

What young people report about the personal characteristics needed for social science research after carrying out their own investigations in an after-school club.

Lucinda Kerawalla and David Messer*

Faculty of Wellbeing, Education and Language Studies, Open University, Walton Hall, Milton Keynes, MK7 6AA

*Corresponding author.

Several arguments have been put forward about the benefits of young people carrying out their own social science research in terms of empowering their voices and their participation. Much less attention has been paid to investigating the understandings young people develop about the research process itself. Seven twelve-year-olds carried out self-directed social science research into a topic of their choice. Towards the end of their six months experience we used a questionnaire and follow-up semi-structured interviews to investigate, from a socio-cultural perspective, what the young people thought about being a researcher. Thematic analysis of the interviews identified three themes and eight subthemes suggesting that they were aware of: the need to demonstrate researcher/research integrity (be thorough, truthful, orderly, and have a good understanding of research process); the need for good interpersonal skills and standards; and good self-management skills (be resilient, agentic, committed, and good at time management). We discuss how first-hand social science research experience might: be relevant to several areas of schooling; give young people experience of the personal characteristics important for success; help young people to realise that they can be social science researchers, and offer advanced and novel learning experiences outside the constraints of the school curriculum.

Introduction

We report on an investigation into what young researchers learn about being a social scientist by conducting their own social science research. The notion of young researchers (or child-led research) within the discipline of Childhood Studies originated in response to article 12 (Respect for the Views of the Child) of the United Nations Convention on the Rights of the Child (UNCRC, 1989). Research led by children and young people is associated also with the development of a 'new sociology of childhood', an approach to evaluating the experiences of children and young people which argues that more attention needs to be paid to understanding children's perspectives of their own lives (e.g. Cosaro, 2005). One way that this can be achieved is by supporting children and young people to conduct their own social science research (e.g. Fielding, 2001, 2003; Kellett, 2005; Bucknall, 2012; Cheminais, 2012; Kim, Sheehy and Kerawalla, 2017), or for very young children to be reconceptualised as researchers (e.g. Murray, 2017).

Organisations (e.g. charities, schools and children's service providers often see the development of young researchers as a way of including children and young people in developing understandings of their own circumstances and enabling them to have a say in the services provided for them (e.g. Fielding, 2001; Kellett, 2011a). More recently a new research methodology has been developed - youth participatory action research (YPAR) – where young people work in dialogue with others (their peers and/or adults) to generate shared data that is employed as evidence to empower the young people to address social injustices that they experience within institutions (e.g. school or community organisations), thus transforming their lives (e.g. Cammarota and Fine, 2008). Moreover, some psychologists (e.g. Kerawalla, 2014) have illustrated how research led by children and young people is a methodological approach that can empower children and young people to communicate their understandings of the world and to become advocates for the opinions of their participants.

So, to date the aim of supporting children and young people as researchers has been to promote children's and young people's rights by empowering them to participate in society. The current paper takes a different approach by trying to understand, from an educational perspective, young researchers' thinking about the research process. Specifically, we investigate what young researchers learn about the personal characteristics needed to be a social scientist by carrying out their own investigations in an after-school club.

Rationale for the current study

In recent years, the Children's Research Centre at the Open University has taken a fresh, cross-disciplinary approach to supporting young researchers which draws on the fields of Childhood Studies, Psychology, Education, and Technology-Enhanced Learning. As members of the Children's Research Centre, the authors of the current paper, who are psychologists, are concerned with evaluating what young researchers *learn* about social science and what it takes to be a social scientist from leading their own social science research. Social science can be defined as the study of human behaviour - the "beliefs, desires, expectations, preferences, hopes, fears, wants, that make actions *meaningful* or *intelligible* to ourselves and one another" (Rosenberg, 2008 p.17 italics as original) – and social scientists are the people who study it. The 12-year-old researchers in the current study were supported in carrying out systematic, ethical, and critical social research (Kellett, 2005) in pursuit of furthering their understanding of the perspectives of members of their local communities. Hence, our focus moves beyond just empowering young people to bring about change; we are concerned also about participation and empowerment through learning, and evaluating what it is that is learnt in this context.

Previously, research reports and presentations produced and delivered by YRs have been offered as evidence of what they can achieve (e.g. Kellett, Forrest, Dent & Ward, 2004; Kellett, 2011b), but there does not appear to have been any systematic and detailed investigation into what understandings YRs have about the research process. In previous investigations, interview questions such as 'what did you learn/gain by doing your own research?' have often elicited responses from YRs that are largely predictable and which gloss over the details e.g. "It [...] helps you learn a lot of things, and lots of us learnt what new words meant and it's fun and it's really interesting and it gives you experience of what it's like to be a researcher" (Bucknall, 2009 p. 243). Similarly, responses from teachers can be equally vague: "there is growth, there is learning, there is increased awareness, self-confidence..." (ibid. p. 249). Thus, we know little about the thinking of YRs about the research process, and the types of responses that have been reported suggest that it can be difficult to elicit in depth reflections from YRs during interviews that employ straight forward 'what do you understand?' questions.

To attempt to address these issues we report on the experiences of seven 12-year-olds carrying out self-directed research projects of their own as part of an after-school 'social science researchers club'. This gave them the opportunity to experience social science and understand what it takes to be a social scientist, and to lead their own social science research from beginning to end (i.e. choose their own topic, create their own research question, develop their own data collection tools, collect, and analyse their own data and share their research with an audience). At the beginning of these projects we asked the YRs to help us with our investigation to provide an understanding of their thinking about the characteristics needed for social science research after they had taken part in an after-school 'social science researchers club'. Thus, the YRs carried out their own investigations and towards the end of this process they provided us with information about their thinking for our research purposes. These dual collaborative research processes were acknowledged at various points in the after-

school activities such as when the YRs provided us with a signed consent form, and when they had to obtain a consent form from the participants who took part in their investigation.

To gain information about the YRs thinking we took a relatively new approach by using an avatar questionnaire (see below for more details) and then follow-up semi-structured interviews to facilitate YRs' reflections on the personal characteristics that they think they or others need to possess in order to carry out effective research and why these characteristics are important. In this way, we could gain insights into the thinking of the young people about being a researcher and doing research, and understand better what they had learned from their investigative experiences. Such thinking has clear implications for the development of employability skills and for building on what children learn in school in order to open doors to potential future careers in the social sciences.

Our focus on the personal characteristics of researchers was underpinned by our socio-cultural perspective (e.g. Vygotsky, 1978) which defines the development of understanding as being a matter of appropriating the tools of a given culture or society (e.g. Säljö, 1996; Wertsch, 1991). Therefore, in order to be a researcher, a YR needs to learn the ways of talking, thinking, being and doing that have been validated as 'scientific' by the wider scientific community (Mortimer and Scott, 2003): "To learn is to appropriate psychological tools and conceptual resources that fit certain needs in certain activities rather than to internalize a "neutral" image of the world" (Säljö, 1996 p.13). Our investigation sought to access ways of being and doing by asking YRs questions about what characteristics are needed to be a researcher and do research, and what are the personal characteristics that can be used to describe themselves as researchers.

Another reason for the focus on personal characteristics was because of the dearth of research about this topic; most resources about 'doing research' are designed for adults and focus predominantly on the standard of the research rather than the personal characteristics required of the researcher in order to meet these standards. For example, Denscombe (2002) offers a 10-point guide for social science researchers which includes the need for the *research* to be relevant, original, accurate, objective, ethical and cautious, but no mention is made of the personal characteristics required of researchers. Similarly, resources are available to support researchers with the design, conduct and analysis of interviews (e.g. Siedman, 2012), but little attention has been paid to identifying the personal characteristics of researchers, particularly YRs, that are needed for them to carry out this work. The one exception that we are aware of is Cheminai (2012) who lists the "skills and qualities of a pupil-researcher" (p.12) but these are generated by the author; they do not represent the perspectives of the pupil-researchers themselves. Consequently, the study of young people's understanding of the personal characteristics needed for social research can contribute to the limited literature about this topic and, these understandings could be relevant for discussions about classroom learning in other subject areas, the development of employability skills and careers in research.

To summarise, the current case study of seven young people (aged 12 years) was designed to identify the positive personal characteristics that they believed were needed for them to carry out research, based on their own experiences of conducting their own investigations over six months. Our research questions concerned: how do YRs describe the personal characteristics of a researcher, and why do they think these are important?

Methodology and analysis

We adopted an interpretive paradigm as we are concerned with investigating the subjective experiences of our participants and how they construct meaning (see Punch, 2014). This is consistent with our socio-cultural theoretical perspective of experiences as being socially constructed and culturally situated (Vygotsky, 1978). Our data collection tools are designed to give the YRs an opportunity to convey how they make sense of being social science researchers. Full details of participants, the after-school club, our data collection tools, and data analysis are below.

Participants

Nine young people aged 12 years at a large rural secondary-level (high) school in central England agreed to take part in the project. They were invited to attend an extra-curricular after-school 'social research club'. No teachers were involved and the participants were selected by the school librarian, who had worked with the first author for four years and who was responsible for overseeing the well-being of the pupils during the sessions. Alongside her substantive role, the librarian provided pastoral support to all school pupils, so she knew them well. She selected pupils based upon her understandings of who would benefit the most. Reasons ranged from giving a child with dyslexia an opportunity to 'show what they could do' to giving children an opportunity to engage in 'something different'. As such, the participants represented a range of abilities and enthusiasms but they were not randomly selected and may not have represented other young people attending the school. Two boys dropped out approximately half way through the study period (for ethical reasons they could not be followed up) so our findings are from one male and six females.

Following a favourable opinion from the Human Research Ethics Committee at the authors' institution, informed consent was given by the participants and their parents. They were advised that attendance at the after-school club was entirely voluntary and that the young people were free to change their mind at any time; they could decide to leave the club altogether or attend the club and discontinue their participation in the authors' research, neither of which would impact negatively on them in any way. Participants and parents were told that findings from the questionnaire and anonymised quotes from the interviews would be published. They were advised that all records and data would be stored on password-protected University computers, be accessible to the authors only, and destroyed once the research was complete.

The social research club

Fifteen after school sessions lasting approximately seventy-five minutes each took place over a period of six months. The first author led the sessions assisted by the second author, and the librarian helped with organisation etc. Two YRs worked as a pair and the remainder worked individually. The after-school sessions were focused on supporting the YRs to carry out their own systematic, ethical, and critical research. The YRs chose a community-based topic and generated a research question of their choice. Their research topics were:

- Community safety and policing
- Community care for older people
- Dental health
- Local provision of takeaway meals
- The role of local charities

- The development of rural villages

Following the creation of their research questions, the YRs were given responsibility for choosing their own research methods, designing their own data collection tools, collecting their own data, analysing their data, and making a research poster to be presented at a Young Researchers' Fair held at the authors' institution. During the face-to-face after-school sessions the focus was on introducing the YRs to the main features of research (such as the stages of research process) and some research terms (e.g. interview, data and qualitative) thus preparing them to be able to continue with self-directed learning at home using the MyShout! web site developed by the first author.

The MyShout! web site has been used successfully in the past and is described in detail elsewhere (Kerawalla and Webb, 2014). It offers technical how-to support; various learning objectives are met by the YR engaging with a range of online activities. Once activities are complete, the YR is invited to make decisions about how to apply what they have learned to their own research (e.g. they learn about various data collection methods and then choose their own). Their decisions are then discussed at the next face-to-face session. The YRs were not given any instruction regarding the personal characteristics required to be a social science researcher.

All the YRs were required to interview a key member of the community (e.g. a police officer) who could shed light on their research question and then collect data about the opinions of members of the community as a whole (e.g. to ascertain their perspectives on community safety). All YRs chose to design a questionnaire. Following the completion of data collection and analysis, the YRs made posters which they presented two weeks later at the Young Researchers Fair.

Data collection tools (used by the authors of this paper)

The research reported here was part of a larger study with the same participants (see Kerawalla and Messer, under review) where the overarching aim was to understand better what young researchers learn by undertaking their own research. Two data collection tools were used: an avatar questionnaire and a follow-up semi-structured interview schedule. The avatar questionnaire was divided into two parts: each part addressed a different aspect of learning and the questions associated with each part were addressed separately in the follow-up interviews. The findings from one part of the questionnaire, which focussed on evaluating YRs' understandings of the personal characteristics of a social scientist, is the focus of this report. Also, we carried out later interviews about a different topic but findings from these are beyond the scope of the current paper and are reported elsewhere.

The design of the avatar questionnaire was informed by previous work by Collins, Devine, Holliman & Russell (2015) who investigated the ways in which young people describe the ideal qualities of university researchers during public engagement activities. In the current study, avatars were represented as a gender-neutral line drawing consisting of a circular head on top of a square torso with two internal lines as arms. The questionnaire consisted of eight questions broadly aligned with the stages of research process described in the MyShout! web site (Table 1), each of which appeared on a separate page above four avatars. The YRs were asked to write down four personal characteristics, one per avatar, in response to each question based upon their own recent research experience.

[Table 1]

Given that they were being asked to think of 32 personal characteristics in only 20 minutes, the YRs were provided with a prompt sheet with 20 positive personal characteristics commonly used to describe people (Table 2) drawn from Anderson (1968). The YRs could use this resource to inform their responses and/or they could use their own words. Before they started, the YRs' understanding of each personal characteristic was checked and they were advised that they were free to ask for definitions at any time. The YRs first completed a practice page where they were asked to reflect upon the personal characteristics they thought were important to get through a school day, and to write these down under four corresponding avatars. The main questionnaire was completed quietly and the YRs sat apart to ensure the responses were their own.

[Table 2]

Each YR participated in a follow-up interview with the authors on the day after the poster presentation event. The interview focused on exploring the YRs' perspectives about the personal characteristics they had written on the avatar questionnaire. The interview was resourced with copies of the completed questionnaires. The YRs were asked broad opening questions such as 'can you tell us about the personal characteristics you have written down here' with follow-up probing questions as appropriate e.g. 'why do you think it is important for a researcher to be calm when collecting data?' The authors had built a good rapport with the YRs and it was felt that this contributed to the accuracy of the YRs responses. Each interview was audio-recorded and later transcribed.

Analysis of the interviews

A thematic analysis (Braun and Clarke, 2006) of the interview content was carried out. To begin with, the transcripts were read multiple times by both authors. The transcripts indicated that the personal characteristics were used by the YRs to describe a range of different research experiences. So, the first task was to identify each time a personal characteristic word appeared in the transcripts and to identify the chunk of discussion about each word. Also, we wanted to retain information about the research stage being discussed at the time. To this end, NVivo (2012) was used and each time a personal characteristic word (e.g. honesty) from the questionnaires was mentioned in a transcript the relevant chunk of interview conversation about that word was coded in Nvivo together with the stage of research being discussed (e.g. 'honesty + transcript of YR's comments + stage such as data analysis'). A coding query was then run on each code in Nvivo. The output of each coding query drew together all the transcript text related to each code (i.e. each word). For example, all chunks of text coded as 'honesty – data analysis' across the seven participants were pulled together and presented on a single page. The output of each query was printed.

Next, the outputs were scrutinised and this resulted in us being able to confirm that some of the words were indeed used in a variety of ways. For example, the personal characteristic 'organised' was used by the YRs in two different ways, to describe how they believed this characteristic was relevant to: 1) ensuring research integrity (e.g. making sure the transformation of raw data from questionnaires to an Excel spreadsheet is organised so mistakes are avoided) and 2) time management (e.g. organising what I need to do, and when). In light of these differences, all the printed coding queries were then subject to a second round of manual coding and sorting which categorised the chunks of conversation in terms of the different rationales offered by the YRs for their choices of the personal characteristics words. This involved the iterative creation of themes using a process of constant comparison (e.g. Fram, 2013) and assigning each chunk of the interview discussion to a theme based on

what the YR had used the personal characteristic word to describe. The chunks of discussion within each theme necessarily included reference to several research stages.

As a result of this process, three themes and eight subthemes (in brackets below) were identified. A social science researcher must:

- 1) Demonstrate researcher/research integrity (be thorough, truthful, and orderly and have a good understanding of research process).
- 2) Demonstrate good interpersonal skills and standards
- 3) Demonstrate good self-management skills (be resilient, agentic, committed, and good at time management).

Finally, the analysis was discussed in detail with an independent researcher and any disagreements were resolved. Our findings are discussed in detail in the following section.

Findings

This section is organised into three sub-sections, each of which reports findings from one of the themes generated from our data analysis. The findings include representative quotes from the interviews to illustrate in detail what the YRs understood about the characteristics of a social science researcher and doing research.

Demonstrate researcher/research integrity

All YRs discussed the fact that a researcher needs to act with integrity throughout the whole research process; they described this in terms of the need to be thorough, truthful, and orderly and to have a good understanding of research process (Table 3).

[Table 3]

It became clear during the face-the-face after-school sessions that some of the YRs experienced a degree of frustration at times, particularly when rewording their questionnaire items over and over again, or when redoing data analysis, for example. One YR described this level of attention to detail as ‘nit picking’; something that he was not used to. He said that ‘doing that was one of the hardest things for me, cos I was used to just first draft, right, hand that in [to my teacher]’. Nevertheless, it is particularly encouraging to see that these young people could evidence that they understood how all research stages are interlinked and that lack of integrity on behalf of the researcher at one stage of the research impacts on the other stages, as well as on the integrity of the research findings. The YRs had learned how personal, researcher, integrity is manifest in the work they do.

Demonstrate good interpersonal skills and standards

Although interpersonal skills and standards made up an important theme for the YRs, there was no single word that the majority of YRs chose in the avatar questionnaires that described this theme (see Table 4).

[Table 4]

It is notable that the rationales provided by the YRs in Table 4 illustrate how, once again, they had understood about how the personal characteristics of a researcher impact upon the research and its integrity. Not only were interpersonal skills and standards described as being important for reasons of common decency, such as when discussing a poster with an

interested party, but they were also described as being important in terms of being an ethical researcher and in terms of collecting good quality data. The exemplars in Table 6 illustrate what the YRs had learnt about research ethics, as well as what a researcher must do (or not do) to be ethical researcher.

Demonstrate good self-management

All YRs said that self-management skills are an essential component of being a researcher and these involved being resilient, agentic, and committed (Table 5).

[Table 5]

These findings suggest that the YRs understood that sometimes social science research can be tough – concepts can be hard to understand, things can go wrong, sometimes procedures need to be repeated, it can take time to get things right, sometimes it is scary and, ultimately, no one is going to do it for you. However, the YRs provided evidence of what they had understood about what it takes to be a social science researcher in terms of facing and overcoming the challenges inherent in research.

Discussion

This paper has adopted a socio-cultural theoretical approach (e.g. Vygotsky, 1978) to investigating what young people aged twelve years attending an after-school ‘social science research’ club believed are the personal characteristics required of a social science researcher and explored in the interviews why they thought these were important. Over six months the YRs took part in after-school sessions (which involved a mixture of teaching, directed activities, and support), self-directed learning with the MyShout! web site and, importantly, they designed and led their own research. Our novel data collection method – the avatar questionnaire – together with follow-up semi-structured interviews provided rich data.

Our investigation is unusual in the context of young people’s self-directed research in that the YRs were agentive in relation to their own investigation, but were not agentive in relation to the findings reported here. It might be argued, therefore, that our findings are unlikely to represent the authentic thinking of the YRs. However, our impression was that because the YRs had carried out investigations on the opinions of others and directly understood the importance of the relationship between their data and their findings, they were more likely to provide help us by providing accurate answers to our questions. Future work should consider the possibility of YRs carrying out research to address questions like the ones posed in this report as this may provide a different perspective and different insights. However, this would be a more complicated research process, particularly in constraining the investigations of some YRs and not others.

Our data analysis has revealed new, in-depth understandings of the perspectives of YRs that have not been revealed in previous research which has focussed largely on the way that child-led research can provide a voice for young people (e.g. Kellett et al., 2004) and which has not explored in detail what understandings are developed because of the experience of their own research (e.g. Bucknall, 2009). The in-depth understanding that has been revealed has similarities to children and young people’s understanding of moral development which has been shown to be in advance of what is often believed (see Kohlberg, Levine & Hewer, 1983).

Consequently, our findings provide an additional perspective about child-led research and the benefits of the process to the individuals involved. We cannot be certain that the understandings described here were the product of the YRs' research experiences alone, but it seems very unlikely that comparable understandings would have been shown at the beginning of the research process by the current YRs, or by a control group, who had not had prior research experience of this nature. The YRs in the current study could illustrate that they had appropriated the ways of talking, thinking, being and doing that have been validated as 'scientific' by the wider scientific community (Mortimer and Scott, 2003). These are impressive achievements and add to the limited literature about young people's perception of research and of researchers.

The thematic analysis of semi-structured interviews with the YRs, during which they were asked to provide rationales for their previous responses on an avatar questionnaire, suggest that first-hand social science research experience can offer young people an opportunity to gain a sound understanding of many of the elements of 'good' research (e.g. Denscombe, 2002). We acknowledge that the findings from our thematic analysis represent our interpretation of what the YRs said to us. The three themes identified from the discussions with YRs correspond to some of the most important aspects of social science research: research integrity (e.g. Denscombe, 2002), a concern for participants as evidenced in terms of demonstrating good interpersonal skills and standards (e.g. Seidman, 2013), and self-management (e.g. Broussine, Clarke & Watts, 2015). We discuss each in turn.

Demonstrating a concern for research/researcher integrity covered a reasonably broad area including: data integrity; issues about data collection; ensuring data collection was unbiased, and the need for hard work and dedication to produce findings of an appropriate standard. It is pleasing that research integrity was such an important theme in the discussions of the young people and it is useful to consider the sources of this view. Issues related to research integrity were mentioned in the after-school sessions and are included in activities on the MyShout! web site, but in both instances the focus was on the research rather the researcher. This suggests that the YRs had developed an understanding of the link between research (i.e. that it is rigorous and systematic) and the personal characteristics of the researcher (e.g. that they pay attention to detail and are honest) i.e. how research is judged to be of high integrity by prevailing scientific culture.

A second and related researcher characteristic identified as a separate theme was demonstrating good interpersonal skills and standards. This characteristic covered a broad range of abilities with an important element relating to the link between interpersonal skills and valid research techniques, for example the need to avoid leading questions during interviews. Other aspects of the theme were related to ethics, and the protection of the participants by respecting their opinions, for example.

The remaining theme concerned being good at self-management and this was broken down into the four sub-themes of: being resilient, being agentic, being committed and being a good time manager. The discussion of resilience was based directly on personal experiences: the need for determination, patience, being self-critical and being calm. Similarly, discussions about agency concerned taking responsibility for the research and the implications of ownership, while the discussions of commitment reflected the need to finish the project. The last theme concerned time management which was another important issue for the YRs who had many out-of-school commitments.

We suggest that these understandings are important for four reasons. First, the new skills and understandings exhibited by the YRs in the current study are likely to be relevant to their learning across other subject areas at school. For example, the National Curriculum for England (2013) for secondary education (high school) requires schools to teach pupils to, amongst other things: be numerate; move freely between different numerical representations; give presentations where they express their ideas; understand the notion of evidence; adapt their writing for a range of purposes; pay attention to objectivity and concern for accuracy, precision, repeatability, and reproducibility; interpret data; and think critically. Second, the experiences provided the YRs with the realisation that personal characteristics such as positive attitude, reasonable independence, good relationships, good communication and engagement/flexibility are important for success. These characteristics are important components of employability skills and the Confederation of British Industries (2012), for example, have argued that these skills need to be developed further by the educational system. Third, the young people linked their own experiences to the important characteristics of researchers. This identification has the potential to make research careers more attractive to young people because they better understand the research process and realise that they possess many of the necessary characteristics. This could be important as many young people, particularly females, think of scientists as being 'not like me' (e.g. DeWitt, Archer & Osborne, 2013) and do not go on to study science beyond the age of sixteen (Archer, DeWitt & Dillon, 2014). The current study suggests that giving young people an opportunity to have authentic research experiences which correspond to those of adult researchers could help them to realise that 'I am like them', and might encourage young people to think beyond the prevailing limited stereotypic images of scientists. Fourth, the findings point to the considerable potential value of after school activities which enable young people to engage in advanced and novel educational experiences which they value and which are not possible with the current constraints of the curriculum in most UK schools.

We acknowledge that larger studies across several schools that include equal numbers of males and females are needed. However, this is challenging given the amount of time and resource required to support a large number of YRs simultaneously in extra-curricular settings. In addition, future research might consider giving the YRs more time in which to think about the words they would use to describe the personal characteristics of a social scientist, without the need for a prompt sheet. However, it should be noted that YRs in the current study mostly used the words provided thus suggesting that they felt they were adequate, and although they were given the option of generating their own words this rarely occurred. It also was the case that different YRs used the same words on the list to describe different experiences, indicating that they employed different meanings for the same words. All of this suggests that the words we supplied did not constrain their reporting within the limited time available for them to complete the questionnaire. In addition, our research points to a future need to investigate the long-term effects of engaging young people in social science by carrying out their own research. For example, do they apply their new knowledge to other subject areas in school, are they more likely to consider social science careers, and do they draw upon their experiences in the workplace and beyond?

Conclusions

Our research has focussed on YRs' perspectives about the personal characteristics required to conduct research, and why they are needed. The observations suggest that young people's engagement in their own authentic social science research develops an understanding of research process, methods, ethics and skills, and an understanding of the relationship between

their own experiences and the positive personal characteristics of scientists. This can inform those who wish to consider introducing such opportunities to young people across a variety of settings.

Acknowledgements

This authors' travel expenses were funded by the Children's Research Centre at the Open University. The research was carried out in their salaried research time. Sincere thanks are due to the young people and the school librarian without whom this research would not have been possible.

References

Anderson, N. H. 1968. "Likableness ratings of 555 personality-trait words". *Journal of Social Psychology* 9: 272-279.

Archer, L., J. DeWitt and J. Dillon. 2014. 'It didn't really change my opinion: exploring what works, what doesn't work and why in a school science, technology, engineering and mathematics careers intervention'. *Research in Science and Technological Education* 32 (1): 35-55.

Braun, V. and V. Clarke. 2006. "Using thematic analysis in psychology". *Qualitative Research in Psychology* 3 (2): 77-101.

Broussine, M., C. Clarke and L. Watts. 2014. *Researching with feeling*. London: Routledge.

Bucknall, S. 2009. *Children as researchers: exploring issues and barriers in English primary schools*. PhD thesis: The Open University.

Cheminais, R. (2012). *Children and young people as action researchers: A practical guide to supporting pupil voice in schools*. England: Open University Press.

Confederation of British Industries. 2012. *Learning to grow: what employers need from education and skills. Education and skills survey 2012*. Accessed September 03 2016. http://www.cbi.org.uk/media/1514978/cbi_education_and_skills_survey_2012.pdf

Collins, T., P. Devine, R. Holliman and M. Russell. 2015. Accessed September 03 2016. <https://www.publicengagement.ac.uk/case-studies/communicating-partnership-participatorydesign-with-young-people>

Denscombe, M. 2002. *Ground rules for good research: a 10 point guide for social researchers*. Buckingham: Open University Press.

DeWitt, J., L. Archer and J. Osborne. 2013. "Nerdy, brainy and normal: Children's and Parents' constructions of those who are highly engaged with science". *Research in Science Education* 43: 1455-1476.

Fram, S.M. 2013. "The constant comparative analysis method outside of grounded theory". *The Qualitative Report* 18: 1-25.

Kellett, M. 2005. *How to Develop Children as Researchers*. London: Paul Chapman Publishing.

Kellett, M. 2011a. *Children's Perspectives on Integrated Services: Every Child Matters in Policy and Practice*. Basingstoke: Palgrave Macmillan.

Kellett, M. 2011b. "Empowering Children and Young People as Researchers: Overcoming Barriers and Building Capacity". *Child Indicators Research* 4 (2): 205-219.

Kellett, M., R. Forrest, N. Dent and S. Ward. 2004. "'Just teach us the skills please, we'll do the rest': Empowering ten-year-olds as active researchers". *Children & Society* 18 (5): 329-343.

Kerawalla, L. and D. Messer (under review)

Kerawalla, L. 2014. "Empowered Participation Through Inclusive Inquiry". In *Participation, Citizenship and Intergenerational Relations in Children and Young People's Lives*, edited by Joanne Westwood, Cath Larkins, Dan Moxon, Yasmin Parry & Nigel Thomas, 117-127. Basingstoke: Palgrave Macmillan.

Kim, C-Y., K. Sheehy and L. Kerawalla. 2017. *Developing children as researchers: A practical guide to help children conduct social research*. Abingdon: Routledge.

Kohlberg, L., C. Levine and A. Hewer. 1983. *Moral stages: a current formulation and a response to critics*. Basel, NY: Karger.

Mortimer, E.F. and P. Scott, P. 2003. *Meaning making in secondary science classrooms*. Maidenhead: Open University press.

National Curriculum for England. 2013. Accessed September 03 2016.
<https://www.gov.uk/nationalcurriculum/key-stage-3-and-4>

Nvivo (2012). NVivo qualitative data analysis Software; QSR International Pty Ltd. Version 10.

Punch, K. 2014. *Introduction to Social Research*. London: Sage.

Säljö, R. 1996. *Learning as discourse: A sociocultural perspective*. UK: British Psychological Society.

Seidman, I. 2012. *Interviewing as qualitative research*. NY: Teachers College Press.

UNCRC. 1989. *United Nations Convention on the Rights of the Child*. Accessed February 02 2017. <https://www.unicef.org.uk/what-we-do/un-convention-child-rights/>

Vygotsky, L. 1978. *Mind and society*. Cambridge, MA: Harvard University Press.

Wertsch, J. 1991. *Voices of the mind*. US: Harvard University Press.

Tables

Table 1: Avatar questionnaire items

Stage of research process	The Questions about personal characteristics
Choosing a topic and research question	What personal characteristics are needed to choose a topic and research question?
Creating an interview schedule and a questionnaire	What are the important personal characteristics for writing interview questions and putting together a questionnaire?
Thinking about research ethics	What are the personal characteristics needed when considering research ethics?
Collecting your data	What personal characteristics are needed when collecting and looking after data?
Representing and analysing your data	What personal characteristics are needed to make bar charts etc. and analyse your data?
Making your poster	What personal characteristics are needed to make a poster?
Preparing to present your poster	What personal characteristics will be needed when you talk about your research to other people at the Anonymised University?
Seeing research through from beginning to end	Now you've finished, what personal characteristics are needed in order to finish research?

Table 2: The positive personal characteristics provided to resource completion of the avatar questionnaires

sensible, patient, friendly, reliable, careful, responsible, determined, kind, optimistic, attention to detail, brave, polite, good listener, honest, calm, independent, hardworking, sensitive, organised, trustworthy

Table 3: The sub-themes within the ‘research integrity’ theme, the personal characteristics words and number of times each was used on the questionnaires, and illustrative examples of why the YRs used them. (Words in brackets did not appear in the word list provided).

Sub-themes	Representative example rationales
<p>Be thorough</p> <p>Attn. to detail (7) Careful (4) (Perfectionism) (1) Good listener (1)</p>	<p>‘You count [your questionnaire responses] up and, say, if one’s got [a tally of] twenty two and one’s got twenty one you know that you’ve missed something. If you didn’t pay attention to detail you wouldn’t know that so then you’d get biased results because it’s not all of them’.</p> <p>‘[Perfectionism because] I had to read [my questionnaire] through and see if there was a question that wasn’t completely finished... or there wasn’t some punctuation or something [that needed editing]. It couldn’t be sloppy’.</p> <p>‘Good listener because you pick the important bits out [of the audio recording of the interview] and not, like, get the bits that aren’t related in’.</p> <p>‘A researcher needs to be careful because you might miss out a question when you’re analysing the questionnaires...you might pick up two of them and you’ll get uneven data’</p>
<p>Be truthful</p> <p>Trustworthy (2) Honest (2) Reliable (1)</p>	<p>‘If we didn’t analyse data accurately then that’s lying, basically...and that’s false data going out to the public’.</p> <p>‘You’ve got to be careful with all of the numbers, so it also means being trustworthy because you can’t sort of [say] “yeah, let’s add two to this”’.</p>
<p>Be orderly</p> <p>Organised (4) Responsible (1)</p>	<p>‘You have to make sure that it’s all like, in order. If you’re not organised you’re gonna try and do loads of things at the same time and you’re going to get muddled’.</p> <p>‘You’ve got to have the right [interview] questions, you’ve got to do them in a logical order, and deliver them well. And if you’ve got them written down on a scrappy piece of paper in pathetic handwriting and you ask them in a skew-whiff order, you’re not going to get the results that you want and that’s why you’ve got to be organised’.</p> <p>‘You’ve got to be organised so that you don’t put the wrong data into the wrong graph’.</p>
<p>Understand research process</p> <p>Sensible (2)</p>	<p>‘You have to be sensible. You can’t just sit there and say ‘I’ll do this’ [research question]. You have to think about it and what you can progress to do with that question’.</p> <p>‘Sensible cos the research question has to be about the topic but it cannot be leading and it has to be something you can answer. The questionnaire has to be ethical or people won’t answer it, so then you won’t get any results’.</p>

Table 4: The personal characteristics words within the interpersonal skills and standards theme, the number of times each was used on the questionnaires, and illustrative examples of why the YRs used them.

Theme	Representative example rationales
<p>Demonstrate good interpersonal skills and standards</p> <p>Kind (3) Friendly (3) Sensitive (3) Polite (2) Good listener (2) Trustworthy (1)</p>	<p>‘It is important to be sensitive because you can’t judge people from what they said. Just because they put something down [on their questionnaire] doesn’t mean it’s right or wrong’.</p> <p>‘Polite because you can’t just say “well that’s not the answer I wanted, gimme the answer I wanted!” You’ve got to rephrase the [interview] question slightly to get the answer that you need’.</p> <p>‘You need to be a good listener. Sometimes the person that I interviewed gave me an answer to the question and then she started veering off the subject slightly... I usually improvised a follow-up question to try and get her back on track’.</p> <p>‘You’ve got to be sensitive to what they’re saying. You can’t sort of go to, like, your friends and go “oh yeah, look what this person said [on their questionnaire]”. You’ve got to be sensitive that they’re anonymous. You’ve got to be trustworthy with what they’re saying. You can’t sort of say “oh yeah Dorothy said this” to the whole village’.</p> <p>‘I will be polite, kind and friendly when I talk about my poster next week’.</p>

Table 5: The sub-themes within the ‘demonstrate good self management skills’ theme, the personal characteristics words and number of times each was used on the questionnaires, and illustrative examples of why the YRs used them. (Words in brackets did not appear in the word list provided).

Sub-themes	Representative example rationales
<p>Be resilient</p> <p>Patient (6) Calm (6) Optimistic (5) Brave (5)</p>	<p>‘[A researcher needs to] be optimistic because there are points when you’re doing your research you think “no, I can’t do this”. And you’ve got to say “look, you’ve only got half of it left. You’ve done half”’.</p> <p>‘Optimistic. You need to be positive. So if the first idea doesn’t quite work out like you think it would then just, like, overcome that problem and sort of work around it’.</p> <p>‘I wrote patient [on my questionnaire] because we had to change our research question, we did our data analysis twice so we had to make our graphs again, and we had to change our interview questions and questionnaire questions because some of them were biased or not related to the subject...we had so many questions that some of them had to go...you had to go over it over and over again’.</p> <p>‘You needed to be calm and hardworking so that if, say, it did take a while to analyse it all you wouldn’t get too worked up about doing it’.</p> <p>‘I had to be brave when I was interviewing two policemen. They’re scary!’</p>
<p>Be agentic</p> <p>Independent (7) Reliable (3) Responsible (3) (Decisive) (1) (Creative) (1) (Imaginative) (1)</p>	<p>‘You have to be, kind of, independent. You can’t listen to, like, what everyone else is doing because it’s your project, it’s not someone else’s’.</p> <p>‘No-one’s going to do it for you... ‘at the end you can say I actually did all this’.</p> <p>‘You have to be independent and responsible. You have to go out and do it yourself because it’s your research, it’s not someone else’s. So you can’t get your mum to go and do it, you can’t get your dad to go and do it, or your sister or brother. You have to do it yourself’.</p> <p>‘The biggest responsibility I have ever taken [before] is looking after a hamster...you have to remember to finish on the Anonymised website you have to go on the computer and finish your poster...I liked it’.</p> <p>‘Creative cos you can’t sort of copy the person next to you’.</p>
<p>Be committed</p> <p>Hard working (7) Determined (6) Brave (1)</p>	<p>‘Hardworking because it tests you’.</p> <p>‘You have to be determined to, like, get your head around it’.</p> <p>‘You have to be hard working to get everything done’</p> <p>‘You couldn’t just stop and give up because it was hard’.</p> <p>‘I was determined. Every time that one of my [questionnaire] questions was rejected, I had to keep on going’.</p> <p>‘I’m the only person that knows the answers, I’m the only person that can do this. So I <i>will</i> do it!’</p> <p>‘You have to be brave because if something goes wrong you still have to keep going’.</p>
<p>Demonstrate good time management skills</p>	<p>‘Time management because if you’ve got something to do by the next week, you’ve done it’.</p> <p>‘I wrote it all down on a list so I knew I had to do this, this and this’</p>

Organised (6)

'You need to leave space in your week and write down notes on what you need to do'.

'It was very stressy because we were doing it as a [pair]. We had to find times that were suitable for both of us and I'm very very busy. I have six things on a week and the same with [my partner]'.