



Rationalising for and against a policy of school-led careers guidance in STEM in the U.K.: a teacher perspective

Richard Watermeyer, Pat Morton & Jill Collins

To cite this article: Richard Watermeyer, Pat Morton & Jill Collins (2016) Rationalising for and against a policy of school-led careers guidance in STEM in the U.K.: a teacher perspective, International Journal of Science Education, 38:9, 1441-1458, DOI: [10.1080/09500693.2016.1195520](https://doi.org/10.1080/09500693.2016.1195520)

To link to this article: <http://dx.doi.org/10.1080/09500693.2016.1195520>



Published online: 21 Jun 2016.



Submit your article to this journal [↗](#)



Article views: 101



View related articles [↗](#)



View Crossmark data [↗](#)

Rationalising *for* and *against* a policy of school-led careers guidance in STEM in the U.K.: a teacher perspective

Richard Watermeyer^a, Pat Morton^b and Jill Collins^b

^aDepartment of Education, University of Bath, Bath, UK; ^bCentre for Science Education, Sheffield Hallam University, Sheffield, UK

ABSTRACT

This paper reports on teacher attitudes to changes in the provision of careers guidance in the U.K., particularly as it relates to Science, Technology, Engineering and Mathematics (STEM). It draws on survey data of $n=94$ secondary-school teachers operating in STEM domains and their attitudes towards a U.K. and devolved policy of internalising careers guidance within schools. The survey presents a mixed message of teachers recognising the significance of their unique position in providing learners with careers guidance yet concern that their 'relational proximity' to students and 'informational distance' from higher education and STEM industry may produce bias and misinformation that is harmful to their educational and occupational futures.

ARTICLE HISTORY

Received 6 October 2015
Accepted 25 May 2016

KEYWORDS

Case study; vocational education; teacher beliefs

Introduction

There are multiple factors attributed to influencing learners' educational and occupational aspirations and choice. Parental influence (Gorard & See, 2009); social determinants of class (Archer, Hutchings, & Ross, 2003), family habitus and capital (Archer et al., 2012), gender (Gottfredson, 2005) and wider equality and diversity factors (Hutchinson, Rolfe, Moore, Bysshe, & Bentley, 2011); and situational influences such as where learners grow up (Green & White, 2007) are all seen to play a part. Interventional influences such as the school are similarly significant for empowering and affecting learners' choice, especially where students feel supported by the school in decision-making processes (Blenkinsop, McCrone, Wade, & Morris, 2006).

In the context of careers guidance, the contribution of schools has been the retention of students in the school system (Howard & Solberg, 2006; Plank, DeLuca, & Estacion, 2005); improvements in the academic achievement of students (Brigman & Campbell, 2003; Evans & Burck, 1992; Lapan, Gysbers, & Sun, 1997, 2001); and smoother transitions in learning (Nicoletti & Berthoud, 2010; Smith et al., 2009) and work (Lapan, Aoyagi, & Kayson, 2007). However, despite the stated advantages of schools' interventional influence on young peoples' awareness, understanding and knowledge of the world of work – and their prospective role in it – the provision of careers guidance in U.K. schools and as supported by external agencies is not noted for its quality or for reaching and enabling *all*

students (Hutchinson et al., 2011). The situation is complicated by a lack of agreement over what school careers guidance in the U.K. consists of or what it *should* consist of (IER, 2005). Concurrently, a normative perception of careers isolated in one-off decisions made at school has been superseded by theories promulgating more complex transitions in education, training and work over a lifetime (Young & Collin, 2000).

The range of activities involved in delivering careers guidance for young people and the availability of these can be, respectively, broad and unequal. Whilst in 2003, the U.K. Department for Education and Skills identified four levels of service provision within a clear framework: information, advice, guidance and personal support, a subsequent policy focus for young people and careers has engendered what Hooley, Matheson, and Watts (2014, p. 4) call a ‘postcode lottery of career guidance’. And yet, whilst an emphasis on a broad range of experiences at school facilitating routes to work has remained (DfE, 2015), a clear policy framework for careers guidance has been lost alongside an integrated approach with the U.K. national curriculum.

In response, a number of attempts have been made to clarify what careers guidance is and what it should be by learning from different practice and successes in its provision in an international context and from countries – some with comparable education systems or cultural contexts to the U.K. – such as the Netherlands, Germany, Hong Kong, Canada, Finland and Ireland (cf. Holman, 2014; Hooley et al., 2014). Holman’s (2014) study, in particular, of careers guidance provision across different national educational systems (and independent/state school contexts) reveals a more blended, consistent and high-status approach to careers guidance than in the U.K. and an emphasis in countries like Canada on co-operative learning, apprenticeships, vocational programmes, subject taster courses, trained teacher guidance counsellors,¹ credited modules in civics in careers, and a guidance system embedded within both pastoral and curriculum structures. Whilst such aspects of international practice may not be entirely replicable in or complementary to the U.K.’s education system, they help to pinpoint the kinds of conditions necessary for ‘good careers guidance’, which Holman (2014) summarises as

- a stable careers programme;
- learning from career and labour market information;
- addressing the needs of each pupil;
- linking curriculum learning to careers;
- encounters with employers and employees;
- experience of workplaces;
- encounters with further and higher education and
- personal guidance.

Whilst aspirational, this kind of blueprint for good careers guidance may not, however, be so easily followed by schools whose ability to operate as service providers is controlled by a multitude of organisational factors, such as school structure, networks, strategy, industrial geography (Hutchinson, 2013) and the commitment of school leaders (Finegold, Stagg, & Hutchinson, 2011), which can cause considerable variance in the quality, scale and scope of careers guidance activity. This variance is compounded by differences in the operational approach to careers guidance taken by individual schools (cf. Watts, 2001, 2013). The lack, therefore, of a harmonised system-wide model for careers guidance

in the U.K. has corresponded to inconsistency and imbalance in schools' provision and affected the extent to which careers guidance is prioritised or neglected as a service available equally, evenly and/or universally to learner cohorts, regardless of the school they attend.

More recent U.K. and devolved educational policy affecting the provision of careers guidance in England and Wales has emerged partly as a response to perceptions of imbalance and incongruity in careers guidance provision and in recognition of the positive interventional influence of teachers and schools in facilitating and scaffolding learners' educational and occupational decisions. Moreover, it is an orientation motivated by fiscal concerns and an impetus to reduce public spending in a milieu of economic recovery.

In England, the Education Act of 2011 placed a statutory obligation on schools to provide independent careers guidance for all students in Years 9, 10 and 11.² The age focus was subsequently revised and extended to include Years 8, 12 and 13 (UK Government: Department for Education, 2013). Critically, however, whilst schools have assumed responsibility for delivering careers guidance this has occurred without additional funding and simultaneously with the effective foreclosure (in England) of 'Connexions', the careers service, which had until such point worked in conjunction with schools in the delivery of careers guidance (Hooley & Watts, 2011). In the case of Wales, a revised strategy for careers guidance materialised with the Welsh Government's 'Careers and World of Work' (CWoW, 2008, p. 2) statutory framework and a focus on providing school children with 'the kind of insights that generate both realism and aspiration in terms of their future life'.

The move towards *school-led* careers guidance (SLCG) in England and Wales generated a largely unfavourable response. The House of Commons Education Committee (2013, p. 3), for instance, reported that,

The Government's decision to transfer responsibility for careers guidance to schools is regrettable. We have concerns about the consistency, quality, independence and impartiality of careers guidance now being offered to young people.

The Committee also highlighted evidence of the financial cost to not offering the best careers guidance – £28 billion to the U.K. economy if young people are not guided towards the right destinations and £200 million per annum if young people make the wrong course choice after Year 11. Other recent high-level reports by Ofsted and Estyn, as the school inspectorial bodies of England and Wales, respectively, have revealed serious misgivings of the way careers guidance is now administered in schools.

A 2013 Ofsted report, which surveyed 60 secondary schools, raised concerns regarding the consistency of provision of information and guidance amongst students in Years 9–11; a lack of effective interface with local authorities in supporting more vulnerable students in making choices (including students with special educational needs or disabilities); a lack of interface with employers, local enterprise partnerships and the like; teachers being without sufficient training and/or briefing required in communicating the diversity of career options to students; little promotion of other post-16 options (beyond standard 'A'-level route); little or no evidence of schools evaluating the quality of their careers guidance and inconsistency in terms of all schools collecting destination data. The report, however, also revealed that for those schools demonstrating success in careers guidance, careers

guidance featured as a strategic priority. A comparative report from Estyn (2012) highlighted many of the same shortcomings but also focused on issues of disparity in the amount of lesson time prioritised by Welsh schools to careers/work-related education; considerable variation between Welsh schools in the extent of external 'buy-in' in the implementation of careers/work-related education; an insufficient number of Welsh schools with a governor with nominated responsibility for careers/work-related education; a lack of internal resourcing and lack of opportunity for borrowed capacity such as through a careers agency.

Whilst these kind of high-level reports reveal many deficiencies at a system level for school-based careers guidance, there exists little intelligence, regarding teachers' own thoughts and attitudes, as front-line providers of careers guidance, certainly amongst those in Science, Technology, Engineering and Mathematics (STEM) disciplines. Understanding teachers' own perspectives on their role in providing careers guidance is arguably especially significant in the context of evidence which reveals that large numbers of young people obtain their information about careers directly from teachers³ (Wellcome Trust Monitor, 2013).

The role of subject teacher as a career influencer is often referred to in research and report recommendations (cf. Bennett, Lubbey, & Hampden-Thompson, 2011; Finegold et al., 2011; Holman, 2014; Hutchinson, 2013; Munro & Elsom, 1999). These publications expound on how subject teachers can relate occupational roles to curricula, particularly in science and engineering domains, which help students to contextualise their studies. However, the student–teacher interface in a careers guidance context may be problematic and prone to producing bias and stereotyping (cf. Perry & Francis, 2010). This may be especially true of teachers whose advice to students is bound with the interests of the school within which they work (cf. Hodgson & Spours, 2011) or teachers whose negative influence in the identity formation of learners restricts aspirational futures (cf. Stahl, 2015). Subject teachers also may not be best placed to challenge stereotypical attitudes from employers and other organisations, or even to recognise this as an important intervention (IOP, 2013). Previous studies (cf. Rolfe & Equal Opportunities Commission, 1999; Wrench, 1992), however, suggest that professional careers advisors are also sometimes guilty of 'protective channelling', where they refrain from sending young people into negative workplace settings, such as for instance where they might be subjected to sexist or racist attitudes and practice.

Any reconfiguration of careers guidance is arguably especially pertinent to STEM subject domains, where uncertainty, confusion and a lack of clarity from learners, their teachers and parents, in respect of career pathways into STEM and the myriad of STEM occupations available to them, continue to be especially acute (Holman, 2011). A focus on STEM careers guidance is also pertinent given continuing evidence which shows the STEM pipeline is failing with low personal interest in science careers (Ipsos Mori/Wellcome Trust, 2013); a decline in the proportion of the cohort of young people selecting chemistry, biology and mathematics at 'A'-level (DIUS, 2009); and a current and projected shortfall between the number of jobs requiring people with STEM skills and the corresponding number of individuals with appropriate STEM qualifications (Hutchinson, 2013).

Whilst there have been examples of careers professionals and subject teachers working collaboratively (Barnes & Kent, 2010; Bennett et al., 2011) the chaos in the careers

landscape post-2010 has meant the focus for STEM policy has shifted to a wider role for teachers in STEM careers awareness. In this article, we try to further problematise this shift by elucidating what science teachers themselves perceive as their contribution to SLCG in STEM and what they self-identify as barriers to its implementation, in turn challenging existing 'careers' policy.

Methodology

An online survey was designed, piloted and ultimately distributed in conjunction with *See Science* – the STEMNet⁴ contract holder in Wales, across 223 secondary schools in Wales, targeting a purposive sample of teachers working within STEM-based disciplines. This generated a total response of $n = 94$ completed surveys. The survey was 'live' over a two-week period with a mid-term and final reminder issued to recipients during such time. An online survey tool was chosen in the context of it being easily distributed across schools and directly to the in-box e-mail accounts of individual teachers, thus maximising the potential of a higher-than-average response rate. The survey was similarly designed for easy and quick completion.

Survey respondents were asked to complete a series of closed-text questions, two of which employed *Likert* scales of quality (good–poor) and frequency (frequently–rarely). Questions focused on respondents' reflections on their level of ability in providing students with detailed and accurate STEM-related careers guidance; how often they were called upon by their students in providing STEM-related careers guidance; what they perceived as obstacles in the delivery of SLCG in STEM and what they felt would increase their capacity to deliver SLCG in STEM. Respondents were also provided an opportunity to nominate other kinds of barriers, unrepresented in the survey. Only one question was entirely open text based and was intentionally sequenced last. This question asked respondents to submit their views on whether or not science teachers ought to be responsible for providing students with STEM careers guidance. Respondents returned rich narrative accounts, which form the evidence base and subject of our discussion.

Responses to this question were scrutinised and sifted applying an inductive and/or grounded theory (cf. Glaser & Strauss, 1999) approach to identify emergent patterns or structures from which to form substantive codes from the data and establish a potentially new, teacher-informed theorisation of SLCG. Close and repeated reading of the responses allowed us to detect emergent categories coalescing around the two potential answers: *yes* and *no*, and provided an opportunity with which to explore a potential breadth of rationalisations put forward to substantiate each respective viewpoint. Sub-themes were subsequently identified, discussed, coded and incorporated by the research team into narrative rationalisations *for* and *against* SLCG. These sub-themes are presented within the following discussion of data. Having coded the data we undertook a simple narrative analysis to consider the ways with which respondents were conceptualising SLCG and making sense of performing or resisting the task of careers guidance in their schools. From these various accounts we were drawn to the notion of proximity to describe the way with which respondents positioned themselves in relation to the practice of SLCG.

In the context of a rationalisation *for* SLCG, most if not all accounts gravitated around a theme of 'relational proximity' and teachers' unique position in communicating careers guidance to their students. In the context of a rationalisation *against* SLCG, we applied

the same theory to unpack what we understood as respondents' identification of *situational issues* and *infrastructural deficits* impeding the undertaking of SLCG. In the case of *situational issues*, three separate but inter-related aspects were identified: responsibility and prioritisation; specialisation and partisanship; and disconnection and distance. In the case of *infrastructural deficits*, two other intersecting aspects were identified as capacity and resource.

The theoretical framing of relational proximity, used herein to problematise SLCG, is borrowed from organisational studies literature, which talks of proximity between interacting agents or partners as beneficial to the co-production of new knowledge (cf. Moodysson & Jonsson, 2007). In the context of this study, relational proximity is adapted and used as a motif describing teachers' intimate and empirical knowledge of students' educational strengths, aptitudes and trajectories forged through instruction, assessment, pastoral care and other iterations of (formal and informal) school-based interactions that distinguish and elevate and yet also problematise the value of their contribution to careers guidance. We also used relational proximity or its inverse, relational (and informational) distance or disparateness, to conceptualise SLCG as something remote from, or as some respondents articulated, incompatible with, teachers' everyday pedagogical practice.

A rationale for SLCG

Respondents' near-consensus rationalisation for SLCG was predicated upon a notion of teachers' unique positionality or 'relational proximity' to their students, confirming the efficacy and success of their contribution as career guides. Respondents reflected that their capacity to close read students' social and academic dispositions and capabilities, translated into credible, accurate and individualised prognoses, related to the availability of future education and employment opportunities and, concurrently, the most appropriate pathway in realising these.

One of the primary claims of SLCG, distinguishing it from traditional careers guidance provision, presented by respondents, focused on teachers' ability to liaise directly, and also continuously and informally, with students in co-identifying complementarity and fit between their educational ability, aptitude and performance; (prospective) subject choices; and occupational intentions or aspirations. Respondents speculated that on the basis of relational proximity, the majority of teachers would be able to authoritatively assess students' educational/occupational prospects and issue practical advice in how to manage, manoeuvre and as may be, manipulate, their, each unique, educational profile:

We know the students strengths and weaknesses, so can advise on their future options.
(Extract 1)

Respondents also made an explicit link between their role as science instructors and ambassadors for STEM, and their investment and duty as teachers in maintaining, and as might be possible, magnifying students' interest in science subjects and potential STEM-based careers. Many respondents self-styled themselves as advocates providing 'guidance on the importance of STEM subjects', and thereby we might also infer the relationship between STEM subjects and STEM-based employment.

Other respondents perceived themselves as part of a micro and macro recruitment drive, attracting more students into science at higher levels in the context of their own schools and more expansively, in a national context, in addressing concerns of a shortage of STEM graduates and downturn in those opting for STEM-based careers:

It is our role to encourage pupils to see a future in science and increase the numbers choosing to study science further. (Extract 2)

... as science specialists it is our role to help direct pupils if they show an interest in a career in science. (Extract 3)

Teachers' proximity not only to their students but the taught curriculum was also evoked, by a number of respondents, as a major advantage of the SLCG approach. One respondent for instance commented on teachers' awareness of (and/or sensitivity to) the impact of the taught curriculum on learners, and the way the curriculum is made available to students influencing their future subject/learning choices, and a correlation between these and career options – an assertion, it should be noted, elsewhere contested (cf. Holman, 2014; House of Commons Education Committee, 2013; Mason, 2014):

Teachers have an insight into the impact of the teaching curriculum on the choice of tertiary courses and the potential career opportunities offered by these courses. (Extract 4)

Multiple respondents suggested that as teachers they would 'be able to provide more insight into STEM careers'. Others reflected that they were the 'most qualified in the school to do so'. Some, however, felt the role of teachers in providing careers guidance ought to be more light touch or situated purely on the level of an introduction to STEM careers or further learning, offering 'just the initial info'. A middle ground approach was reflected in respondents' characterisations of STEM secondary teachers as intermediaries, or brokers facilitating links or forward momentum for learners' educational and career choices; yet we might assume not directly involved in brokering these choices with learners: '... they [teachers] should know what is required for the next step'.

The significance of teachers' pre-existing relationships with their students and their specific, detailed knowledge of each student's academic competency and potential was also highlighted as being a reason for greater involvement from teachers rather than relying on an interview with a careers advisor to make choices. Accompanying this view was a frequently elicited feeling that careers advisors lack key pieces of knowledge concerning learners' abilities, aptitudes and enthusiasms and moreover an understanding of their unique personalities: 'they don't know the children'. A large proportion of respondents also speculated that the interface between the careers advisors and student was habitually impoverished, inefficient, ill-fit for purpose and arguably of gravest concern that the information provided by careers advisors was unsuitable or misaligned with the needs of the student. In a similar vein, of 33 *positive* responses to the question *should science teachers be responsible for providing students with STEM careers guidance*, only one respondent made reference to the value of teachers working in collaboration with careers advisors. Concurrently, only one other respondent made reference to the role of 'specialists' in encouraging the future occupational participation of young learners in STEM (see extract 7), reinforcing a view of teachers operating in a silo and as isolated and potentially disconnected from other STEM careers resources.

Whilst this cadre of respondents were notionally supportive of SLCG in STEM, the greater majority of respondents were far less convinced, if not categorically opposed.

A rationale against SLCG

An issue of responsibility and prioritisation

One of the most recurrent objections to SLCG made by respondents stemmed from a perception of careers guidance as a new *formal* assignment for which they would be forced to accept *sole* responsibility. Whilst respondents less sympathetic to SLCG reiterated some of the positive sentiments promulgated by their counterparts advocating the role of teachers in careers guidance, they cautioned that an expectation on teachers as solely accountable was misguided and potentially harmful, for amongst other things adding further stress to already swollen timetables (see extract 6). Furthermore, respondents asserted that an explicit and clear delineation was necessary, separating teachers sharing their experiences and (anecdotal) knowledge in informal and/or unregulated ways and teachers providing a ‘professionalised’ service. Extracts 5–11 place special emphasis on teachers not being responsible and accountable for STEM careers guidance and reveal a tacit fear of SLCG evolving into a performance measure. The extracts also, however, reveal that respondents recognise a role for teachers in the provision of careers guidance but that the configuration of this role is more informal than formal (extract 6) and ought to be considered more as a ‘contribution’ (extract 7), ‘add-on’ (extract 9), ‘input’ (extract 8) or form of ‘encouragement’ (extract 11) than ‘responsibility’ (extract 7) or ‘requirement’ (extract 11). Respondents also couched an issue of ‘responsibility’ and issue of ‘accountability’ – which differentiate careers guidance into an aspect of teachers’ professional practice and aspect of performance evaluation, respectively – in the terms of limited expertise (extracts 7 and 9):

All teachers in school have an important role to play in the career guidance programme and sharing their knowledge and experiences all help to broaden pupils’ career education. However having responsibility is completely different and this should be the role of a specialised career adviser. (Extract 5)

... because we have enough to do without having this formally added to our work-load. (Extract 6)

Not to be held accountable but could contribute to careers guidance – based on possible CPD experience/work placement days. (Extract 7)

Not to be accountable but could have some input into careers guidance. (Extract 8)

Not responsible for, but as well as. I wouldn’t know if I was giving up-to-date guidance. (Extract 9)

Teachers should promote the careers available when they promote their subjects but not to be the sole provider of careers guidance. (Extract 10)

Encouragement is fine but it should not be a requirement to give guidance. (Extract 11)

A number of respondents considered that teachers’ investment and capacity to effectively deliver formal careers guidance would be compromised by an abundance of other competing priorities and teaching workloads being already stretched. Responses, such as extracts 12 and 13, also make the suggestion that careers guidance lacks the status and visibility as a core pedagogical priority, as might be attributed by teachers, school managers and education policy-makers:

Providing careers guidance would not be a top priority for teachers. It would likely be prioritised below planning regular lessons, marking, coursework marking, afterschool revision classes, parents evening, report writing and other tasks that teachers must deal with in the working day. (Extract 12)

We are overloaded with things to do – literacy, numeracy etc. and is there any point as science is no longer core, it's not even mentioned in the new Welsh Bacallaureate. (Extract 13)

An issue of specialisation and partisanship

Whilst many respondents cited a lack of knowledge as a reason against SLCG, very few, indeed only 5 of 68 respondents (those who stated that it was *not* their responsibility for providing students with careers guidance), made explicit reference to careers guidance as a 'specialism' ($n = 2$) and/or careers advisors as 'specialists' ($n = 3$). Nevertheless, knowledge specialisation was considered by some respondents to underpin good STEM careers guidance in schools. These, albeit few, considered that the success of SLCG hinged on the depth and breadth of teachers' subject and occupational knowledge; thereby reinforcing a well-rehearsed claim that 'generalist' guidance in STEM careers is inadequate if not potentially detrimental to learners' career decision-making. However, whilst this sub-cohort championed teachers becoming specialised in careers guidance and advocated it as a component of continuous professional development, they concurrently acknowledged that specialisation would place further pressure on teachers already struggling to contend with limitations of time and resource:

Teachers can only give a narrow view of the career opportunities unless more time is devoted to developing knowledge – time that they don't have if they are to fulfil their teaching obligations and responsibilities in the wider school community. (Extract 14)

A call for greater specialisation of teachers in STEM domains conflicts with a notion of specialist teachers as promoters of their own disciplines learners' subject choices and occupational aspirations. (Extract 15)

As in extract 14, respondents identified a risk that SLCG might cause the fracturing of teachers' professional roles and identities and obfuscation concerning what they might or should prioritise in their pedagogical interactions with learners. Respondents also expressed concern that teachers' specialisation in STEM careers guidance would counteract and denude their capacity to provide impartial and objective guidance – they might become overly adept at or single-minded in selling their discipline. In this context, a correlation can be made between teachers' specialisation in SLCG – for example, a chemistry teacher providing occupational guidance on catalysis or materials science – and the narrowness of this guidance, particularly where guidance morphs, if unwittingly or tacitly, into advocacy or persuasion.

An issue of distance and disconnection

Respondents identified prolonged personal disengagement from further/higher educational opportunities in STEM and opportunities in STEM industry and enterprise as a major obstruction to teachers' delivering good careers guidance. In the following extracts, detachment from the world of work in STEM is presented as the passage of

time separating many teachers' university experience – and what is taken as their greater exposure to STEM career opportunities – and their entrenchment as classroom practitioners:

It's too long ago that many graduated – everything has changed since most of us were at university, and many new courses now run. (Extract 16)

Even if we have industrial experience it's limited and probably dated. We are not familiar with course requirements. (Extract 17)

These observations correlate the limited nature of teachers' post-graduation interface with universities with their lack of awareness of latest course options and access routes in higher education. They also suggest that teachers' understanding and awareness of university opportunities might also be delimited to what they actually studied and the parameters of their own personal university experience.

A more complete knowledge and awareness of the breadth of STEM educational and occupational routes might, therefore, be entirely out of reach for many teachers for whom university days are a distant memory and whose time in the classroom has ever been the dominant reality. What current knowledge they may have of STEM career-routes/careers may thus be the outcome of personal inquisitiveness, serendipitous acquisition or chance encounter and/or predicated on the impetus of universities and employers to get formally involved with schools, such as for instance through universities' widening participation and outreach agendas; schools–university partnerships (<http://www.rcuk.ac.uk/pe/PartnershipsInitiative/>) or STEM Ambassador schemes (www.stemnet.org.uk/ambassadors).

Extract 18 reveals a perception from respondents that for most teachers the potential for a more expansive interface with STEM is caught short by them becoming specialised first as teachers, then as subject specialists:

Our specialism is often too narrow and many have gone straight into teaching and don't have the life experience to advise on wider career choices... Careers guidance is a specialism which teachers are not qualified in. (Extract 18)

In the majority of cases science teachers have not worked in any field except teaching. (Extract 19)

Extracts 18 and 19 also reveal a perception that good careers guidance is formed from wider world experiences or, specifically, experiences accrued beyond the classroom. Extract 19, especially, intimates that the process undertaken by many in becoming classroom teachers is ostensibly too streamlined, shallow or superficial and that an excess of STEM teachers are without deep and broad experience of their subject – certainly beyond its academic construction.

Extract 20 states that were careers guidance to be more firmly ingrained as an aspect of teachers' professional obligation, opportunities in STEM would likely become more conspicuous – and in such ways, where teachers themselves might even reconsider their own occupational choices:

I'm not qualified. If I knew more about opportunities I would not be teaching. (Extract 20)

The rapid proliferation and diversification of STEM opportunities were also seen by respondents as further weakening teachers' capacity to confidently and accurately guide their pupils' occupational choices. Extract 21 draws the irony-tinged observation that

an excess of opportunity in terms of potential STEM careers ultimately disfavours learners by increasing the chance for misinformation. It also highlights the risk of teachers not being properly informed:

Too many career paths are opening up in science and teachers may not be up-to-date and a pupil could miss out on an opportunity through incorrect guidance. (Extract 21)

Infrastructural deficits

Lack of capacity

Capacity and resource are interlinking and overlapping issue categories, and yet are distinguished here for being, respectively, what teachers have availability for and what they have access to. In many instances, and as previously identified, respondents complained that they already contended with congested and multi-layered workloads and were forced to simultaneously manage multiple parallel activities. Respondents also made plain that careers guidance was an unrecognised (potentially unrewarded), and arguably incongruous part of their professional portfolio:

We have enough to deal and contend with as it is. We don't have the time or the opportunity to become specialists in offering careers guidance. (Extract 22)

I don't feel I have the experience to offer this guidance as I am focused on assessments and new exams. (Extract 23)

A few respondents referenced specific and/or what they perceived as core aspects of their teaching roles which would prevent them from operating as specialist careers advisors:

I don't have time with curriculum specifications and restraints. (Extract 24)

There's no time to do this as well as completing the syllabus. (Extract 25)

Science teachers are not able to keep up to date with changes in STEM careers because they are too busy with the job of teaching. (Extract 26)

These accounts raise the question of how much teachers' role as specialist career guides will be at the expense or to the detriment of their other professional duties.

Lack of resource

Respondents cited resource, or rather, a lack of resource as another operational barrier impeding their ability to provide STEM careers guidance. Respondents identified a lack of resource in terms of inadequate access and provision of informational materials specific to STEM and the informational needs of their students:

We don't have access to the relevant materials. We would be giving generic guidance only. (Extract 27)

We're not *provided* with the up-to-date information on the rapidly changing world of careers. (Extract 28)

The issue of teachers' informational impoverishment in the context of careers guidance was seen to be, as alluded to in extracts 27 and 28, exacerbated where career pathways and processes in career development were in a contemporary context inconstant and changeable – an issue further compounded by the diversity and abundance of established

and emergent STEM occupations. A means to navigate the complexity of careers guidance provision in STEM domains was also seen to be compromised by teachers lacking the most current information or more specifically, as told in extract 28, not being *provided* with this information. The choice of phrasing in this instance is subtle yet significant in revealing an attitude that teachers should not be expected to make a personal/professional investment in foraging for or actively researching careers information as they might in lesson design and preparation, but have it provided to them. It is a statement that also, therefore, draws a distinction between teachers involved in the provision of careers guidance and careers *education* to their pupils.

Whilst few would argue that the most up-to-date information is indispensable to good careers guidance, it would seem a mistake to think of teachers' contribution only in the context of dissemination. Their role is surely more substantial and pedagogically oriented and rests with their capacity to translate and broker careers information in the most effective ways. This process of translation arguably begins with augmenting and scaffolding teachers' capacity to synthesise careers information, perhaps with their own direct and lived experiences, and instigate a space of negotiated learning where learners are harnessed in their deliberative management of informed choice.

Teachers' role in STEM careers guidance might not be as a 'one-stop' or 'closed-shop' of careers information, typically associated with the careers advisor, but a continuous process, more easily and realistically managed, of teachers raising awareness amongst their learners of the diversity of career opportunities available to them in STEM. Teachers raising awareness of STEM might then be understood as a process, which as recommended by the UK Science and Learning Expert Group (2010, p. 6) implants in learners the interest and curiosity to seek out further information. Awareness-raising is simultaneously a process intended to stimulate learners' sense of responsibility and ownership over their informational needs: 'users must feel that this is *their* information, available for *them*, in a way *they* want to use it'. Teachers' relational proximity to their learner cohorts might therefore be argued as a key aspect of what makes them integral to the facilitation of learners' powers of self-visualisation and their ability to confidently build future imaginaries through personalised STEM careers guidance.

However, in raising awareness, respondents identified a lack of access to careers training as an operational barrier to teachers' STEM careers guidance. Respondents also argued that training should be available to *all* teachers – and not only those specially assigned by school management – and exist as a common, if not universal, component of teachers' continuous professional development:

... relevant training is not in place for *all* staff. (Extract 29)

No training is given to staff. (Extract 30)

The final iteration of a resource deficit identified by respondents focused on a 'lack of support in developing links with STEM employers'. The intimation of this claim being that schools and thereby school teachers may be without the necessary relational support – be this in the form of an outreach manager or facilitator with continuous responsibility for brokering and managing external communications and relationships with STEM industry and business – and we might easily also imagine universities – or dedicated/allocated time allowing for them to independently pursue relationships with industry's educational, outreach and recruitment personnel. This issue is, therefore, as

much an issue of resource in a physical or relational sense as it is time and capacity. Of course, an interaction with industry and business is not unilateral and depends upon the willingness of both in directly supporting and working with schools.

Discussion

The results of this survey reflect the challenges teachers face in managing the complexity and frailty of their pedagogical identity and practice within the context of the marketisation of compulsory education; the downsizing of educational support services and the growing expectations of educational policy-makers. The survey communicates a curious dichotomy of professional dis/empowerment where an expectation made of teachers to deliver careers guidance explicates the significance of their relational (and informational) proximity to learners and the interests of the schools within which they work. Yet, it also exemplifies the closeted nature of their practice and the paucity of an external interface that might otherwise bolster the efficacy of this specific pedagogical function. Concurrently, these respondents conceptualise their pedagogic role from the perspective of having expert knowledge of their learners and the curriculum yet an inability to make connections that traverse the pedagogical boundaries and organisational preoccupations of the school. These responses accordingly reveal a sense of disparateness between a singular conceptualisation of teachers as instructors of curriculum and a more holistic conceptualisation of teachers that incorporates their role as bridging agents to learners' future educational and occupational contexts. They also insinuate the diminution and withdrawal of pedagogical ambition in schools. Furthermore, they reflect the intensification and diversification of the teacher's role and an antagonism that exists between its evolving constituent parts.

Holman's (2014) recipe for effective careers guidance is thus in the context of our respondents' conceptualisations of SLCG, only half-way possible where it is complicated by teachers' conflicting interests and allegiances and the boundedness of their practice. Teachers are caught for instance between the personal investment they make in cultivating and supporting their learners and the kinds of professional disinterestedness they need to apply in providing neutral and objective guidance. They similarly have a pedagogical responsibility to their learners but a performance-based and fiscally oriented responsibility to their schools in the context of student retainment and securing competitive status within national league tables. We would argue, therefore, that the professionalisation of the teacher in the context of careers guidance is compromised by variances of relational proximity. On one hand, the teacher is close both to his/her discipline as it is constructed by the curriculum; close to a working knowledge of the interest and needs of his/her learners and operates with a close awareness of the performance-based demands of his/her school. Conversely, the teacher is less proximal or perhaps even dislocated from the future reality of his/her learners and operates with less or limited awareness of pathways to and opportunities within higher education and industry. Such variances may be further exacerbated by aspects of proximity that impact not at an individual but organisational level, for example, the extent of a school's relationship across and/or activity within a network of external stakeholders. The potential for a 'stable careers programme' as anticipated by Holman (2014) would seem, therefore, certainly from the purview of these respondents to gain traction with teachers' relational proximity to their students

opening up opportunities for ‘personal guidance’ and ‘addressing the needs of each pupil’. Its potential, however, dissipates where teachers’ distance from ‘encounters with employers and employees’; ‘experience of workplaces’ and ‘encounters with further and higher education’ arrests their capacity in ‘linking curriculum learning with careers’.

These conceptualisations of SLCG signpost a systemic failure to recognise the contribution of the teacher beyond a prescriptive delineation of instruction and credentialism belonging to a market rationalisation of education that also massively underplays an already teeming portfolio. They make comment not only of the seeming irreconcilability of relational, informational and attitudinal differences that inform conceptualisations of the teacher’s role in the provision of careers guidance but suggest that the widening of this role illuminates the impotence of teachers in transcending, with their students, the organisational paradigm of the school. Furthermore, these accounts reflect the incongruousness of the aspirations of educational policy with the lived experience of teachers’ practice and a failure to engage with a more joined-up approach to education with the continuation in the U.K. of public governance by austerity.

Conclusion

The results of this survey reveal a myriad of obstacles identified by respondents complicating and frustrating teachers’ contribution to careers guidance in STEM. These first-hand and ‘bottom-up’ accounts also represent a challenge to the authority and legitimacy of current U.K. and devolved education policy on careers and what has been critiqued herein as SLCG. Respondents’ attitudes towards SLCG are not, however, altogether antagonistic, and are in part tempered by a belief in the value of teachers involvement in careers guidance.

Approximately a third of respondents identified with a rationale for SLCG, motivated by a sentiment of teachers’ relational proximity – potentially in academic and pastoral contexts – to their students and of being in some shape or form, *in loco parentis*; of teachers ‘owning’ the responsibility of guiding ‘their’ students’ educational (social and intellectual) development; of them having informational proximity as a virtue of their subject specialism (thought this was equally seen as a deficit); and their being best equipped to make credible assessments of complementarity and fit between learners’ aspirations, choices and trajectories.

The relational proximity of teachers to their students – and therein teachers’ individualised/personalised knowledge of each student – was viewed by respondents as something that might significantly enrich and ameliorate the quality of careers guidance. SLCG was, in such context, seen to offer a bespoke, more roundly informed (employing meta-criteria not solely a criterion of educational performance) reading of learners’ potential educational and occupational trajectories. The significance of relational proximity was also seen in the context of careers guidance being not a one-off or isolated but continuous, expansive, non-proscriptive and two-way conversation.

The benefit of relational proximity to SLCG might, however, only be guaranteed with a trusting and dialogically fluent teacher–student interface. Where the interface is anything less, the advantage of relational proximity might likely deteriorate into the disadvantage of relational distance or disconnection and sabotage the unique positionality of the teacher as career guide. A teacher’s relational proximity to a student might also impair his/her

capacity as an impartial and critically detached steward. Proximity may, for instance, cause a teacher to become overly invested in a personal and non-objective conviction of what a student's educational and occupational prospects might, or rather, *should* be. A potential for impartiality might further attenuate where a teacher's proximity to his/her subject and the role played as subject specialist, advocate and recruiter within a school, delimits his/her ability and willingness to enter into an advisory relationship with a student on terms any other than as a champion of their own specialism (and school).

Overall, a rationalisation against SLCG might be most easily understood in the terms of an imbalance of relational, informational and attitudinal proximity. *Relationally*, teachers may be too close to their students. On an *informational* level, they may be far removed from up-to-date careers information. *Attitudinally*, they may be even further from an acceptance of SLCG as a formal responsibility, less informal contribution. These issues may then be seen – as respondents did – to be further aggravated by underlying and inter-linking 'infrastructural' deficits of capacity, resource and expertise.

The study also reveals respondents' apprehension in advocating for SLCG yet reticence in suggesting its provision is devolved to careers professionals, whom they hold in low esteem and consider to lack both relational and informational proximity. Respondents' eschewal of careers professionals also complicates a belief that the best careers guidance is provided by 'a mix of professional guidance practitioners, teachers and other key stakeholders, and when delivery is supported by appropriate tools and technologies' (Hooley, Marriott & Sampson, 2011). Successful careers guidance might then seem to depend not only on relational proximity but relational brokerage facilitating the harmonious interface of teachers with other stakeholders.

We surmise overall that the success of SLCG, in organisational terms, hinges on the contribution of school management, governors and external facilitators and the integration of STEM enrichment and engagement activities into the curriculum. Parents too, as a major source of and influence on young people's careers information (Wellcome Trust Monitor, 2013), have a prominent role in contributing to SLCG; albeit a contribution affected by the same issues of relational and informational proximity attributed to teachers. Universities – their academic and student communities – also have a significant contribution in supporting SLCG, and a contribution propelled through an emphasis on innovation and engagement in higher education contexts. Concurrently, as Archer, Wong, and DeWitt (2013) argue, there is a need for increasing the diversity of routes into science, certainly beyond the 'gold-standard' of the A-level⁵ and university degree, facilitating more equitable participation in science and the promotion of a socially, culturally and intellectually heterogeneous scientific community. Such an action might also mitigate against the self-aggrandisement of schools in their retaining and recruiting at post-16.

In rethinking and potentially revising policy for careers guidance in STEM, a more cross-cutting and/or shared perspective is necessary that not only spreads the responsibility for careers guidance across the educational and occupational continuum but simultaneously enriches it. Such a policy requires mindfulness of the variance of proximities and the organisational boundedness that affects the teaching profession and which seems to impede the potential of a stable careers programme. Orienting the next generations of future scientists is surely a responsibility not just for teachers but every member of the STEM community. SLCG is only plausible where it is afforded ballast

and continuity both in the local context of the school and with the external contribution of the wider educational and occupational community.

Notes

1. In Finland, guidance counsellors all have trained teacher status. Holman (2014) reports 25% as having a master's degree qualification in guidance.
2. Years 9–13 in the UK reflect an age range of 14–18 years.
3. In the Wellcome Trust Monitor 2013 survey, 49% of respondents stated obtaining information about careers from their teachers. However, 67% stated that they sought careers information from their parents.
4. STEMNET (the Science, Technology, Engineering and Mathematics Network) works with thousands of schools, colleges and STEM employers, to enable young people of all backgrounds and abilities to meet inspiring role models, understand real-world applications of STEM subjects and experience hands-on STEM activities that motivate, inspire and bring learning and career opportunities to life (see www.stemnet.org.uk).
5. The 'A'-level or General Certificate in Education Advanced Level is an academic award in the UK conferred upon completion of pre-university education.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Richard Watermeyer is a Senior Lecturer and Director of Research within the Department of Education at the University of Bath. He is a sociologist of education with broad interests in education policy, practice and pedagogy.

Pat Morton is a Principal Lecturer and Director of SET in the Centre for Science Education at Sheffield Hallam University.

Jill Collins is a Project Manager for SET in the Centre for Science Education at Sheffield Hallam University.

References

- Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B., & Wong, B. (2012). Science aspirations, capital, and family habitus: How families shape children's engagement and identification with science. *American Educational Research Journal*, 49(5), 881–908.
- Archer, L., Hutchings, M., & Ross, A. (2003). *Higher education and social class: Issues of exclusion and inclusion*. London: Routledge Falmer.
- Archer, L., Wong, B., & DeWitt, J. (2013). Spheres of influence: What shapes young people's aspirations at age 12/13 and what are the implications for education policy? *Journal of Education Policy*, 29(1), 58–85.
- Barnes, I., & Kent, P. (2010). *Leading careers education, information, advice and guidance (CEIAG) in secondary schools*. Nottingham: National College for Leadership of Schools and Children's Services.
- Bennett, J., Lubbey, F., & Hampden-Thompson, G. (2011, June). *Schools that make a difference to post-compulsory uptake of science*. Final project report to the Astra Zeneca Science Teaching Trust.
- Blenkinsop, S., McCrone, T., Wade, P., & Morris, M. (2006). *How do young people make choices at 14 and 16* (Research Report RR773). London: DfES.

- Brigman, G., & Campbell, C. (2003). Helping students improve academic achievement and school success behavior. *Professional School Counseling*, 7, 91–98.
- Department for Education. (2013). *Education, England: The School Governance (Roles, Procedures and Allowances) (England) Regulations 2013*. Retrieved from http://www.legislation.gov.uk/uksi/2013/1624/pdfs/uksi_20131624_en.pdf
- DfE. (2015). *Careers guidance and inspiration in schools, statutory guidance for governing bodies, school leaders and school staff*. London: HMSO.
- DIUS. (2009). *The demand for Science, Technology, Engineering and Mathematics (STEM) skills January*. Retrieved from http://www.bis.gov.uk/assets/biscore/corporate/migratedD/publications/D/Demand_for_STEM_Skills
- Estyn. (2012). *Informed decisions: The implementation of the Careers and the World of Work framework*. Retrieved from <http://www.estyn.gov.uk/english/docViewer/258012.3/informed-decisions-the-implementation-of-the-careers-and-the-world-of-work-framework-october-2012/?navmap=30,163>
- Evans, J. H., & Burck, H. D. (1992). The effects of career education interventions on academic achievement: A meta-analysis. *Journal of Counseling & Development*, 71, 63–68.
- Finegold, P., Stagg, P., & Hutchinson, J. (2011). *Good timing: Implementing STEM careers strategy in secondary schools*. Coventry: Centre for Education and Industry (CEI), University of Warwick.
- Glaser, B., & Strauss, A. (1999). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick, NJ: Aldine.
- Gorard, S., & See, B. H. (2009). The early impact of SES on participation and attainment in science. *Studies in Science Education*, 45(1), 93–129.
- Gottfredson, L. S. (2005). Using Gottfredson's theory of circumscription and compromise in career guidance and counseling. In S. D. Brown & R. W. Lent (Eds.), *Career development and counseling: Putting theory and research to work* (pp. 71–100). New York, NY: Wiley.
- Green, A. E., & White, R. (2007). *Attachment to place: Social networks, mobility and prospects of young people*. York: Joseph Rowntree Foundation.
- Hodgson, A., & Spours, K. (2011). Educating 14–19 year olds in England: A UK lens on possible futures. *London Review of Education*, 9(2), 259–270.
- Holman, J. (2011). *Foreword: Good timing: Implementing STEM careers strategy in secondary schools* (Final report of the STEM Careers Awareness Timeline Pilot). Retrieved from http://www.derby.ac.uk/files/icegs_good_timing.pdf
- Holman, J. (2014). *Good career guidance*. London: Gatsby Charitable Foundation.
- Hooley, T., Matheson, J., & Watts, A. G. (2014). *Advancing ambitions: The role of career guidance in supporting social mobility*. London: Sutton Trust.
- Hooley, T., & Watts, A. G. (2011). *Careers work with young people: Collapse or transition?* Derby: International Centre for Guidance Studies, University of Derby.
- Hooley, T., Marriott, J., & Sampson, J.P. (2011). *Fostering college and career readiness: How career development activities in schools impact on graduation rates and students' life success*. Derby: International Centre for Guidance Studies.
- House of Commons Education Committee. (2013). *Careers guidance for young people: The impact of the new duty on schools* (Government Response to the Committee's Seventh Report of Session 2012–13). London: Stationery Office.
- Howard, K. A., & Solberg, V. S. (2006). School counseling as a method for achieving social justice. *Professional School Counseling*, 9, 278–294.
- Hutchinson, J. (2013). *School organisation and STEM career related learning*. York: National STEM Centre.
- Hutchinson, J., Rolfe, H., Moore, N., Bysshe, S., & Bentley, K. (2011). *All things being equal? Equality and diversity in careers education, information, advice and guidance*. Manchester: Equality and Human Rights Commission.
- Institute for Employment Research. (2005, March). What is effective career guidance? Evidence from longitudinal case studies in England. *Bulletin No.78*.
- Institute of Physics. (2013). *It's different for girls: The influence of schools*. Retrieved from www.iop.org/education/teacher/support/girls_physics/different/page_61620.html

- Ipsos Mori/Wellcome Trust. (2013). *Risks and rewards: How PhD students choose their careers*. London: Wellcome.
- Lapan, R., Aoyagi, M., & Kayson, M. (2007). Helping rural adolescents make successful postsecondary transitions: A longitudinal study. *Professional School Counseling, 10*, 266–272.
- Lapan, R. T., Gysbers, N. C., & Petroski, G. F. (2001). Helping seventh graders be safe and successful: A statewide study of the impact of comprehensive guidance and counseling programs. *Professional School Counseling, 6*(3), 186–198.
- Lapan, R. T., Gysbers, N. C., & Sun, Y. (1997). The impact of more fully implemented guidance programs on the school experiences of high school students: A statewide evaluation study. *Journal of Counseling & Development, 75*(4), 292–302.
- Mason, R. (2014). Vince Cable tells teachers: You know nothing about the world of work. *The Guardian*. Retrieved March 6, 2014, from www.theguardian.com/education/2014/mar/06/vince-cable-angers-teachers-careers-advice
- Moodysson, J., & Jonsson, O. (2007). Knowledge collaboration and proximity: The spatial organization of biotech innovation projects. *European Urban and Regional Studies, 14*(2), 115–131.
- Munro, M., & Elsom, D. (1999). *Choosing science at 16: The influences of science teachers and careers advisers on student's decisions about science subjects and science and technology carers*. Cambridge: CRAC.
- Nicoletti, C., & Berthoud, R. (2010). *The role of information, advice and guidance in young people's education and employment choices*. University of Essex: Institute for Social and Economic Research.
- Perry, E., & Francis, B. (2010, December). *The social class gap for educational achievement, a review of the literature*. London: Royal Society of Arts.
- Plank, S., DeLuca, S., & Estacion, A. (2005). *High school dropout and the role of career and technical education: A survival analysis of surviving high school*. St. Paul, MN: National Research Center for Career and Technical Education.
- Rolfe, H., & Equal Opportunities Commission. (1999). *Gender equality and the careers service* (Research discussion series). Manchester: Equal Opportunities Commission.
- Smith, M., Brooks, S., Lichtenberg, A., McIlveen, P., Torjul, P., & Tyler, J. (2009). *Career development learning: Maximising the contribution of work-integrated learning to the student experience*. Wollongong: Academic Services Division, University of Wollongong.
- Stahl, G. (2015). *Identity, neoliberalism and aspiration: Educating white working-class boys*. London: Routledge.
- UK Science and Society Expert Group. (2010). *Science for careers: Report of the Science and Society Expert Group*. Retrieved from <http://www.dera.ioe.ac.uk/467/>
- Watts, A. G. (2001). Career education for young people: Rationale and provision in the UK and other European countries. *International Journal for Educational and Vocational Guidance, 1* (3), 209–222.
- Watts, A. G. (2013). False dawns, bleak sunset: The Co-alition Government's policies on career guidance. *British Journal of Guidance and Counselling, 41*(4), 442–453.
- Wellcome Trust Monitor. (2013). Retrieved from <http://www.wellcome.ac.uk/About-us/Publications/Reports/Public-engagement/WTX058859.htm>
- Welsh Government. (2008). *Careers and world of work (CWoW): A framework for 11 to 19-year-olds in Wales*. Retrieved from <http://www.careerswales.com/prof/upload/pdf/careersworldofworkframeworke.pdf>
- Wrench, J. (1992). New vocationalism, old racism and the careers service. In P. Braham, A. Rattansi, & R. Skellington (Eds.), *Racism and anti-racism: Inequalities, opportunities and policies* (pp. 133–147). London: Sage.
- Young, R. A., & Collin, A. (2000). Introduction: Framing the future of career. In A. Collin & R. A. Young (Eds.), *The future of career* (pp. 1–20). Cambridge: Cambridge University Press.