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Improving young people's health and well-being through a school health research network: Reflections on school–researcher engagement at the national level

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Abstract

The School Health Research Network is a policy–practice–research partnership established in Wales in 2013. The network aims to: provide health and well-being data for national, regional and local stakeholders, including schools; co-produce school-based health improvement research for Wales; and build capacity for evidence-informed practice in the school health community. School-focused engagement activities include providing member schools with bespoke Student Health and Well-being Reports, hosting school health webinars, producing school-friendly research briefings and holding annual events for schools. The network's model for co-producing research with schools is described and its impacts on schools is explored. These include more efficient recruitment of schools to research projects, school involvement in intervention development, schools beginning to embed evidence-informed practice by using their Health and Well-being Reports and other network resources, and securing funding to evaluate innovative health and well-being practices identified by schools. Drawing on the transdisciplinary action research (TDAR) literature, the article reflects on how TDAR principles have underpinned the progress of the network. The concept of reciprocity in the co-production literature, and its relevance to engagement with schools, is also explored, along with the network's contribution to our understanding of how we can build sustainable co-production at large scale in order to generate national-level action and benefit.

Keywords: co-production; school engagement; school health research; reciprocity

Key messages

- Building in reciprocal benefits for all policy, practice and research partners supports the development and sustainability of national engagement networks.
- Bespoke Student Health and Well-being Reports and a network manager providing a regular point of contact into the university research team are highly valued by schools.
- Effective and efficient data infrastructure can simultaneously support both school- and national-level policymaker engagement with research.

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Introduction

The potential for schools to positively influence young people's health and well-being is well recognized. Public health policymakers and practitioners take advantage of schools' near universal coverage of the school-aged population by utilizing them as a setting in which to deliver health programmes and health education to young people. As well as voluntary programmes, such as the World Health Organization's health-promoting schools model (Langford *et al.*, 2014), there has also been a move in recent years to integrate health and well-being within national curricula, such as in Scotland, New Zealand and the Netherlands (Donaldson, 2015). While England is a notable exception to this trend (Bonell *et al.*, 2014), current curriculum reform in Wales aims to make developing young people as 'healthy, confident individuals' a core purpose of its national curriculum and to establish health and well-being as one of six areas of learning and experience around which the curriculum is organized (Donaldson, 2015). This shift may reflect increasing recognition of the link between health, well-being and educational attainment (Bonell *et al.*, 2014), but schools do not always see health as part of their core business and/or face competing pressures on their time. Undertaking health improvement research in schools, and establishing sustainable pathways for knowledge exchange between researchers and schools to support evidence-informed practice, can therefore be challenging.

Yet there is an imperative to conduct school health improvement research and to rethink how it is conducted. First, there has been a failure on the part of health researchers to evaluate effects of school health improvement interventions on educational outcomes, such as attendance and attainment (Bonell *et al.*, 2014; Langford *et al.*, 2017). This means that, while the link between health intervention and education outcomes has a small evidence base, it is far behind where it could be and is insufficient to guide decisions on how resources to improve education outcomes should be distributed between health and education interventions. Second, there is a long history of implementation failure in models such as the health-promoting school, where programmes have failed to recognize schools as complex adaptive systems and engage with pre-existing system dynamics, leading to the most fundamental system-change elements of interventions being least well implemented (Keshavarz *et al.*, 2010; Kremser, 2011; Samdal and Rowling, 2011; Gugglberger and Inchley, 2012). Attempts to introduce change to complex systems creates disruption, triggering self-organization processes, as actors within the system work to return it to order. Where existing dynamics are directed toward de-prioritizing anything outside of 'core business', and health researchers fail to recognize and engage with these dynamics, self-organization processes may lead to any new intervention being washed out rather than accommodated into the system (Hawe *et al.*, 2009). Related to this, school health improvement programmes have also been criticized for using insufficiently complex theories, which focus on individual behaviour change rather than focusing on how the social dynamics of school systems may harm or enhance student health (Langford *et al.*, 2017). Recognizing school health improvement interventions as attempts to modify complex systems highlights the need for health researchers to collaborate fully with the actors who make up the system, and understand how and why it functions as it does. Employing strategies to engage schools and the education community with health research will therefore improve the relevance of health research to the education community, by ensuring that it addresses school needs and speaks to their key outcomes of interest, and improve our understanding of how school systems and assets drive health improvement (Rowling and Jeffreys, 2006).

The potential value of researcher–practitioner collaboration is well recognized, and the various strands of work within the literature, such as transdisciplinary action research (TDAR), co-production and engaged scholarship, have at their core the need to address the research-to-practice translation gap. Bridging this gap, it is argued, will lead to advances in both theory and practice that benefit academics and practitioners in different ways (Van de Ven and Johnson, 2006; Heaton *et al.*, 2016). Population-level change in health, however, requires effective collaboration between multiple system levels, recognizing that each unique school system also sits within regional and national health and education systems. Bringing policymakers into researcher–practitioner collaborations means that interactions between macro-, meso- and micro-levels of the socio-ecological model of health promotion can be better understood and modified for population-level impact (McLeroy *et al.*, 1988; Stokols, 2006).

Researcher–practitioner collaboration in health has been operationalized in the UK through a number of different structures. Primary Care Research Networks have successfully fostered a culture of practitioner-led enquiry and facilitated the use of evidence in practice by strengthening links between academia and primary health-care practitioners (Thomas *et al.*, 2001; Sullivan *et al.*, 2007). More recently, Collaborations for Leadership in Applied Health Research and Care (CLAHRCs) and Academic Health Science Networks have been established in England (Soper *et al.*, 2015; Greenhalgh *et al.*, 2016). In Wales, the Public Health Improvement Research Network brings together policymakers, practitioners and researchers to develop public health interventions and secure funding for their evaluation (Fletcher *et al.*, 2016). Likewise, there are examples of researcher–practitioner partnerships and networks in education that focus on using research to improve teaching practice and student attainment (McLaughlin and Black-Hawkins, 2004; Coburn and Penuel, 2016), including the Research Schools Network in England (EEF, 2016).

Yet examples of cross-sector collaborations that bring together health researchers and education practitioners in sustainable, long-term relationships are less common. In Canada, for example, Youth Excel linked researchers, policymakers and practice leaders to promote knowledge development and exchange across seven provinces (Riley *et al.*, 2011). Also in Canada, three ongoing projects have underpinned long-term practitioner–researcher collaboration with a process that feeds back local health survey data directly to schools and to other local, regional and national users in order to facilitate evidence-informed action, evaluation and policymaking, while also using the data for research (Cameron *et al.*, 2007; Schwartz *et al.*, 2010; Leatherdale *et al.*, 2014).

This paper describes the School Health Research Network in Wales, the first school network in the UK to bring together health researchers with policymakers and practitioners from health, education and social care. The network is a form of TDAR, described as coordination of three types of collaboration: (1) transdisciplinary scientific collaboration; (2) collaborations among researchers and community practitioners; and (3) inter-sectoral partnerships for designing and implementing public policies (Stokols, 2006). These three types are evident within the network through multidisciplinary research teams, collaboration with schools ('community practitioners') and partnering with regional and national stakeholders from health, education and social care. The evolution of the network and the multilevel partnerships and transdisciplinary activities that underpin its TDAR cycle are described in full elsewhere (Murphy *et al.*, under review). This paper focuses specifically on the second element of TDAR, 'collaborations among researchers and community practitioners (schools)' and describes how the network has operationalized school engagement at the national level and how the principles of

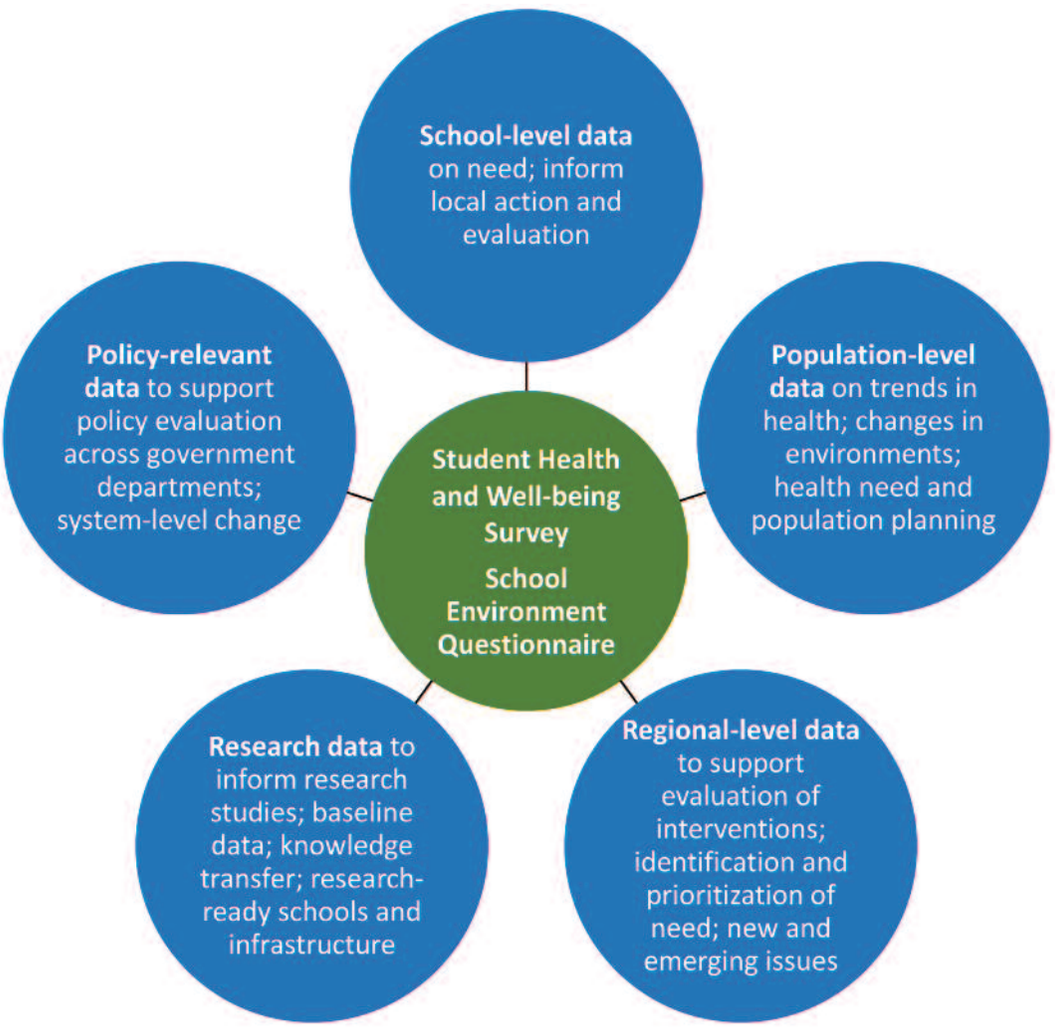
co-production are being built into the network's school health improvement research. We critically reflect on our progress towards co-producing research with schools, particularly the role of reciprocity within the network's development, sustaining co-production at the national level and the role of academic researchers as 'critical friends'.

The School Health Research Network

The School Health Research Network is a strategic partnership between Cardiff University, the Welsh Government, Public Health Wales (PHW) and Cancer Research UK. It aims to:

- provide robust health and well-being data for schools, and regional and national stakeholders
- work with policymakers and practitioners from health, education and social care to co-produce high-quality, school-based health and well-being research for Wales
- help schools, and those who support schools, to understand health research evidence and how it can be used in schools.

Figure 1: Network data infrastructure



The network was launched in 2013 and has developed over three phases: (1) feasibility; (2) scaling up; and (3) embedding and sustainability. Network members are schools serving mainstream students of secondary school age (11 to 18 years old). Sixty-nine schools joined in phase 1, with membership increasing to 115 schools in phase 2, just over half of secondary schools in Wales. Recruitment in phase 3 increased membership to 212 schools (100 per cent of eligible maintained schools). The network is led by a multidisciplinary research team at Cardiff University and has a dedicated manager, who has a background in schoolteaching, school health promotion practice and research.

The network has developed a flexible and responsive data infrastructure to collect data on school health and well-being practices, emerging issues and policy-relevant topics. Every two years, network school students complete a Health and Well-being Survey and each school receives a Student Health and Well-being Report. Schools also complete a School Environment Questionnaire, which allows relationships between school policies and practices and student health to be investigated. The infrastructure is a cost-effective way to conduct school-based surveys, research studies and natural experiments of new policies (Moore *et al.*, 2017), and meets health data needs at school, regional, national and international levels (see Figure 1).

Strategies for school engagement

Stokols (2006) emphasizes the importance of continuity of participation and regular communication to collaborations between researchers and community practitioners. These principles are built into the network through the activities described below, which offer schools resources to support their existing work on health and well-being, feed back findings from network research and provide access to new research evidence, university researchers and other schools.

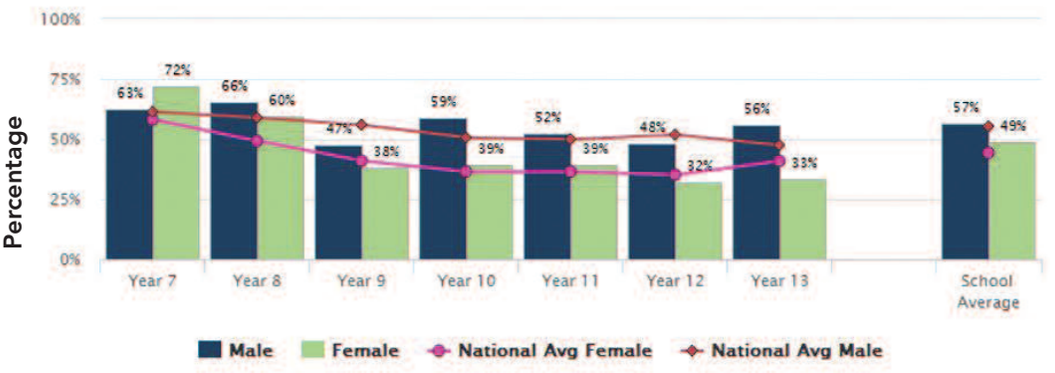
Student Health and Well-being Reports

Bespoke Student Health and Well-being Reports report each member school's student survey data by gender and year group, with national data for comparison (see Figure 2). Data charts are accompanied by recent research findings and ideas for action for different groups within the school community. At a practical level, the reports aim to encourage, and provide a resource for, evidence-informed health action planning. They also have relationship-building aims, and are intended to give schools something useful in return for taking part in the survey and to demonstrate the network's responsiveness to school priorities by including data on topics that schools have raised as concerns, for example new psychoactive substances.

Webinars

Webinars are an innovative approach to communication that enable 'live' contact with network schools at a national level. They are broadcast three times a year at the end of the school day and on different days of the week to facilitate school staff participation. Their purpose is to translate recent research findings, including analysis of the student survey and School Environment Questionnaire data, into a format suited to schools, and to provide an opportunity for direct communication with schools. After broadcast, they are posted on the network website for schools that could not join the live broadcast.

Figure 2: Sample chart from a Student Health and Well-being Report showing percentage of students who eat breakfast every weekday



Students at the Sheppard Academy

Research briefs

Network research is also translated for schools through research briefs. These are succinct summaries of the research findings and what they mean for schools. They are circulated to schools at the end of webinars and via the termly network newsletter, as well as being posted on the network website.

Network events

The value of face-to-face contact with schools was recognized at the network's launch event, and subsequently an annual event for schools has been held. The event is repeated in North and South Wales to facilitate participation, with a West Wales event added in 2017, and is held in June, following consultation with schools about the most convenient timing for them. The events provide an opportunity for network staff and other researchers to build relationships with schools, and for schools to have an opportunity to network with each other and talk about their health and well-being work, something many have little time to do, particularly with schools from other local authorities. The events also provide another opportunity to present research findings to schools, to gather school feedback on topics to include in the next student survey and to recruit schools to upcoming research projects.

The network's school engagement activities have explicitly sought to be compatible with, and supportive of, the Welsh Network of Healthy School Schemes (WNHSS), PHW's long-established, national school health programme. The terminology and grouping of health topics in the Student Health and Well-being Reports, for example, reflects those of WNHSS, and the strategic partnership with PHW means researcher and WNHSS practitioner resources are being linked in order to support both practitioners and schools. Connecting the two networks in this way aims to reinforce to schools that the School Health Research Network is not a conflicting initiative, and that engaging with research through the network will enhance schools' existing health and well-being work with WNHSS.

Co-production theory

The concept of co-production was developed in the USA in the late 1970s in resistance to centralization of service planning and delivery, and in recognition of the potential of closer collaboration between 'producers' of services and clients to transform public services (Ostrom, 1996). Over subsequent decades, co-production principles have been used by campaigners in various public service fields to try to move perceptions of service users from passive clients with needs to active citizens with assets, who can share responsibility with professionals and commissioners for the design of services (Flinders *et al.*, 2016).

Heaton and colleagues describe five core features of co-production (Heaton *et al.*, 2016). First, and as indicated above, users of services are regarded as active agents, not passive recipients. Second, relationships between service users and professionals become more equal and service user knowledge and experience are valued to the same degree as professional knowledge. Third, relationships between service users and professionals become reciprocal and mutually beneficial. Fourth, transformative service change results from service users' active involvement and renegotiated relationships with professionals. Fifth, networks and organizations encourage and facilitate service user involvement.

Co-production of knowledge has followed in the wake of co-production of public services, and represents the transfer of the concept to research, bringing with it an explicit change in academic research practice that brings policymakers, practitioners, special interest groups, communities and the general public into the research process (Flinders *et al.*, 2016; Heaton *et al.*, 2016). From the outset, such collaboration is purported to ensure that research questions are locally relevant, research designs are sensitive to local contexts, and research findings are more likely to be utilized and generate action and impact (Greenhalgh *et al.*, 2016). Underlying this change in research practice is an attempt to shift power from a small professional group (academics) to those who use and/or benefit from research, and to bring about a concomitant epistemological shift among academics to a position that values practitioner and service user knowledge and experience, and uses them to gain explanatory power (Flinders *et al.*, 2016).

A review of the community-based health service research literature has identified three common features of co-produced research (Greenhalgh *et al.*, 2016). First, it takes a systems perspective, acknowledging the complex ways in which organizations, contexts and interventions interact, adapt, reorganize and produce unpredicted outcomes. Attempts to change systems are therefore conceived as dynamic processes, rather than as discrete sets of rigidly standardized actions. Second, co-produced research is a creative endeavour, underpinned by the individual experiences of service users and practitioners. Third, process is crucial and includes how co-production projects are created, framed, governed and led. Inherent to this is the respectful and reciprocal nature of the relationships within the project.

It is clear from the literature that co-production is not a precisely defined concept, nor is there a clear and agreed method by which to operationalize it (Wehrens, 2014; Flinders *et al.*, 2016). One strong theme that does emerge from the literature, however, is the common assumption that co-production is an inherently 'good thing', with the potential to be transformative for both research and for society (Flinders *et al.*, 2016), although experiences of the challenges of co-producing research somewhat temper this enthusiasm (Orr and Bennett, 2012; McCabe *et al.*, 2016).

Operationalizing co-production in the School Health Research Network

Co-producing research is in its infancy in the network, not least because time and resources have predominantly been invested in building relationships with schools as a critical first step of co-production (Van de Ven and Johnson, 2006). However, a number of processes and strategies are being established to operationalize the network's ethos of co-production at different points in the research cycle.

First, the network endeavours to ask the 'right' research questions, that is, those that address schools' concerns and priorities, and to understand schools' experiences of the issue being investigated in order to yield a 'richer gestalt of the question' (Van de Ven and Johnson, 2006: 810; Evans *et al.*, 2016). Understanding school priorities is facilitated through the relationships with schools, but crucially the data infrastructure (see Figure 1) keeps research questions grounded in evidence of need, as schools use their Student Health and Well-being Reports to identify or confirm their key issues of concern; the reports help schools 'know what they want to know'. This process is further strengthened by the way that the network adapts the student survey content to schools' data needs, with data fed back via the Student Health and Well-being Reports.

Second, the network seeks examples of innovative health and well-being practice in member schools that could potentially be rolled out to a sample of schools and evaluated. A model has been developed and trialled to bring together school and researcher expertise, and to secure initial funding to fully articulate the innovation, explicate its underlying theory and identify its potential impact and prospects for wider adoption.

Third, the network engages member schools in developing health and well-being interventions, drawing on practitioner knowledge and experience to co-design interventions that are grounded in the realities of school life. Different approaches have been employed, including working with teachers and students in a small number of schools, first to develop the components of school-based health intervention and then to pilot the components (Hawkins *et al.*, 2016). Alternatively, researchers have combined a whole-network approach with focused work in a small number of schools. A project designed to inform development of a self-harm prevention intervention utilized the School Environment Questionnaire to gather school experiences and views across the network and then undertook staff focus groups in four purposively sampled schools to explore the issue further (Evans *et al.*, 2016). The value of engaging with schools at this early stage in intervention development was highlighted by the finding that schools had reservations about delivering universal self-harm prevention interventions, unless they were part of a more general mental health intervention or were delivered by external experts (Evans *et al.*, 2016).

Reflections on co-producing research with schools

Establishing reciprocal relationships

As outlined above, reciprocal relationships are a core element of co-production. Reciprocity has been described as an 'exchange in which there is an expectation of return that takes place between people who have a social bond, which is strengthened by the exchange' (Maiter *et al.*, 2008: 307–8). Reciprocity reinforces equality in relationships, another principle of co-production, but it also carries moral weight,

allowing one party to hold power over the other until the obligation to reciprocate is met (Maiter *et al.*, 2008).

Reciprocity is essential to the network, whose structure and operation are founded on the principle that partners and member schools will both contribute to the network and benefit from it. Below, we reflect on how the network has tried to establish reciprocal relationships with schools as a foundation for co-producing research with them.

The key reciprocal exchange between schools and the network has been the Health and Well-being Survey and Reports. Here, the network contributes by designing and funding the survey, and schools manage its distribution to students, contributing their time and effort to data collection. In return, the network obtains a valuable data resource for the network partners (see Figure 1) and schools receive their reports. The network was established on the basis of this reciprocal process and it has been fundamental to schools' engagement with the network, both instrumentally and symbolically. Feedback from schools indicates that the reports are of practical value to different groups within the school community and for different purposes. They have been used by school senior management teams, personal and social education coordinators, subject teachers, pastoral care teams and student voice groups. Reports have been used for health action planning, both within and between schools, curriculum planning, teaching, parent engagement and as evidence in school inspections. Crucially, they provide school managers with data on their own student body that they cannot get elsewhere. It is important to recognize, however, that schools' perception of the practical value of the reports may be partly contingent on elements of the Welsh education system and the wider national context that legitimize schools spending time and energy on student health and well-being. Well-being, for example, has for many years been part of the school inspection framework in Wales. The Welsh Government has also shown commitment to school health and well-being through funding the WNHSS and through supportive legislation, such as nutritional standards for school food and the Well-being of Future Generations Act, which requires local authorities to help create 'a healthier Wales'. Most recently, the Welsh Government has accepted the recommendation that health and well-being should be a core area of learning in the national curriculum. This supportive context has undoubtedly helped to make the reports a coveted asset for schools in Wales, but they would not necessarily be viewed as such elsewhere.

Feedback from schools, however, indicates that the degree to which the reports are used is variable and does not always reflect the enthusiasm with which they are received, although embedding cycles of planning, implementing and evaluating action based on report data is likely to take time. This suggests that the reports have a symbolic value in addition to their practical utility, as they demonstrate the network's commitment to schools and its credibility. These are demonstrated by the network providing a report to all schools that take part in the survey, regardless of whether they engage in any other aspect of the network. The reports are also distributed at a time (Easter) that is commensurate with school planning cycles, and their content is amended to reflect school data needs; for example, charts on new psychoactive substance experimentation were added in 2016, following discussions with schools at the network events.

The network manager (co-author Roberts) has been crucial in engaging schools and facilitating reciprocal relationships with them. The dedicated nature of her role as relationship-builder means that she has time to get to know member schools, and these informal communications have helped to build trust and establish the social

bonds across which reciprocal exchanges take place (Edelstein, 2016). A highly skilled communicator, her background in education and the WNHSS gives her legitimacy in school settings, and she has proved to be a highly effective intermediary between academic researchers and schools. She understands the landscapes, priorities and challenges of both academia and schools, and is thus in a strong position to help establish a 'common language' between the two, the lack of which is a commonly cited hindrance in researcher–practitioner collaboration (Coburn and Penuel, 2016). She helps researchers to understand schools' resource limitations, be they temporal, financial, political or ideological (Mansfield, 2016), and she takes the role of 'programme champion', helping schools to see the benefits of joining and supporting the network (Stokols, 2006).

The webinars and research briefs, as well as a termly electronic newsletter, help the network to maintain regular communication with schools over a wide geography. In addition to their knowledge translation and exchange aims, they further demonstrate to schools the network's commitment to reciprocity by 'plugging the gap' between the two-yearly Student Health and Well-being Reports with resources that are free, relevant to schools' health and well-being work and specifically designed for them. This variety of regular communications seeks to maintain the relationships established through the survey and reporting process by keeping the network 'in people's minds because they're basically primarily concerned with something else' (Edelstein, 2016: 207).

School participation in the live webinar broadcasts has so far been low, but their value may lie as much in the fact that they are offered as in their content. They demonstrate, for example, the network's awareness of the difficulty that school staff increasingly face in obtaining permission to be released to attend training. As discussed above, there can be a symbolic element to reciprocity, particularly in the early stages of engagement with schools (Pearson *et al.*, 2015), and it has been an explicit strategy of the network to 'give' first in order to initiate and embed reciprocal, trusting relationships with schools that will underpin co-producing research with them in the future (McCabe *et al.*, 2016). By demonstrating its 'stance of reciprocity' (Trainor and Bouchard, 2013: 988), the network aims to convey to schools its genuine desire to be a sustainable and reliable resource for their health and well-being work, but also for schools to feel Maiter and colleagues' (2008: 307) 'expectation of return', so that they engage in co-producing research that will ultimately bring benefits to both them and the network partners. There are indications that this is happening, as recruitment of schools to research projects, particularly when done face-to-face at the network events, is accelerating.

A key factor that facilitates researcher–practitioner collaborations is ensuring that all relevant groups are represented within the collaboration (Stokols, 2006), so it is important to note that the reciprocal relationship with 'schools' described above is predominantly with school senior managers and does not yet encompass the wider school community, including students, parents, school governors and non-teaching staff. Establishing processes whereby students and parents feel they can both contribute to and benefit from the network will be challenging, particularly on a national scale, but the network is beginning to explore this with students (see below). The challenges of involving parents in school-based initiatives, particularly at secondary school, is well recognized (Inchley *et al.*, 2007; See and Gorard, 2013), and the least well-implemented element of the health-promoting school framework (Langford *et al.*, 2017), and this remains a complex issue for the network to address.

Sustainability and scale

Sustained collaboration is a recognized feature of successful co-production and effective research utilization (Stokols, 2006; Greenhalgh *et al.*, 2016), and network-type structures such as CLAHRCs and the School Health Research Network are an effort to create an infrastructure to support this. Sustained collaboration helps to address the temporal friction in co-production, arising from the discrepancy between the time needed to build trusting relationships that have the capacity to co-produce research and the relatively short timeframes of research funders and electoral cycles (Flinders *et al.*, 2016). Sustaining collaboration through a network model means that, as with initiatives such as CLAHRCs, relationships between researchers and schools endure beyond specific research projects (Heaton *et al.*, 2016). The need to reinvent the co-production wheel each time a new project starts is therefore avoided as a degree of trust and understanding is already in place.

The inherently reciprocal nature of the network's structure and operation is also relevant to sustainability, because it draws in and draws on powerful national bodies that can offer strategic support and financial resource to the network. The partnership structure connects national stakeholders to member schools and links resources from both to co-produce data and research evidence that are mutually beneficial. The reciprocal relationship with schools has been described above, but the partners' relationship with the network is also reciprocal. The Welsh Government and PHW benefit from the robust, relevant evidence the network produces, which informs national and regional policymaking and programme planning. In return, they offer the crucial political and financial support that sustains the network (Stokols, 2006), thereby creating the time, space and legitimacy for schools to engage in co-production. The network seeks to sustain this critical support by identifying national partners' strategic and/or long-term data needs, such as monitoring indicators for the Well-being of Future Generations (Wales) Act.

While the national nature of the network is a challenge in some respects, it also potentially strengthens network sustainability, as the large membership means no school is asked to do too much. Equal contributions are not a prerequisite for successful collaboration (Edelstein, 2016) and the network accommodates schools' different capacities to be engaged with co-producing research and encourages them to maintain their membership when their own circumstances change, by continuing to offer all the benefits of membership. Schools, for example, are encouraged to include all their students in the health and well-being survey, but can opt to include the minimum of two classes per year group or half the year group, if local circumstances do not permit them to include all students. Participation in other research projects is always the school's decision. The agreement that head teachers sign on joining the network specifies only that they 'give full consideration to invitations to take part in research studies', not that they have to take part in a research project within a given timeframe. This degree of flexibility, made possible by the national nature of the network, helps to sustain school membership of the network. It is important to acknowledge, however, that co-production with schools on a national scale, even a small one such as Wales, is new territory, and methods through which a small team of university staff can more deeply involve more schools are yet to be fully explored.

Maintaining critical friendships

The potential of co-production to be empowering and transformative is well known in the literature, but warnings to be cognizant of the risks and politics of co-production

are also being voiced to try to minimize an emerging 'rhetoric–reality gap' (Flinders *et al.*, 2016: 262). As noted earlier, following co-production principles requires an epistemological shift for researchers, moving away from the traditional research model of the passive researcher who minimizes bias by adopting a neutral position to one who values local knowledge, breaks down the researcher–researched boundary and works on an equal footing with local actors to generate new knowledge. The former can be criticized for its potential to overlook or disregard important local knowledge for the sake of maintaining a safe distance (Berwick, 2008), but the latter carries risk too. Striving for objectivity and methodological rigour are fundamental to 'good' science, and co-production can be seen to risk undermining these principles (Ziman, 1996; Greenhalgh *et al.*, 2016) if academic researchers prioritize maintaining relationships with their non-academic partners over exercising their expertise as scientists, the very asset they bring to the collaboration.

Experience of working with schools in the network has highlighted to researchers the importance of 'critical friendships', and the skill required to maintain these when schools seek help to evaluate programmes or approaches that they have developed, possibly over many years, and are already fully implemented and well established in their school. Such situations have brought to light how subtle differences in school and researcher perspectives can risk evaluation projects progressing without a shared understanding of the research question or the focus of the evaluation (Brewster *et al.*, 2015). While schools, for example, might see a project as a means to affirm that what they are doing 'works', researchers' tendency is to take a more distanced stance, focusing more on the scalability of the programme and the generalizability of its outcomes. This is an example of the discord Van de Ven and Johnson (2006: 806) describe between practitioners' highly localized focus and researchers' 'quest for generality'.

Co-production brings together a group of people from different professions who hold a diversity of viewpoints, so it is highly unlikely that conflict can be avoided, (Van de Ven and Johnson, 2006), particularly if all involved are striving to be critical friends to each other. The inevitability of conflict in co-production, however, is not necessarily detrimental and it is argued by some that it is actually essential to the co-production process (Van de Ven and Johnson, 2006; Greenhalgh *et al.*, 2016). An ethos that encourages constructive, task-oriented conflict, and places it at the centre of a project so that it fuels creativity and innovation can drive successful co-production, but it needs skilled and sensitive management to avoid interpersonal conflict, which has far more potential to be damaging (Greenhalgh *et al.*, 2016). While network researchers have recognized the importance of maintaining the role of 'critical friend', being so in practice can take significant resolve. With a strong sense of wanting to nurture schools' enthusiasm for evaluating their practice and co-producing new knowledge, researchers can feel they are quashing that enthusiasm and being counterproductive if they are honest and explicit at the outset about what different types of evaluation can achieve, if they perceive that they will not meet schools' expectations. However uncomfortable those conversations might be, though, they represent task-oriented conflict and their potential to strengthen the project by harnessing the differences between researcher and school perspectives should be embraced. Addressing the 'expectations gap' (Flinders *et al.*, 2016: 269) might also avoid more significant damage to the network's relationships with schools caused by interpersonal conflict.

Moving forwards

Key to the network's future progress is the need to further our understanding of how to co-produce research with schools in a way that meets their needs and capacity. Every school is a unique complex system interacting with local, regional and national contexts, and schools' capacity to co-produce health and well-being research is therefore highly variable, not only between schools, but also within a school over time (Rowling and Jeffreys, 2006). Such variation is captured within the various typologies of collaboration and co-production that exist, such as that from McCabe and colleagues (2016), who describe three types of collaboration on a continuum from knowledge transfer, through knowledge exchange to knowledge leverage (co-production). There is an inherent assumption here that knowledge leverage is superior to knowledge transfer and exchange, but pragmatically, the relationships that develop between the network and its member schools will represent all three types of collaboration in different schools and at different times. What is crucial is that the meaning of co-production and how it is operationalized within the network are negotiated and constructed with schools themselves (Mansfield, 2016), not imposed upon them by academic researchers. The strategies and methods we develop to co-produce research with schools will prioritize maximizing school involvement while being sensitive to their capacity, rather than striving to align with the typologies described in the literature.

Returning to Heaton and colleagues' (2016) core features of co-production, the network perceives school staff as active agents in the co-production process, whose role is complementary to that of researchers, and positions them as education experts with assets, knowledge, experience and alternative perspectives. These, when combined with those of academic researchers in the research decision-making process (McCabe *et al.*, 2016), will generate new knowledge that meets the network's overall aim of improving the health and well-being of young people, while also benefiting academic researchers and schools by simultaneously advancing both theory and practice, and addressing internal agendas such as inspections (schools) and academic publications and the research impact agenda (universities) (Van de Ven and Johnson, 2006). In the longer term, the network's programme of work on research capacity development in the school health community may see some school staff move towards a role of practitioner–researcher, a transition that may be facilitated by the Welsh education sector's recent recognition of the need to embed a culture of evidence-informed practice in the teaching profession (Furlong, 2015). Such a role is commonly championed as a means to improve education practice (Donaldson, 2011), but is as yet untested in school health improvement.

When and how to measure the impact of the network is another issue to address as it progresses. Defining what constitutes 'success' for the network in the short, medium and long term is a process that will need to be negotiated within the network so that it is pertinent to different stakeholders, but it is important that it incorporates both formative (process) and summative (outcome) criteria (Stokols, 2006). Evaluations of research–practice partnerships in education have neglected to do this, tending to focus either on process or outcome, thereby limiting their ability to elucidate the mechanisms through which these partnerships generate outcomes (Coburn and Penuel, 2016). Within health, a recent evaluation of the CLAHRCs included both and evaluated the CLAHRC models, operating contexts and outcomes in terms of changes in clinical practice, but not patient outcomes (Soper *et al.*, 2015).

Improvements (or not) in health and well-being and educational attainment are key 'final' outcomes for the network. However, Greenhalgh and others (2016) argue that there is limited mileage in trying to measure the downstream impacts of co-produced research, given the complexities of the systems and contexts in which it exists, which make it difficult to establish causality, particularly over the longer timeframes that some outcomes may take to emerge. Other outcomes that could be captured include cultural shifts in the education community towards evidence-informed practice and the spread and scale of innovation (Coburn and Penuel, 2016). However, evaluating the processes through which the network generates new knowledge, and facilitates its use in practice, will substantially advance learning about co-production in a national network and its impact on complex systems (Greenhalgh *et al.*, 2016).

As well as the 'how' and 'when' of evaluation, we should also consider the 'who'. Co-production projects are rarely externally evaluated and are frequently in narrative form, written by academic researchers who were participants in the project and draw positive conclusions about co-production in general and about the project being evaluated (Coburn and Penuel, 2016; Flinders *et al.*, 2016; Greenhalgh *et al.*, 2016). Being critical of one's partners can be difficult, particularly in ongoing collaborations, so the value of an external evaluation, which can probe impartially into the full range of perspectives within the collaboration, is clear (Coburn and Penuel, 2016; Flinders *et al.*, 2016), not least because it is more likely to satisfy the funders of the project or collaboration (Greenhalgh *et al.*, 2016).

As the network moves forward, a key area for development is the representation and involvement of other groups within the school community, most importantly students. Some students are involved at the local level through student-led review of their school's Student Health and Well-being Report and subsequent action-planning, but this does not yet happen in all schools. Students are also involved in research projects, such as the intervention development projects described above, but processes that engage them more directly are only in the early stages of development. Initially, these will explore how the university's successful young people's research advisory group model, ALPHA, could be adapted to be based in school rather than university.

The momentum generated by the network is evidenced by its rapid progress towards complete membership of secondary schools in Wales, and it is crucial that it capitalizes on this momentum in order to realize its vision of evidence-informed school health policy and practice in Wales. Key to ongoing development and sustainability will be ensuring that reciprocity remains at the heart of the network: it must continue to deliver tangible benefits to schools and partners, while drawing on their resources to meet its aims. While much remains to be done to develop our understanding and execution of co-production with schools, a key early lesson from the network has been the value and utility of the survey and reporting infrastructure, both as a tool for engaging schools across a wide geography and as a means to help co-produce research that will identify sustainable, effective interventions, with an understanding of for whom they work best and in what circumstances (Fletcher *et al.*, 2016). The network's continuing development of co-production processes with schools and partners will be a valuable contribution to the field, while the research evidence those processes produce will form the bedrock of sustained school health improvement in Wales.

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