the experience

they shared as challenging. Where reflections were shared, they were often more limited in scope.

### **Influence of organisation and implementation on student and pupil experience**

Both medical students and school pupils identified further potential in the Schools Project. Many comments regarding realising the potential of the project were framed as issues with project organisation or delivery.

Organisationally, timing was the focus of many medical students' comments. Students noted that as the scene setting and planning sessions were quite spread out before the Mental Health teaching session, it was difficult to remember the last session, keep the momentum going, and catch up if you missed a session. They suggested an approach that involved more frequent sessions occurring over a shorter period. In addition, it was felt that delivery of the teaching session in the second half of the year, when exam worry was heightened, hampered engagement. Indeed, many students chose not to sign up for the second project teaching session, owing to concerns regarding time for revision.

It was a shame the second teaching session was so much closer to exams.

P10, MS

School pupils perceived these difficulties as a lack of preparation or planning from medical students. Many pupils' suggestions for improvement included interactivity, which they felt could have been improved by changes in lesson delivery.

I think if...the people had made it a bit more interactive... no one was really talking.

P18, SP, G2

Perhaps due to this boredom, engagement among school pupils was perceived as a variable by medical students, and students appreciated support from school-teachers regarding managing their group's engagement and behaviour.

[The teacher] was very helpful in the class that sort of keeping them engaged. I think that was quite important.

P9, MS

There were varied requests for additional content from school pupils, and as previously mentioned, these requests were split across the schools and related to previous learning. In addition to more in-depth content requests, many requested a focus on information that would be practically useful to pupils – identifying mental health problems in oneself and others, evidence-based coping strategies, how to speak to or support a friend who is struggling. What unified these requests was a clear relevance to pupils' everyday lives.

I think we better like learn about how to support a friend who's having these problems.

P20, SP, G2

To inculcate an understanding of pupils' lives and needs, input from schoolteachers and pupils in planning students' sessions was invaluable, with many medical students wishing for additional inputs on their lesson plans, proposed format and content they planned to cover.

It would have been really nice to sit down with the teachers and say, look, this is what we've got, this is what we're planning on doing. What do you think it would have been really nice to have?

P7, MS

Students also identified a need for information on safeguarding (given the sensitive nature of their teaching topic). Case studies of people suffering from mental illness were particularly memorable when used, and where they weren't, pupils requested this approach.

I think a more intimate approach to it...I'm not asking for personal stories, but how it can appear in different people and how you can recognise it in yourself.

P21, SP, G2

## DISCUSSION

Fundamentally, as Furco<sup>13</sup> notes, service-learning projects must 'equally benefit the provider and the recipient of the service' (p.5). Our conceptualisation of service learning as a spectrum spanning from service to learning,<sup>10</sup> which must involve mutual benefit or synergy,<sup>11</sup> can help us make sense of our participants' experiences and offer important messages for educators interested in creating and implementing service learning (in particular, school teaching) projects.

Several medical students identified the topic—Mental Health—in their interviews as content revision, aligned to their curriculum. However, later in the project, when the pressure to perform well in exams heightened, many students disengaged, and most chose not to sign up for the second, voluntary session. Concern regarding the conflict of the project with exam revision suggests that the Schools Project was not a part of the curriculum perceived as aligned with end-of-year exams. Biggs's theory of constructive alignment<sup>14</sup> suggests that learning outcomes should inform teaching activities and assessment. Though the project was designed to meet core curricula, GMC, and MLA outcomes, students did not feel it prepared them for final exams. A key lesson here is that educators must carefully consider constructive alignment in the planning phase of their service-learning project (with both learning outcomes and existing exam content) and, if they are in a position to, explore influencing assessment content or format if they note that the assessment strategy is not constructively aligned to institutional or national learning outcomes. Challenging the

perceived impact and importance of community-engaged projects is also critical, as our data suggest that medical students perceived community engagement as encouraging only non-technical skills that were of lower importance in passing exams. Involving undergraduate students more centrally in the leadership of school projects may enhance the perceived relevance, and therefore appeal, of such projects among medical students.<sup>15</sup>

In addition to attending to constructive alignment, our results showcase the importance of opportunities to reflect on one's experience. The importance of reflection is noted throughout medical education,<sup>16</sup> including in fostering transformative learning,<sup>17</sup> empathic understanding<sup>18</sup> and turning service into learning.<sup>9</sup> As we interviewed our medical student participants, it became clear that many were struggling to decipher the meaning of their experiences – not because there was no meaning but because they did not have the chance to reflect on, for example, why they found different views among school pupils on matters of mental health challenging. Owing to changes in the delivery of our project, we could not hold a debrief session, which was a lost opportunity to facilitate sense-making and engage students in social discourse, which might begin their journey towards transformative learning<sup>19</sup> on topics such as health inequity. What this research adds to previous work, which highlights the impact of reflection,<sup>9</sup> is the importance of integrating opportunities for reflection throughout a project, to safeguard the benefits of service learning against unanticipated changes in project delivery. If students had the opportunity to reflect on their experiences immediately following session delivery, some of the benefits of reflection in reference to service-learning might have been realised.

The balance of service and learning has ramifications for community stakeholders, too. Previous research within school service-learning suggests that school pupils enjoy being taught by medical students,<sup>15</sup> medical student-led interventions in schools can change school pupil behaviour<sup>20</sup> and that medical students' roles provided them with the status as an expert, which enhanced pupil engagement.<sup>6</sup> We found variation in pupil engagement, but this was similarly associated with whether medical students were perceived as experts. Sessions were perceived to be valuable when information shared was unfamiliar. The same content was seen as boring and repetitive when previously covered in the school, and school pupils in these sessions became disengaged. Across pupil group interviews, there was a shared desire for content to have application to everyday life (eg, how to help a friend). Students learn when they are supported to acquire new knowledge that was previously out of reach,<sup>21</sup> and when the relevance of knowledge to oneself is apparent.<sup>22</sup> In this study, this was achieved with variable success within the same locale, with variations in experience evident between two schools in the same academy. Tailoring approaches to individualised learning needs and priorities is therefore key to enhance learning

and engagement. If possible, involving school pupil (end-users of the service) perspectives in the design of the teaching sessions, alongside a review of their curriculum coverage, would increase the likelihood of pitching learning at the correct level, thereby enhancing learning. Our research also draws attention to the importance of not assuming universal benefit for community partners within such projects. Evaluating projects from all stakeholder perspectives is critical to developing a truly mutually beneficial service-learning project.

This project was mandatory, and, on reflection, this is likely to have negatively influenced student engagement. Decisions regarding whether service-learning projects should be voluntary or mandatory are complex – voluntary projects ensure engaged participants but indicate that such projects are an optional extra.<sup>23</sup> In our mandatory project, medical student engagement was an issue, with resultant impacts on learning perceived by school pupils. Educators should individually consider whether a service-learning project should be voluntary, providing the opportunity for all to participate with the risk of lower student engagement. Whether a project should be voluntary or mandatory should be carefully considered and planned. Educators should consider impacts on perceived institutional messaging, curriculum alignment and community/student engagement at every stage of project development.

Across our project and this study, several other logistical considerations regarding project organisation and delivery became apparent. We have synthesised our expansive logistical recommendations as lessons learnt in online supplemental material 3. A summary of our key lessons learnt throughout the project, inclusive of the challenges faced in implementation, is provided in [table 1](#), below.

### Limitations

The impact of this project was limited by unanticipated changes, cutting short the project (originally planned to involve the delivery of two lessons) and removing opportunities for students to reflect. We anticipate that, had the project run as designed, some of these issues may have been remedied. These changes in context are specific to our institution and unlikely to be applicable to other sites. There is, however, a transferable finding here regarding the importance of integrating reflection throughout projects in the advent of unforeseen changes. Medical students and school pupils volunteered to be interviewed, suggesting a risk that those with higher levels of engagement may be overrepresented. We interviewed 10 medical students and 17 school pupils, only a portion of those involved, and may have missed a larger spectrum of experiences.

### CONCLUSION

To shift the focus of community engagement projects that promote service-learning towards mutual benefit (towards kindling a flame in partnership working rather than filling a vessel), designing in partnership with participating community stakeholders is critical. Community voices have been absent from service-learning research and evaluation within medical education, which we sought to remedy in the context of a Schools Project by exploring school pupil perspectives.

In summary, experiences vary among pupils as they depend on pupil needs, local contexts, logistical challenges and ensuring adequate project scaffolding. All stakeholder voices are critical at every stage of project planning, and medical student, community partners, and school pupil perspectives should be actively considered

**Table 1** Summary of recommendations for educators regarding the design and delivery of school-focussed service-learning projects

Lesson learnt	Recommendation
Service-learning projects must offer mutual benefits for all stakeholders	Educators should carefully consider constructive alignment in the planning phase of their service-learning project and explore how they may influence assessment
Opportunities for reflection are critical	Integrate opportunities for reflection throughout the course of the project to safeguard against changes in project delivery
Tailoring approaches to individualised learning needs and priorities is key to enhance learning and engagement	Involve school pupil perspectives centrally in the design of teaching sessions, alongside review of their curriculum coverage
Evaluating projects from all stakeholder perspectives is critical to developing a mutually beneficial project	Educators should consider impacts on perceived institutional messaging, curriculum alignments and community/student engagement at every stage of project development
Decisions regarding whether projects should be voluntary or mandatory are complex	Educators should consider whether, for their own context, a project should be voluntary, balancing providing the opportunity for all to participate with the risk of lower student engagement
Logistical issues are important and can detract from engagement	Please see online supplemental material 3 for an expansive list of logistical recommendations

during the design of projects and sessions, where possible. For community engagement projects to strike a balance between service and learning for medical students, reflection on experiences is critical and should be facilitated regularly to maximise benefit despite unanticipated changes to project delivery. Future research should focus on the impact of school projects in different institutional and international contexts, explore the implication of constructively aligned projects with adequate opportunities for reflection and further investigate the impact of voluntary and mandatory participation. Above all else, to create synergistic partnerships between medical education and communities, we must continue to explore and centre community partner voices in evaluation, research and design.

**Twitter** Megan E L Brown @Megan\_EL\_Brown and Ravi Parekh @Imperial\_Medic

**Acknowledgements** We would like to thank the three schools (and their staff) for all their time and effort in collaborating with us on this community engagement partnership project. We would like to thank the pupils for their engagement in these sessions, and for sharing their perspectives so openly with us within this research. Thank you also to our medical student participants for their candour and time. Thank you to Dr Victoria Collin for facilitating one of the school pupil focus groups.

**Contributors** MELB, NA and RP were responsible for conception and design of this research. MELB, NA and AK collected all study data. MELB, AK, NA and VS analysed all study data. MELB prepared the first draft of this paper, and all other authors (NA, AK, VS, RP) revised the work. All authors approved the final version of this manuscript submitted for publication and agree to be accountable for all aspects of the work. RP is the guarantor of the study and data.

**Funding** This article presents independent research commissioned by the National Institute for Health Research (NIHR) under the Applied Health Research (ARC) programme for North West London. Grant number: N/A.

**Disclaimer** The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

**Competing interests** None declared.

**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** We received ethical approval following the Imperial College London Education Ethics Review Process (EERP) (approval number: 2122-024a). Medical students provided written informed consent. As the school pupils we wished to recruit were under 16, we sought written, informed consent from their parents/guardians in alignment with school policies. Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** No data are available. As ethical approval was not obtained to make data sharing possible outside of the listed research team, no additional data are available.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially,

and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iDs

Megan E L Brown <http://orcid.org/0000-0002-9334-0922>

Ravi Parekh <http://orcid.org/0000-0003-0219-4956>

#### REFERENCES

- 1 Michener JL, Yaggy S, Lyn M, *et al*. Improving the health of the community: Duke's experience with community engagement. *Acad Med* 2008;83:408–13.
- 2 Strasser RP. Community engagement: a key to successful rural clinical education. *Rural Remote Health* 2010;10:1543.
- 3 Wilkins CH, Alberti PM. Shifting academic health centers from a culture of community service to community engagement and integration. *Acad Med* 2019;94:763–7.
- 4 Parekh R, Maini A, Golding B, *et al*. Community-engaged medical education: helping to address child health and social inequality. *Arch Dis Child Educ Pract Ed* 2022;107:397–401.
- 5 Hirsh D, Walters L, Poncelet AN. Better learning, better doctors, better delivery system: possibilities from a case study of longitudinal integrated clerkships. *Med Teach* 2012;34:548–54.
- 6 Pilling R, Mollaney J, Chandauka R, *et al*. "BURSTING THE BUBBLE": service learning in schools. *Clin Teach* 2021;18:163–7.
- 7 Brown MEL, Ard C, Adams J, *et al*. Medical student identity construction within longitudinal integrated clerkships: an international, longitudinal qualitative study. *Acad Med* 2022;97:1385–92.
- 8 Brown MEL, Dueñas AN. A medical science educator's guide to selecting a research paradigm: building a basis for better research. *Med Sci Educ* 2020;30:545–53.
- 9 Stewart T, Wubbena ZC. A systematic review of service-learning in medical education: 1998–2012. *Teach Learn Med* 2015;27:115–22.
- 10 Sigmon RL. *Linking service with learning in liberal arts education*. Washington, D.C, 1997.
- 11 Hunt JB, Bonham C, Jones L. Understanding the goals of service learning and community-based medical education: a systematic review. *Acad Med* 2011;86:246–51.
- 12 Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE guide No.131. *Med Teach* 2020;42:846–54.
- 13 Furco A. Service-learning: A balanced approach to experiential education. In: Taylor B, ed. *Expanding boundaries: serving and learning*. Washington, DC: Corporation for National Service, 1996: 2–6.
- 14 Biggs J. Enhancing teaching through constructive alignment. *High Educ* 1996;32:347–64.
- 15 Patalay P, Annis J, Sharpe H, *et al*. A pre-post evaluation of openminds: a sustainable, peer-led mental health literacy programme in universities and secondary schools. *Prev Sci* 2017;18:995–1005.
- 16 Sandars J. The use of reflection in medical education: AMEE guide No.44. *Med Teach* 2009;31:685–95.
- 17 Vipler B, Knehans A, Rausa D, *et al*. Transformative learning in graduate medical education: a scoping review. *J Grad Med Educ* 2021;13:801–14.
- 18 Finn GM, Brown MEL, Laughey W. Holding a mirror up to nature: the role of medical humanities in postgraduate primary care training. *Educ Prim Care* 2021;32:73–7.
- 19 Mezirow J. Transformative learning as discourse. *Journal of Transformative Education* 2003;1:58–63.
- 20 Brinker TJ, Stamm-Balderjahn S, Seeger W, *et al*. Education against tobacco (EAT): a quasi-experimental prospective evaluation of a multinational medical-student-delivered smoking prevention programme for secondary schools in Germany. *BMJ Open* 2015;5:e008093.
- 21 Wass R, Harland T, Mercer A. Scaffolding critical thinking in the zone of proximal development. *Higher Education Research & Development* 2011;30:317–28.
- 22 Malau-Aduli BS, Lee AY, Cooling N, *et al*. Retention of knowledge and perceived relevance of basic sciences in an integrated case-based learning (CBL) curriculum. *BMC Med Educ* 2013;13:139.
- 23 Chan SC, Ngai G, Kwan K. Mandatory service learning at University: do less-inclined students learn from it. *Active Learning in Higher Education* 2019;20:189–202.