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BMC Research Notes

RESEARCH NOTE Open Access

Navigating public health research in UK secondary schools: key challenges and opportunities identified by researchers

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Abstract

Objective Conducting health research with adolescents involves navigating complex challenges at both organisational and individual levels. As part of evaluating the EACH-B (Engaging Adolescents with Changing Behaviour) intervention—a school-based randomised controlled trial aimed at improving diet and physical activity in adolescents, we explored researchers' insider experiences of programme implementation. The study investigates real-world implementation challenges and protocol adaptations in the EACH-B trial to provide practical guidance for public health interventions in schools. Applying the Consolidated Framework for Implementation Research (CFIR), data were collected through semi-structured interviews and focus groups with 10 members of the research team.

Results Researchers identified significant barriers within the 'Inner' settings (internal research processes) and 'Outer' settings (external school environment and policy landscape). Research delivery was hindered by post-pandemic school priorities—specifically academic recovery and mental health support which limited the feasibility of maintaining adolescent engagement and school access. Researcher-led adaptations emerged as a critical, yet often hidden, component of maintaining trial fidelity. The study concludes that reflexive 'insider' perspectives and flexible designs are essential to align research with shifting school priorities. These adaptive strategies provide a blueprint for more resilient and feasible public health interventions.

Keywords Adolescent health, School-based interventions, Implementation science, CFIR, Researcher reflexivity, Public health, Process evaluation, COVID-19

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Introduction

Understanding how a programme is implemented is increasingly seen as vital to explaining its success or failure [18]. The outcomes of school-based trials are often shaped by the real-world operational decisions and adaptive strategies employed by the delivery team. This study forms part of the process evaluation of a school-based randomised controlled trial run by the NIHR-funded project Engaging Adolescents in Changing Behaviour (EACH-B). The intervention being trialled aimed to improve diet and physical activity among adolescents–an area where sustained engagement has been difficult to achieve [24]. The secondary school environment presents significant challenges for public health research. This setting is characterised by increased student autonomy and external peer influences on health behaviours, alongside the logistical complexities represented by specialist staff and rigid timetables that require students to pass between many different members of staff. Integrating external research activities here requires robust implementation strategies and a higher degree of organisational resilience compared to that required in primary school settings [15, 24].

Developed using a person-based approach [8], the EACH-B intervention incorporated input from adolescents, parents, schools, youth groups, and other stakeholders and included three components: teacher training in behaviour change (Healthy Conversation Skills), nine curriculum-aligned science lessons and a visit to LifeLab® (a hospital-based facility where young people experienced the science behind health messages), and a personalised digital app with gamified features. The evaluation of the intervention recognised that achieving high data quality and sustained student engagement is critically linked to the acceptability of measurement tools in the school context [11]. Standard assessment tools were adapted with this in mind while also considering their potential impact on student wellbeing.

This study is conceptually anchored in Implementation Science, specifically utilising the Consolidated Framework for Implementation Research (CFIR) [19]. While the CFIR is typically used to assess organisational readiness, we apply it here to explore the 'Inner setting'—the researchers' own operational environment—and the 'Process' of implementation. This emphasis on process reflects the inherent complexity and unpredictability of delivering complex interventions [15, 25].

Whilst researchers' positionality is widely acknowledged as central to qualitative data generation [7, 9, 10], , there is less emphasis on insider or peer research where researchers study their own team's processes [13]. Given their involvement in both delivering and evaluating interventions, researchers are uniquely positioned to observe how interventions unfold and adapt to real-world contexts [17]. By integrating CFIR with a reflexive 'insider' methodology, this study addresses a distinct gap in the literature: the lack of evidence derived from the proximal implementation efforts of the researchers themselves [7]. While Implementation Science has robust frameworks for assessing fidelity and adaptation, most research relies on external observations or post-hoc surveys of school staff, often overlooking the operational implementation work performed by the research team. By adopting an 'insider' methodological lens, this study moves beyond a descriptive account of school-based barriers towards a critical analysis of the 'implementation climate' [19] as experienced by those navigating it daily. This study positions researcher reflexivity not merely as a personal exercise, but as a formal data source that enhances the 'transparency and reproducibility' of complex trials [27]. This allows us to move beyond simply describing what adaptations occur to explaining the systemic and relational drivers behind them. Understanding the day-to-day decisions and dilemmas faced by these agents is necessary to analyse the underlying mechanisms of change, rather than merely documenting the changes themselves. Thus, the conceptual framework for this study is informed by implementation science, supplemented by insights from researcher positionality.

To ensure analytical clarity, the key concepts of this study are operationally defined within the context of implementation science. 'Challenges' refer to the systemic, logistical, and ethical barriers encountered within the 'Inner Setting' (research team) and 'Outer Setting' (school environment) that impeded trial delivery [19]. 'Opportunities' are defined as the enablers, such as institutional support or digital flexibility, that facilitated intervention acceptability and engagement. Finally, 'Navigation' describes the reflexive process and adaptive strategies employed by the research team to reconcile the tension between intervention fidelity and the real-world constraints of the school setting. To explore implementation, researchers were interviewed about delivering the intervention and running the trial, both of which involved engaging with schools and adolescents and adapting to constraints imposed by COVID-19. Their insights offer practical guidance for improving school-based public health interventions and research in evolving educational settings.

The research question guiding this study is therefore: how did the research team navigate practical implementation challenges and balance intervention fidelity during the delivery of a public health intervention in UK secondary schools? The specific objective was to examine the real-world implementation challenges experienced by the research team during the delivery of EACH-B trial. The study also aimed to identify specific adaptations made to the intervention protocol and analyse how researchers'

strategies contribute practical guidance for public health interventions in school environments.

Methods

Study design and participants

This was an exploratory qualitative study drawing on the tradition of 'insider research', a methodological approach where researchers occupy a dual role as both members of the group under investigation and observers documenting the shared experience [14]. As the purpose of the study was to explore researchers' reflections on the team's experiences of implementing a secondary school-based public health intervention trial, the authors themselves as both participated and analysts. This practice aligns with contemporary standards for reflexive and insider qualitative methodologies which emphasise that the researcher's contextual insights are a crucial input in understanding intervention implementation processes [25] and that this type of reflexivity is a central quality criterion for qualitative data analysis [4]. An invitation email detailing the study's aims was circulated to all eligible researchers. All ten members of the research team involved in the EACH-B trial were recruited using total population sampling [6], ensuring a full spectrum of perspectives. The cohort comprised six research assistants/fellows and four managers, all of whom worked on the EACH-B trial for two to five years, providing a rich 'insider' perspective on both the trial management and intervention delivery.

Ethical considerations and data management

Participants were explicitly informed that participation was voluntary and would not affect their employment or position. Written consent was obtained from every participant. Ethical approval was granted under the University of Southampton Ethics Committee (Ethics no. 49226.A11). All interview data were anonymised during transcription by replacing identifying details with pseudonyms or generic descriptors. Digital recordings and transcripts were stored securely on a password-protected, university-managed server and accessible only to the core research team.

Data collection

Data were collected between October and December 2022 by an experienced qualitative researcher new to the EACH-B project. Selecting an interviewer who was new to the project was intended to challenge the team's accepted ways of working and their pre-existing understandings, thereby eliciting the richest insights possible. A semi-structured approach to interviews was employed to explore in-depth the complex dilemmas and adaptations faced by the team. Four participants took part in individual interviews (20–45 min), two in a group interview (40 min), and four senior researchers in a 50-minute focus group (see interview guide in Supplementary File). Interviews were conducted once the trial had been completed and explored views on trial implementation and COVID-19-related adaptations. All sessions were audio-recorded and transcribed by an independent transcriber.

Data analysis

The anonymised transcripts were transferred to NVivo and analysed using a hybrid thematic analysis approach [3], which combined deductive and inductive coding. A deductive lens was initially applied, guided by the research questions regarding implementation processes; however, an inductive approach was simultaneously maintained to allow for new, unexpected themes to emerge from the participants' unique 'insider' perspectives. Following the initial generation of codes, themes were developed and reviewed through iterative discussions among all authors. This collaborative process ensured methodological rigour and enhanced the credibility of the findings by addressing potential uncertainties and biases throughout the analysis. To ensure maximum transparency, the reporting of this study adheres to the 32-item Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [20].

Results

Changing priorities within the education environment impacted delivery

Opt-in/opt-out – careful consideration of consent processes is essential

Early phases of the research study used an opt-in method to consent students to the intervention, which was reported to be burdensome for parents and teachers and led to low levels of recruitment. This was replaced with an opt-out process, which significantly increased participation. Traditional opt-in consent was maintained for collecting demographic data on participants: some schools achieved 100% parental consent for demographic data, but others faced challenges posed by inadequate communication and a lack of parental engagement, affecting data consistency and reliability (Table 1).

Competing demands on schools impact the delivery of interventions

Researchers found that remote intervention delivery during the pandemic was less engaging for teachers and students compared to in-person sessions. Variations in teachers' confidence affected the completeness of the intervention experience. Schools were hesitant to take on new commitments, challenged by absences and staff turnover. Post-pandemic, promoting a healthy diet and physical activity became lower priorities as mental health and behavioural issues took precedence.

Table 1 Quotes illustrating theme 1: changing priorities within the education environment impacted delivery

Theme	Supporting quote
1.1 Opt-in/opt-out – careful consideration of consent processes is essential	"But originally, the whole study was an opt-in study. So, we needed signed parental consent that was done electronically, for every single student, for them to take part in baseline, and then to do all the different bits for the study. Now we work on an opt-out process, with only opt-in for the demographics, which is a much more complicated method to explain to teachers, but it means our numbers and our participation rates are much higher." (Interview 1) "…one positive [aspect] was swapping to an opt-out consent, because from a data perspective, in some places you then actually set yourself up to get much more data." (Focus group)
1.2 Competing demands on schools impact delivery of the intervention	"So that [remote delivery] was one way we tried to mitigate the effects of it [the pandemic restrictions], and we tried to come up with ways to do this at a distance, but obviously it was really challenging, and it wasn't the same as us going in and the kind of hype and energy that you get from researchers being in the classroom." (Group interview S2) "Teachers got trained in healthy conversation skills, and where they took part in the training and really enjoyed and engaged with the training, I think they sometimes find it difficult to then implement it in their actual lives and remember things, because they have so much on their minds and so much to try and remember." (Interview 3)

Table 2 Quotes supporting theme 2: the necessity of an age-appropriate assessment and data collection approach

Theme	Supporting quote
Measuring adolescent health behaviour requires comprehensive, reliable and age-appropriate tools	"Now [post-pandemic] you're going into schools and a lot of students just aren't… they really are struggling to understand the questionnaires sometimes and asking you what I would consider very common knowledge things, like, you know, what's wholemeal bread, and what's semi-skimmed milk." (Group interview S1) "Some students with the GeneActiv actually [are] not much excited [by them]. I think that for the data collection, this was one of the challenges." (Interview 2) "They [adolescents] sort of had a quick look and didn't do it [app], having had loads of adolescents involved in the development. Some students struggled to install the app on their devices so, it does make me much more cynical than when I started out about using apps for delivering health interventions. They're such a transient, fast-moving thing that today's app is…" (Focus group)
Adequate researcher/student ratio required for optimum engagement and comprehension from adolescents	"That [smaller team] may have some impact on the quality of data, because quite often in the early days we were able to talk the students through each question. If they had any queries, they didn't have to put their hand up and wait for someone to come to them to get their question answered. So, it might be a case now that those questions aren't being answered, and some of the students are just completing the questions however they think is right. So, there might be impacts on the quality of data from going to the system that we use now." (Interview 1)

The necessity of an age-appropriate assessment and data collection approach

Measuring adolescent health behaviour requires comprehensive and age-appropriate tools

Despite the research using measures validated for use in this age group, the research team reported variation in questionnaire completion rates, affecting data quality. Specific questions on the food frequency questionnaire challenged some students. Post-pandemic, participants often needed more time and support. Completion speed reflected differing engagement levels. Students' reluctance to wear GENEActiv monitors was due to privacy concerns, discomfort, and the fact that they were unclear about the monitor's purpose. The school-based delivery of App, combined with device compatibility and installation issues, significantly limited student engagement (Table 2).

Adequate researcher/student ratios at data collection sessions are required for optimum engagement and comprehension

Researchers found that teams of five to six were more effective than smaller teams of two to three at data collection sessions in schools, enabling better student engagement and data quality. Initially, classes were split into groups of seven to eight, each supervised by a researcher for questionnaire completion. COVID-19 restrictions forced smaller teams, often limiting the researchers to just one or two, making it hard to ensure accurate responses from full classes of 30 students.

Discussion

The findings of this study provide a critical synthesis of the structural tensions inherent in school-based research. Despite these barriers, secondary schools remain a critical universal setting, offering unparalleled access to a large and diverse adolescent population, which is essential for developing equitable public health programmes [11]. Our findings extend this literature by demonstrating that the 'implementer's dilemma'—the tension between rigid trial fidelity and the fluid needs of the school environment is exacerbated by shifting institutional priorities.

The adaptations to the programme required by pandemic infection prevention measures, such as transitioning to online modules and bringing the LifeLab experience directly to schools, raised important questions about maintaining fidelity and effectiveness when adapting interventions for changing contexts [17]. This points to the necessity for flexibility in intervention implementation—a requirement that is not easily accommodated within a classic trial protocol. Such contextual shifts requiring significant trial adaptation have been widely reported in other Western school settings, highlighting a systemic need for new implementation

frameworks [16, 23]. This suggests that 'contextual fit' is not static but is subject to rapid policy and social shifts.

Furthermore, our analysis of the transition from opt-in to opt-out consent highlights a persistent administrative friction. While the shift to opt-out consent improved participation rates among students, teachers were still required to process opt-in forms for demographic data collection, placing an additional burden [19, 21]. Such administrative load is frequently cited as a primary determinant of implementation failure [22]. As an actionable solution, we suggest that future trials adopt a 'hybrid consent model' to maximise student reach while minimising teacher burden [21].

The issues that students experienced while engaging with the digital research component and assessment raise questions about the acceptability and effectiveness of digital interventions and activity tracking in school-based research. To address this, a strategic solution is to move beyond standalone apps toward 'supported digital delivery'. This involves ensuring adequate researcher-to-student ratios during data collection. Our findings provide a specific operational benchmark: maintaining a high ratio of researchers to students (e.g., 1:5) is a practical strategy to ensure data quality and student comprehension [1, 11], . This approach mitigates the risks of remote or unsupervised delivery, ensuring that interventions remain inclusive and effective in the complex secondary school environment.

Strengths of the study

Research on capturing researchers' views on challenges in school settings and how to address them remains scarce. This study contributes by acknowledging researchers' individual perspectives during complex intervention implementation, suggesting the necessity of adaptive research approaches in school health interventions. Our findings align with past studies [2, 5, 12], highlighting the importance of peer research and process evaluations in understanding research delivery and outcomes. While Byrne et al. [5] highlight the need for peer research to provide insider perspectives, Gradidge et al. [12] emphasise its role in fostering collaboration and interdisciplinary exchange.

Limitations

The primary limitation is the study's applicability outside a pandemic context as most implementation data relies on delivery adapted and disrupted by the COVID-19 pandemic. Additionally, the use of an insider methodology, where team members acted as both participants and analysts, offers valuable insights but challenges traditional ideas of researcher 'objectivity'. Drawing on established researcher positionality frameworks [14], we believe that harnessing the reflexive insights of team members is the only way that true 'research-on-research' can be conducted effectively. Rigorous reflexivity was used to mitigate bias, yet we recognise that prior assumptions may still have influenced the interpretation of themes.

Future research and policy implications

Future research would benefit from operationalising the insider perspective to rigorously test tailored strategies for optimising the research process. This includes developing and trialling standardised methods to navigate 'gatekeeping' and improve the feasibility of outcome assessments. Crucially, research is needed to establish best-practice frameworks for rapid study adaptation when external disruptions (e.g., curriculum shifts, health crises) occur. Concurrently, policymakers and funding bodies should incentivise study designs that formally align research with measurable school needs. Building resilient educational ecosystems that support United Nations Sustainable Development Goal 4 (SDG 4) ensuring inclusive and equitable quality education requires a shift toward localised mentorship and community integration [26]. For school leaders, this necessitates moving toward research-practice partnerships that embed research coordinator roles within school staff to reduce administrative friction. Finally, funders should formally integrate insider methodology as a mandated component of process evaluation and allocate resources for the human infrastructure and mentorship roles required to ensure that digital technologies effectively contribute to the global equity goals of SDG 4 [26].

Conclusion

In conclusion, this study offers a novel, insider perspective on the operational and contextual challenges inherent in school-based health intervention delivery. Its primary contribution is the demonstration that researcher-led adaptation is a form of 'hidden implementation work' that, if captured systematically, provides a model for more resilient trial designs. The key contribution of this insider methodology is demonstrating that the researchers' experiences constitute vital process data, providing unique insights into how and why adaptations were made and what operational challenges truly limit the feasibility of outcome assessments. By shifting from a descriptive to a critical 'insider' stance, this research provides a framework for future trials to integrate researcher reflexivity as a formal mechanism for monitoring the implementation climate. To achieve logistically feasible and less burdensome research, technology including online survey systems should be considered and specifically engineered to sustain adolescent engagement rather than simply digitising existing tools. Achieving long-term impact requires systemic policy alignment; funding agencies and governing bodies must recognise research in

schools as a strategic imperative, incentivising it through mechanisms like school inspection frameworks. Furthermore, sustainability necessitates that research findings translate into embedded, continuous school practice, supported by explicit systems (e.g., local authorities) for monitoring and resource allocation. These structural and methodological barriers must be overcome for the development of resilient, effective, and equitable public health programmes in schools.

Abbreviations

EACH-B	Engaging adolescents with changing behaviour
NIHR	National Institute for Health Research
NVivo	Qualitative data analysis software

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13104-026-07642-8.

Supplementary Material 1

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Author contributions

LK contributed to the study design, recruitment of participants and data collection. SS, SM and LK contributed to data analysis, interpretation, and manuscript writing. The wider team held regular meetings to review the analysis. All authors read and approved the final version.

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Data availability

The information collected from the study participants was personal and is not publicly available. Access will be considered for qualified researchers following a formal request to the corresponding author.

Declarations

Ethics approval and consent to participate

This study received ethical approval from the Ethics Committee (Medical), University of Southampton (ethics certificate number V3.4 11/11/22). The research was conducted in accordance with the Declaration of Helsinki. Informed consent to participate was obtained from all participants following a full explanation of the study procedures and documentation of their agreement.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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References

1 Anthony Jnr B. Implications of telehealth and digital care solutions during COVID-19 pandemic: A qualitative literature review. Inform Health Soc Care. 2021;46(1):68–83. https://doi.org/10.1080/17538157.2020.1839467.
2 Bergen N, Labonté R. Everything is perfect, and we have no problems: methodological challenges in researching organisational culture. BMJ Global Health. 2020;5(3):e002048. https://doi.org/10.1136/bmjgh-2019-002048.
3 Braun V, Clarke V. Reflecting on reflexive thematic analysis. Qualitative Res Sport Exerc Health. 2019;11(4):589–97. https://doi.org/10.1080/2159676X.2019.1628806.
4 Braun V, Clarke V. One size fits all? What counts as quality practice in (reflexive) thematic analysis? Qualitative Res Psychol. 2021;18(3):328–52. https://doi.org/10.1080/14780887.2020.1814044.
5 Byrne E, Brugha R, Clarke E, Lavelle A, McGarvey A. Peer interviewing in medical education research: experiences and perceptions of student interviewers and interviewees. BMC Res Notes. 2015;8., Article 403. https://doi.org/10.1186/s13104-015-1370-z.
6 Campbell S, Greenwood M, Prior S, Shearer T, Walkem K, Young S, Walker K. Purposive sampling: complex or simple? Research case examples. J Res Nurs. 2020;25(8):662–71. https://doi.org/10.1177/1744987120927206.
7 Dwyer DB, Nitz J. Qualitative researchers as instruments: Self-reflexivity as a path to credibility. Qualitative Rep. 2022;27(1):162–75. https://doi.org/10.46743/2160-3715/2022.5186.
8 Easton S, Ainsworth B, Thomas M, Latter S, Knibb R, Cook A, Roberts G. Planning a digital intervention for adolescents with asthma (BREATHE4T): A theory-, evidence- and person-based approach to identify key behavioural issues. Pediatr Pulmonol. 2022;57(11):2589–602. https://doi.org/10.1002/ppul.26091.
9 Fook J, Statham D, White S. Using research to foster critical reflexivity in practice. Qualitative Social Work. 2021;20(4):1017–31. https://doi.org/10.1177/1473325020938634.
10 Foss J. Teacher candidates' epistemic reflexivity about elementary science instruction. Disciplinary Interdisciplinary Sci Educ Res. 2025;7(11). https://doi.org/10.1186/s43031-025-00129-9.
11 Gonta I, Tripon C. Resilience in STEM: The role of well-being against media's unrealistic body ideals. Social Sci. 2025;14(3). https://doi.org/10.3390/socsci14030123.
12 Gradidge PJ, Draper CE, Casteleijn D, Palmeira A. Pharmaceutical workers' perceptions of physical activity and healthy eating: A qualitative study. BMC Res Notes. 2021;14:1–6. https://doi.org/10.1186/s13104-021-05511-9.
13 Hill NT, Bailey E, Benson R, Cully G, Kirtley OJ, Purcell R, Robinson J. Researching the researchers: psychological distress and psychosocial stressors according to career stage in mental health researchers. BMC Psychol. 2022;10(1):19. https://doi.org/10.1186/s40359-022-00701-w.
14 Holmes AGD. Researcher positionality—A consideration of its influence and place in qualitative research—A new researcher guide. Shanlax Int J Educ. 2020;8(4):1–10. https://doi.org/10.34293/education.v8i4.3232.
15 Kingsley E, Biggs K, Solaiman K, Packham A, Nekooi R, Bursnall M, Young T. Implementation successes and lessons learnt from a randomized controlled trial of a complex school-based intervention. Res Methods Med Health Sci. 2024;5:26320843231224804. https://doi.org/10.1177/26320843231224804.
16 Lazo-Porras M, Perez-Leon S, Cardenas MK, Pesantes MA, Miranda JJ, Suggs LS, Beran D. Lessons learned about co-creation: developing a complex intervention in rural Peru. Global Health Action. 2020;13(1):1754016. https://doi.org/10.1080/16549716.2020.1754016.
17 Loblay V, Garvey K, Shiell A, Kavanagh S, Hawe P. Can adaptation to 'extraordinary' times teach Us about ways to strengthen community-based chronic disease prevention? Insights from the COVID-19 pandemic. Crit Public Health. 2022;32(1):127–38. https://doi.org/10.1080/09581596.2020.1866152.
18 Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, Moore L, O'Cathain A, Tinati T, Wight D, Baird J. Process evaluation of complex interventions: medical research Council guidance. BMJ. 2015;350:h1258. https://doi.org/10.1136/bmj.h1258.
19 Nilsen P. (2020). Making sense of implementation theories, models, and frameworks. In B. Albers, A. Shlonsky, & R. Mildon, editors, *Implementation Science 3.0* (pp. 53–79). Springer. https://doi.org/10.1007/978-3-030-03874-8_3
20 O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: A synthesis of recommendations. Acad Med. 2014;89(9):1242–9. https://doi.org/10.1097/ACM.0000000000000388.
21 Ozer EJ, Wan-Ping K, Fagan J, Korduner J. Challenges and lessons learned from adapting a youth health promotion intervention in US schools during

the COVID-19 pandemic. Health Promot Pract. 2023;24(3):418–26. https://doi.org/10.1177/15248399221095033.
22 Redican KJ, Raczynski KA, Aronson RE, LaForge R. Implementation of school health programs: challenges and opportunities during the COVID-19 pandemic. J Sch Health. 2022;92(12):922–30. https://doi.org/10.1111/josh.13220.
23 Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, Hilton S. A new framework for developing and evaluating complex interventions: update of medical research Council guidance. BMJ. 2021;374:n2061. https://doi.org/10.1136/bmj.n2061.
24 Strommer S, Barrett M, Woods-Townsend K, Baird J, Farrell D, Lord J, Barker M. Engaging adolescents in changing behaviour (EACH-B): A study protocol for a cluster randomized controlled trial to improve dietary quality and physical activity. Trials. 2020;21:328. https://doi.org/10.1186/s13063-020-04256-2.
25 Toomey E, Hardeman W, Hankonen N, Byrne M, McSharry J, Matvienko-Sikar K, Byrne M. Focusing on fidelity: narrative review and recommendations for improving intervention fidelity within trials of health behaviour change interventions. Health Psychol Behav Med. 2020;8(1):132–51. https://doi.org/10.1080/21642850.2020.1720554.
26 Tripon C. Towards quality education for all: integrating EdTech, mentorship, and community in support of SDG 4. Educ Sci. 2025;15(9):1184. https://doi.org/10.3390/educsci15091184.
27 Woods P, Sikes P. Successful writing for qualitative researchers. 2nd ed. Routledge; 2022.

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