Studies in Higher Education

ISSN: 0307-5079 (Print) 1470-174X (Online) Journal homepage: https://www.tandfonline.com/loi/cshe20

The teaching–research gestalt: the development of a discipline-based scale

Angus Duff & Neil Marriott

To cite this article: Angus Duff & Neil Marriott (2017) The teaching–research gestalt: the development of a discipline-based scale, Studies in Higher Education, 42:12, 2406-2420, DOI: 10.1080/03075079.2016.1152465

To link to this article: https://doi.org/10.1080/03075079.2016.1152465

Published online: 21 Mar 2016.

Studies in Higher Education, 2017
Vol. 42, No. 12, 2406–2420, https://doi.org/10.1080/03075079.2016.1152465

The teaching–research gestalt: the development of a discipline-based scale

Angus Duff[a]* and Neil Marriott[b]

[a]*Business School, University of the West of Scotland, Ayr KA8 0SX, UK;* [b]*Winchester Business School, University of Winchester, Winchester SO22 4NR, UK*

This paper reports the development and empirical testing of a model of the factors that influence the teaching–research nexus. No prior work has attempted to create a measurement model of the nexus. The conceptual model is derived from 19 propositions grouped into four sets of factors relating to: rewards, researchers, curriculum, and students. The propositions are operationalised by 61 scale-items and empirically recomposed by a factor analysis on data obtained from 247 UK accounting academics. We demonstrate that, in the discipline of accounting, there are six factors that describe the positive effects of relations between academic research and teaching. We also identify five factors that militate against productive relations between the two. This double-edged sword we term the teaching–research gestalt: although faculty research can be beneficial to teaching and vice versa, there can also be negative effects. The relationship between academic research and teaching therefore requires judicious management.

Keywords: Teaching and research links; teaching and research staff; staff; scholarship of teaching; reward system

Introduction

The relationship between teaching and research in higher education (HE) has been the subject of vigorous debate. Mediaeval universities were places of learning focusing on preparing future generations of highly educated employees (King 2004). Modern universities use the *von Humboldt* model where research is inseparable and identical to teaching and learning (Annala and Mäkinen 2012). This contrasts with the *French* model where research institutes are in charge of research and the university is in charge of teaching (Shin 2011). While research and teaching are believed to have a symbiotic relationship (Visser-Wijnveen et al. 2010), the debate is inconclusive (Simons and Elen 2007). Some literature identifies the mutuality of research and teaching (e.g. Colbeck 1998; Zamorski 2002; Zimbardi and Myatt 2012). Others suggest research and teaching have few synergies and vie for time and resources (Coate, Barnett, and Williams 2001; Stappenbelt 2013). This debate is labelled 'the teaching-research nexus' (e.g. Neumann 1994; Ramsden and Moses 1992) and implies a symbiotic relationship between research and teaching. Given the differing nature of academic experience across disciplines, empirical work is frequently context specific (Griffiths 2004; Robertson and Bond 2001; Shin 2011).

*Corresponding author. Email: angus.duff@btinternet.com

The rationale for this study is threefold. First, despite teaching–research relations being a vigorous area of research activity, the debate is inconclusive with little work synthesising arguments for and against integration. Second, there is an unprecedented interest in measuring academic performance and teaching and research represent two important components in this regard. Third, this study is contextual, considering the discipline of accounting, a popular course of study in universities in many Western countries and the site of just one prior study, a qualitative investigation of accounting academics in one institution in South Africa (Lubbe 2015).

This investigation makes three contributions. First, it synthesises the teaching–research nexus literature to create a normative model (the *teaching–research gestalt*). Second, it creates a questionnaire survey to measure the normative model. Third, it reports the results of a large-scale survey of accounting academics in UK universities allowing: testing of the empirical model that may have the potential to be used in other contexts; and measurement of relationships between those factors derived from the extant teaching–research nexus literature. As HE policy-makers have been divided in their opinion about the relationship of research to teaching and vice versa this study makes a significant contribution to that debate.

Literature review

The literature review identifies four broad issues that frame the interaction of faculty research and student learning, categorised as: (i) extrinsic rewards issues, (ii) curriculum issues, (iii) researcher issues, and (iv) student perspectives.

Extrinsic rewards issues

Faculty members are expected to undertake a wide range of roles meaning that these activities become competing demands (Serow 2000; Vidal and Quintanilla 2000). Consequently, individual actors should maximise their efforts in areas of endeavour that are the most lucrative or prestigious.

Teaching is found not to be a significant factor in faculty rewards and publishing research was the most valued of all activities (Fairweather 1993a), a finding supported by studies that identify that faculty who publish research are paid more than peers who spend most of their time on teaching (Fairweather 1993b, 1994) with more teaching delegated to less research-active faculty (Geschwind and Broström 2015). Similarly research efforts are promoted at the expense of teaching efforts (Cretchley et al. 2014).

Chief academic officers use research publications to measure the effectiveness of teaching (Leslie, Harvey, and Leslie 1998). Similarly, research is seen as a means to promotion, rather than teaching excellence (Nehme 2014; Ramsden and Martin 1996; Tien 2000). Other authors suggest that the specialisation of knowledge means research is remote from what students need to know, leading researchers to separate their research from their teaching (Lubbe 2015; Smeby 1998). Collectively:

P1: There are few rewards for creating a teaching–research nexus

Curriculum issues

A popular view of integrating research into teaching is that it promotes critical enquiry (Cullen, Richardson, and O'Brien 2004; John and Creighton 2011; Kane, Sandretto,

and Heath 2004; Kelly, Davey, and Haigh 1999; Leslie, Harvey, and Leslie 1998; Neumann 1994; Robertson and Bond 2001; Smeby 1998; Visser-Wijnveen et al. 2012). The link between research and teaching is based on a 'mature epistemological disposition' that embraces critical thinking alongside curiosity (Elen, Lindblom-Ylänne, and Clement 2007, 123) and a willingness to use reasonable arguments to defend a stance (Elen and Verburgh 2008). Similarly, Brew (2006) and Jenkins et al. (2003) articulate a vision of research-enhanced learning providing opportunity for students to experience and conduct research developing enquiry throughout their course of study.

Consequently:

P2: Researchers provide students with the skills they need to conduct critical analysis

Some research has identified the potential danger that researchers could distort the curriculum with their own research, at the expense of providing a more holistic view (e.g. Jenkins et al. 1998; Neumann 1994). This is particularly so when 'a teacher's individual research and research interests were seen to dominate, particularly at the expense of the aims of the course' (Jenkins et al. 1998; Neumann 1994, 335).

Lindsay, Breen, and Jenkins (2002) suggest that graduate students believe that faculty research should be useful, interesting and relevant: a belief requiring a judgement on the suitability of lecturer research to student learning, that is, students need to be stakeholders in academics' research (Brew 2006; Jenkins et al. 1998; Lindsay, Breen, and Jenkins 2002; Shin 2011; Zamorski 2002). Thus:

P3: Researchers may distort the content of the curriculum with a desire to include their own research

The curricula of some professionally oriented disciplines, such as accounting (Lubbe 2015), the built environment (Griffiths 2004; Webster 2002), and healthcare (McKee 2002), are largely determined by professional bodies. Including research at the expense of professional syllabus coverage could conceivably lead to content gaps in the professional curriculum. Accordingly:

P4: Using contemporary research creates a tension with the professional curriculum

Researchers and their cutting-edge research are said to enhance the 'knowledge currency' of the curriculum (Coaldrake and Stedman 1999; Jenkins et al. 1998; Lindsay, Breen, and Jenkins 2002).[1] Cutting-edge research is generally interpreted as meaning high-quality research and the inclusion of such contemporary knowledge into the curriculum enhances its value. For example, the research councils in the UK have delivered the 'Cutting Edge Science' programme with leading scientists 'to deliver the latest knowledge, new contexts and practical activities to teachers' (RCUK 2015). A connection between lecturer research and the curriculum is to be found in those subjects where knowledge is seen as constantly changing rather than other sciences and mathematics where knowledge is seen as relatively static (Neumann 1994).

University managers hold a belief that faculty research positively benefits teaching (Buckley 2011; Leslie, Harvey, and Leslie 1998). The benefits of research-active faculty are noted in other specific ways: Jenkins et al. (1998), Lindsay, Breen, and

Jenkins (2002) and Vidal and Quintanilla (2000) identify how students perceive researchers to be more competent dissertation or project supervisors; Cullen, Richardson, and O'Brien (2004, 251) report that accounting case studies provide a 'powerful means of further effecting real accounting practice', rather than 'lying dormant in the pages of academic journals'. Thus:

P5: Researchers provide students with a 'cutting edge' to their learning

Researcher issues

Faculty issues have been highlighted in the corpus of literature considering teaching and research relations particularly of academics' experience of the research–teaching nexus (Kane, Sandretto, and Heath 2004; Robertson and Bond 2001; Shin 2011).

Spronken-Smith and Walker (2010) and Willcoxson et al. (2011) find that teaching could be informed by research if problem-based learning methods were deployed, an approach students find empowering in their intellectual and personal development (Levy and Petrulis 2012). Coppage and Baxendale (2001) and Horta, Dautel, and Veloso (2012) report that when teaching graduate students research, the discussion of which often leads students to propose new approaches to the topic under investigation, leading to collaborative research with students (Hermanson and Hermanson 1996; Robertson 2007). Prosser et al. (2005) identify that academics who experience their subject in atomistic ways without integration tend to be more information transmissive and teacher-focused in their teaching. Research-active faculty with more integrated and holistic understandings of their subject undertake teaching in more student-focused ways. Thus:

P6: Teaching stimulates the researcher's thoughts

Critically evaluating the academic role, Barnett (1992), Romainville (1996), and Stappenbelt 2013 each proposes teaching and research are different requiring different personal qualities. The differential personality model proposes that there is a negative relationship between teaching and research, as the two activities require contrary and contrasting personal orientations. Eble (1988) believes that teachers are more sociable, more able to cope with pressure and distractions and enjoy the interaction with students; researchers are more introverted and more at ease with ideas, facts, and materials of a discipline than with students and learning. Similarly, Durning and Jenkins (2005, 418) identify not effectively managing teaching and research leads to the creation of 'clear tensions ("blocks")'.

Goode's (1960) theory of role strain suggests that committing time and energy to one job role comes at the expense of another. So, committing time to teaching necessarily comes at the sacrifice of research (Gonzalez-Brambila and Veloso 2007; Horta, Dautel, and Veloso 2012): the 'scarcity model' (Colbeck 1998; Nehme 2014). Geschwind and Broström (2015) identified a persistent practice of division of labour between teaching-orientated and research-orientated faculty; and a dislocation of these roles (Locke 2012). Outstanding university teachers were also active researchers but were unlikely to publish about their teaching, questioning the institutional separation of teaching and research (Halse et al. 2007). Thus:

P7: Research and teaching activities require different personal qualities and compete for a scarce time resource

Student perspectives

Student perspectives on the teaching–research nexus were first highlighted by Neumann (1994) who identified the limitations of correlational studies in this domain. Some studies report tangible benefits to students of faculty research, as students perceive their courses to be up-to-date and that their lecturer was enthusiastic about the course material (Ball and Mohamed 2010; Cullen, Richardson, and O'Brien 2004; Healey et al. 2010; Neumann 1994; Wilson et al. 2013). Faculty research lends credibility to the department and university in which they are studying (Jenkins et al. 1998). The UK National Student Survey finds that students in departments with the highest research (research selectivity exercise) scores were more positive than students in lower rated subject areas (IUSSC 2009). Thus:

P8: Students value contact with researchers

Faculty research is said to be important to students in 'the sense it gave them of faculty as people and as learners' (Jenkins et al. 1998, 133). Similarly, Elton (2001) proposes that 'a positive research and teaching link depends on the nature of students' learning experiences' (43) and that faculty involvement in research is said to demonstrate their enthusiasm and their commitment to learning. Student support for learning in an environment where research is conducted is also identified by Healey et al. (2010), Jenkins (2004), Hunter, Laursen, and Seymour (2007) and Wilson et al. (2013). Together these findings support the following proposition:

P9: Student learning is enhanced through contact with researchers

Students undertaking professional courses tend to focus their learning on 'how to do the job' at the expense of acquiring intellectual skills such as recognising and managing complexity, that are addressed as a matter-of-course by researchers (Griffiths 2004). This requirement to impart professional skills is at odds with developing research skills. The focus on curriculum is significant as Annala and Mäkinen (2012) have identified the tensions that exist around the 'core point' of the teaching–research nexus which lies in the curriculum design. University accounting degrees are said to emphasis rote-learning of techniques rather than the impact on society of extant accounting practice and organisation (Chabrak and Craig 2013). Thus:

P10: Research skills are not valued by students pursuing professional studies

IUSSC (2009), Lindsay, Breen, and Jenkins (2002), and Zimbardi and Myatt (2012) identify the positive effect research-active faculty may have on future research career considerations. The accounting discipline notes a shortage of accounting PhDs (Plumlee et al. 2006) exacerbated by the numbers of faculty destined to soon retire (Felix Committee 2006). Consequently, the accounting community needs to encourage undergraduate students to pursue a research-orientated academic career. Collectively:

P11: Students exposed to research are more likely to consider a career in research

Goldstein and Neugebauer (1995) provide an account of distinguished physicist Richard Feynman who attempted to integrate research and teaching through deep scholarship: a technique that resulted in declining class attendance. Similarly, Vidal and Quintanilla (2000) identify that the most specialised research may affect the most general and basic courses negatively. For new, doctorally qualified accounting faculty in the USA, teaching development is not a component of their doctoral programme, suggesting that new PhD holders, like Feynman, are more aware of their own learning, than student learning (Swain and Stout 2001). Thus:

P12: Researchers may pitch the level of their teaching too high

A range of empirical studies have considered the relationship between student satisfaction and an institutional research mission. Stappenbelt (2013) reported that, at an individual level, teaching and research competed for limited time and resources with little benefit of the transference between them. Jenkins et al. (1998), Lindsay, Breen, and Jenkins (2002), Healey et al. (2010) and IUSSC (2009) identify that students perceive research-active lecturers to be less available than teachers not engaged in research. To summarise:

P13: Researchers have less time to be available to students, and hence provide them with less support

Method

Questionnaire design

The 13 propositions developed in the literature review are used to develop inventory items for the questionnaire. Scale-items are derived from the extant literature in education and accounting and adapted to the context of this study. The statements were developed after conducting 16 interviews with accounting academics that allowed the researchers to better contextualise some of the statements. Sixty-one statements were developed, requiring respondents to indicate their acceptance using a five-point Likert scale. The inventory also contained questions on demographic information including gender, seniority, and time spent on various academic activities.

Data collection

Questionnaires were distributed by email to 1491 accounting academics in the UK. Respondents were assured that responses were anonymous and confidential. Two hundred and fifty-seven respondents returned a useable questionnaire, a response rate of 17.2%.

The demographics of our sample are as follows. Respondents by rank were: Professors, 25%; Readers 2%; Senior Lecturers 34%; and Lecturers 30%. Pre-1992 ('old') institutions made-up 34% of respondents, with 66% working in post-1992 ('new') institutions[2]; 43% were entered into RAE2008, 57% were not. Considering the average time participants spent on various work activities, teaching accounted for 42%; personal research and research-related activities 33%; administration, 20%; and consultancy, 5%.

Factor analytic procedure

The teaching–research gestalt is theoretically described by 13 propositions which are defined by 13 first-order factors. Each first-order factor constitutes a measure, operationalised by a number of survey items. The confirmatory factor analysis (CFA) was used to assess the ability of survey items to describe the hypothesised first-order factors and the overall teaching–research gestalt second-order factors. First, an analysis of the relationship between the items (observed variables) and the first-order factors (unobserved variables) is undertaken. Second, the standardised regression weights (SRWs) are examined for each first-order factors. SRWs less than 0.4 are removed as they have limited ability to represent the factor (Cabrera-Nguyen 2010). Retained items then create a composite measure for each item. Third, an assessment of the relationship between the two teaching–research gestalt second-order factors and the first-order factors and their constituent items is undertaken to identify how the two second-order factors that describe the teaching–research gestalt are represented by the first-order factors that were derived from the extant literature. Finally, the goodness-of-fit of the model to the data is considered using the standardised root mean square residual (SRMR) in tandem with the root mean square error of approximation (RMSEA) (MacCallum and Austin 2000).

Results

Analysis

Using the procedure described above, 11 first-order factors were identified relating to 10 propositions. Three propositions, P11–13, were not supported. Proposition P5 was not distinct and empirically related to two factors. The 11 factors are described in Table 1.

Factor I is labelled ‘extrinsic rewards of research’ and consists of seven items directly derived from proposition P1: all related to extrinsic rewards issues and reflect issues relating to institutional values and the valorisation of research over teaching. This factor can be considered as having a negative impact on the nexus.

Factors II–IV each address curriculum issues. Factor II is labelled ‘research promoting critical analysis’ and consists of four items derived from P2, conceptualised as having a positive effect on teaching–research relations. This factor can be interpreted as academic beliefs that research plays an active role in ensuring the curriculum include contemporary material and that student learning includes critical enquiry.

Factor III is labelled ‘research dissonance from the curriculum’ and consists of five items relating to P3. Factor III has a negative impact on the nexus. Research may be detrimental in a cramped curriculum, driven by the needs of professional bodies. Reasons for this conflict include: student apathy to faculty research and distorting effects of the inclusion of research.

Factor IV ‘tension between research and professional curriculum’ consists of two items derived from P4 and refers to the challenge of including contemporary research into a professionally driven curriculum. It is seen as having a negative effect on the gestalt.

Factor V is labelled ‘research-led teaching’ and consists of three items relating to P5. It proposes that researchers are more competent to teach and promote student learning and has a positive effect on the gestalt.

Table 1. Summary of teaching–research gestalt factors.

Item and description of factor	SRW	SMC
Factor I: Extrinsic rewards of research (P1).[−ve] α = .85		
Research rather than teaching is rewarded by promotion at my institution	.880	.775
Research is valued more highly at my institution	.712	.506
Teaching is not a significant factor in faculty rewards	.719	.517
Promotion policies fail to recognise good accounting and finance teaching	.691	.394
Faculty who publish research are better rewarded than those who spend their time on teaching	.622	.387
Faculty who seek promotion, publish in academic journals at the expense of other activities	.628	.394
As a result of the demands of research activity, I cannot spend as much time supporting my students	.420	.177
Factor II: Research promoting critical analysis (P2).[+ve] α = .85		
Integrating research into teaching promotes students' critical enquiry	.871	.759
Using research as part of a holistic approach to learning assists students' critical thinking skills	.886	.785
Research-active academics provide students an exemplar of a questioning approach to learning	.747	.558
Research activity contributes to updating the curriculum	.581	.338
Factor III: Research dissonance from curriculum (P3).[−ve] α = .75		
Increased specialisation of knowledge means that research is remote from what students need to know	.790	.624
Inclusion of an academic's research overloads an already cramped curriculum	.761	.578
Researchers can distort the curriculum with their own research at the expense of subject coverage	.580	.337
Including specialised research leads to lecturers pitching the course too high	.497	.247
Students rarely see staff research as valuable to their own learning	.470	.221
Factor IV: Tension between research and professional curriculum (P4).[−ve] α = .63		
Accounting profession's influence on the curriculum creates tension if linking research to teaching	.492	.242
Inclusion of research at the expense of professional syllabus coverage leads to gaps in the curriculum	.943	.889
Factor V: Research-led teaching (P5).[+ve] α = .73		
Teaching staff involved in research are more committed to student learning	.817	.668
Teaching staff who are involved in research are more enthusiastic about their teaching	.846	.715
Research-active staff adopt a more holistic and interpretative approach to their teaching	.468	.219
Factor VI: Researcher stimulation of ideas (P6).[+ve] α = .72		
Teaching can stimulate research	.616	379
Integrating teaching and research increases research productivity	.677	.459
'Some of my best research ideas have come out in the course of teaching in an area.'	.420	.177
Teaching and research are mutually beneficial	.680	.462
Time devoted to teaching is conducive to research output	.534	.285
Factor VII: Research and teaching: Different attributes (P7).[−ve] α = .74		
It is unreasonable to expect good teachers to be good researchers and vice versa	.707	.500
Teaching and research are different roles requiring different qualities	.828	.686
Factor VIII: Students value contact with researchers (P8).[+ve] α = .88		
My students consider my course is up-to-date because of my research activity	.864	.747
My students perceive me as enthusiastic about my course because of my research activity	.909	.826

(*Continued*)

Table 1. (*Continued*.)

Item and description of factor	SRW	SMC
Factor IX: Development of professional skills (P10).[−ve] α = .76		
Students on professionally oriented courses should focus their learning on 'how to do the job'	.693	.480
Students need professional skills, not research skills	.887	.786
Factor X: Currency of research to the curriculum (P5).[+ve] α = .59		
'You need research to be at the cutting edge, an outdated course has no point in the real world'	.481	.232
It is important for a lecturer to engage in research as the world is constantly changing	.864	.746
Factor XI: Student learning (P9).[+ve] α = .62		
Students enjoy learning activities based on real-world examples from practice	.494	.244
Students enjoy learning activities based on real-world examples from research	.928	.861
Empirically based case studies provide a means of demonstrating real accounting practice	.419	.176

Notes: SRW – standardised regression weights, SRWs < .4 not shown; SMC – squared multiple correlations.

Factor VI is described as 'researcher stimulation of ideas' using items from P6 and has a positive effect on the gestalt. The underlying theme is that teaching and research are mutually beneficial, as for example, teaching can stimulate ideas, and integrating the two increases research productivity.

Factor VII, 'research and teaching: different attributes' uses items created from P7. Factor VII describes the conflict created by the intense growth in HE, whereby scholars are expected to excel in a number of different spheres. Factor VII has a negative impact on the gestalt.

Factor VIII created is labelled 'students value contact with researchers' which relates to two items derived for P8. This factor describes a situation where student learning is enhanced by contact with productive and well-known scholars in the field: the 'unique-selling proposition' marketed by elite research-intensive institutions.

Factor IX, the 'development of professional skills' is seen a negative factor on the connection between student learning and faculty research. This factor, relating to P10, espouses a belief that accounting is a professional course, more a question of 'how to', rather than 'why'. Thus, including academic research within the curriculum is at odds with creating industry-ready professionals.

'Currency of research to the curriculum' is the label given to factor X and uses items created for P5. It views research as essential to the curriculum to provide it with a 'cutting edge'. That is, by making course content contemporary.

Finally, factor XI, 'student learning', consists of three items derived from P13. It has a positive effect on the gestalt. Factor XI describes how academic research and professional practice can be used to create authentic learning materials, such as case studies.

To evaluate the expectation that these 11 factors can be considered a two-sided gestalt of positive and negative effects, a second-order factor analytic model is constructed. Specifically two second-order factors are created as unobserved variables. In the first higher order factor, positive effects are measured by factors II, V, VI, VIII, X, and XI. The second higher order factor is measured by factors I, III, IV, VII, and IX – see Table 2. Each first-order factor loads onto the hypothesised second-order factor with strong SRWs.

The positive aspects that encompass the teaching–research gestalt are in order of importance: 'Currency of research to the curriculum' (0.77); 'Research-led teaching' (0.75); 'Students value contact with researchers' (0.65); 'Research promoting critical analysis' (0.64); 'Researcher stimulation of ideas' (0.57); 'Student learning' (0.54). Similarly, the negative side of the gestalt is measured by in order of importance: 'Research dissonance from the curriculum' (0.89); 'Research and teaching: different attributes' (0.75); 'Development of professional skills' (0.57); 'Tension between research and the professional curriculum' (0.54); and 'Extrinsic rewards of research' (0.44).

To evaluate the fit to the data, three models are considered. Model A is a one-factor model tested purely for comparison purposes. Model B is an 11-factor model based on the 11 first-order factors identified in the factors. Model C is a second-order CFA model, with two higher order factors: the first measured by factors II, V, VI, VIII, X, and XI; the second by factors I, III, IV, VII, and IX. The goodness-of-fit statistics for each of these three models are given in Table 2. Predictably, the data demonstrate an inadequate fit to the one-factor model (Model A), with an RMSEA value of .111 and SRMR value of .125 indicating rejection (see Table 2). Model B is at the threshold of acceptable fit. However, model C produces fit indices clearly indicative of satisfactory fit (RMSEA = 0.057; SRMR = 0.087) and is preferable to Model B on the grounds of parsimony. In conclusion, the two second-order factor, eleven first-order factor model is chosen.

Discussion

This paper calibrates the teaching–research nexus. We demonstrate that there are six factors that describe the positive effects of relations between academic research and teaching and five factors that militate against productive relations between the two. This double-edged sword we term the teaching–research 'gestalt' is a development

Table 2. Summary of two second-order factors

Item and description of factor	SRW	SMC
Panel A: Positive gestalt		
Factor II: Research promoting critical analysis (P2).	.643	.414
Factor V: Research-led teaching (P5)	.745	.555
Factor VI: Researcher stimulation of ideas (P6).	.572	.327
Factor VIII: Students value contact with researchers (P8).	.646	.417
Factor X: Currency of research to the curriculum (P5).	.766	.586
Factor XI: Student learning (P9).	.543	.295
Panel B: Negative gestalt		
Factor I: Extrinsic rewards of research (P1).	.441	.195
Factor III: Research dissonance from curriculum (P3).	.888	.789
Factor IV: Tension between research and professional curriculum (P4).	.538	.289
Factor VII: Research and teaching: Different attributes (P7).	.745	.556
Factor IX: Development of professional skills (P10).	.571	.326

Notes: *Model A: One-factor model*
$\chi^2(779). = 3235.23$; χ^2/d.f. = 4.15 $p < .001$; RMSEA = .111 (.107–.115); SRMR = .125.
Model B: Eleven-factor model
$\chi^2(783). = 2094.77$; χ^2/d.f. = 2.69 $p < .001$; RMSEA = .081 (.077–.085); SRMR = .111.
Model B: 2 second-order factor, eleven first-order factor model
$\chi^2(617). = 1124.72$; χ^2/d.f. = 1.82 $p < .001$; RMSEA = .057 (.051–.062); SRMR = .087.

of the popular term 'nexus' that implies a natural symbiosis between teaching and research. The clear implication of these findings is that although faculty research can indeed be beneficial to teaching and vice versa, but there can also be negative effects. The relationship between academic research and teaching consequently requires judicious management.

The 11 first-order factors developed in this paper largely correspond to their description derived from the 13 normative propositions, derived from the literature that underlies the empirical model. The factor model replicates the 'extrinsic rewards' proposition as a unitary factor. Researcher issues are described by just two factors (VI and VII). Curriculum issues are calibrated by four factors (II, III, IV, and X). Issues relating to student learning are measured by four factors (V, VIII, IX, and XI). The empirical model consists of four types of factors: (i) where there are few material rewards for the academic to promote a nexus; (ii) where teaching and research can be mutually beneficial, but require different personal attributes; (iii) a view that research promotes critical enquiry, which stifles, and is stifled by, a professional and vocational curriculum, that is, a curriculum largely created by professional bodies, rather than academics; and (iv) a residue of issues where, by and large, research is deemed to have a positive effect on student learning.

A novel finding of this research is that these eleven factors are described by two second-order factors that describe a gestalt. The gestalt describes two opposing sets of forces that shape the relationship between teaching and research. The value of research to teaching is characterised by: the value of research to the curriculum; the notion that research-active faculty are highly committed to learning; the value students place on contact with researchers; the ability of research to promote critical analysis; how teaching can stimulate researcher thinking; and the direct relevance of research and practice for student learning. The problems of linking research and teaching are: the lack of relevance of contemporary research to the curriculum; the different personal qualities required to succeed as a teacher or researcher; the necessity of developing professional skills rather than research skills in students; the technical content gaps that can be created by making a curriculum too research focused; and institutional focus on research at the expense of teaching. It is plausible that a similar gestalt may operate in other disciplines, particularly where professional accreditation is to the fore, for example, engineering, law, psychology, and social work.

We identify three limitations that are suggestive of future research. First, accounting education in the UK is in some ways different from other countries and cultures. It would be interesting to establish whether the model operates equivalently in other countries. Second, the paper considers the discipline of accounting. It would be interesting to establish how applicable the model is in other disciplines whether relating to professional practice or not. However, our survey contains many largely generic items, rather than items relating to the acquisition of technical knowledge or professional identities. Consequently, it is likely that the instrument will be of utility to other education researchers. Third, the paper considers *faculty* views rather than *student* views. As identified in the prior literature, student views on teaching–research relations are potentially valuable (Neumann 1994) and a comparative measurement study of student perspectives would also be valuable.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Institute of Chartered Accountants of Scotland.

Notes

1. Specifically, the term 'knowledge currency' is used by Lindsay, Breen, and Jenkins (2002, 320) in summarising Jenkins et al.'s (1998) key findings.
2. In 1992, the UK government transformed former polytechnics providing higher education into universities with their own degree-awarding powers. The distinction between 'new' universities and their older counterparts remains in the eyes of some observers, with pre-1992 institutions being generally more research focused, with post-1992 institutions being more teaching intensive.

References

Annala, J., and M. Mäkinen. 2012. "The Research-teaching Nexus in Higher Education Curriculum Design." *TCI (Transnational Curriculum Inquiry)* 8 (1): 3–21.

Ball, S., and M. A. T. Mohamed. 2010. "Insights on How Students Perceive the Research-teaching Nexus: A Case Study of Hospitality Management Students." *The Journal of Hospitality Leisure Sport and Tourism* 9 (2): 89–101.

Barnett, R. 1992. "Linking Teaching and Research: A Critical Inquiry." *The Journal of Higher Education* 63: 619–36.

Brew, A. 2006. *Research and Teaching: Beyond the Divide*. London: Palgrave Macmillan.

Buckley, C. A. 2011. "Student and Staff Perceptions of the Research–teaching Nexus." *Innovations in Education and Teaching International* 48 (3): 313–22.

Cabrera-Nguyen, P. 2010. "Author Guidelines for Reporting Scale Development and Validation Results in the Journal of the Society for Social Work and Research." *Journal of the Society for Social Work and Research* 1 (2): 99–103.

Chabrak, N., and R. Craig. 2013. "Student Imaginings, Cognitive Dissonance and Critical Thinking." *Critical Perspectives on Accounting* 24: 91–104.

Coaldrake, P., and L. Stedman. 1999. *Academic Work in the Twenty-First Century: Changing Roles and Policies.* Canberra: Department of Education, Training and Youth Affairs.

Coate, K., R. Barnett, and G. Williams. 2001. "Relationships Between Teaching and Research Education in England." *Higher Education Quarterly* 55 (2): 158–74.

Colbeck, C. 1998. "Merging in a Seamless Blend: How Faculty Integrate Teaching and Research." *The Journal of Higher Education* 69: 647–71.

Coppage, R. E., and S. Baxendale. 2001. "A Synergistic Approach to an Accounting Educator's Primary Responsibilities." *Accounting Education* 10: 239–46.

Cretchley, P. C., S. L. Edwards, P. O'Shea, J. Sheard, J. Hurst, and W. Brookes. 2014. "Research and/or Learning and Teaching: A Study of Australian Professors' Priorities, Beliefs and Behaviours." *Higher Education Research & Development* 33 (4): 649–69.

Cullen, J., S. Richardson, and R. O'Brien. 2004. "Exploring the Teaching Potential of Empirically-Based Case Studies." *Accounting Education* 13: 251–66.

Durning, B., and A. Jenkins. 2005. "Teaching/Research Relations in Departments: The Perspective of Built Environments Academics." *Studies in Higher Education* 30 (4): 407–26.

Eble, K. E. 1988. *The Craft of Teaching: A Guide to Mastering the Professor's art*. San Francisco, CA: Jossey-Bass Publishers.

Elen, J., S. Lindblom-Ylänne, and M. Clement. 2007. "Faculty Development in Research-Intensive Universities: The Role of Academics' Conceptions on the Relationship Between Research and Teaching." *International Journal for Academic Development* 12 (2): 123–39.

Elen, J., and A. Verburgh. 2008. *Bologna in European Research-intensive Universities: Implications for Bachelor and Master Programs*. Antwerpen-Apeldoorn: Garant.

Elton, L. 2001. "Research and Teaching: Conditions for a Positive Link." *Teaching in Higher Education,* 6 (1): 43–56.

Fairweather, J. 1993a. "Academic Values and Faculty Rewards." *The Review of Higher Education* 17: 43–68.

Fairweather, J. 1993b. "Faculty Reward Structures: Toward Institutional and Professional Homogenization." *Research in Higher Education* 34: 603–23.
Fairweather, J. 1994. "The Value of Teaching, Research and Service." In *The NEA 1994 National Almanac of Higher Education*, edited by H. Wechsler, 39–58. Chicago: University of Chicago Press.
Felix Committee. 2006. *The Supply and Demand for Accounting PhDs*. Sarasota, FL: American Accounting Association.
Geschwind, L., and A. Broström. 2015. "Managing the Teaching–Research Nexus: Ideals and Practice in Research-oriented Universities." *Higher Education Research & Development* 34 (1): 60–73.
Goldstein, D. L., and G. Neugebauer. 1995. Special preface to R. Feynman (Ed.). *Six Easy Pieces*. London: Penguin Books.
Gonzalez-Brambila, C., and F. M. Veloso. 2007. "The Determinants of Research Output and Impact: A Study of Mexican Researchers." *Research Policy* 36 (7): 1035–1051.
Goode, W. J. 1960. "A Theory of Role Strain." *American Sociological Review* 25: 483–96.
Griffiths, R. 2004. "Knowledge Production and the Research-teaching Nexus: The Case of the Built Environment Disciplines." *Studies in Higher Education* 29: 709–26.
Halse, C., E. Deane, J. Hobson, and G. Jones. 2007. "The Research–Teaching Nexus: What do National Teaching Awards Tell us?" *Studies in Higher Education,* 32 (6): 727–46.
Healey, M., F. Jordan, B. Pell, and C. Short. 2010. "The Research–teaching Nexus: A Case Study of Students' Awareness, Experiences and Perceptions of Research." *Innovations in Education and Teaching International* 47 (2): 235–46.
Hermanson, D. R., and H. M. Hermanson. 1996. "Maximising Research Productivity: Some Ideas to Consider." *Accounting Perspectives* 2 (Fall): 269–306.
Horta, H., V. Dautel, and F. M. Veloso. 2012. "An Output Perspective on the Teaching-research Nexus: An Analysis Focusing on the United States Higher Education System." *Studies in Higher Education* 37 (2): 171–87.
Hunter, A.-B., S. L. Laursen, and E. Seymour. 2007. "Becoming a Scientist: The Role of Undergraduate Research in Students' Cognitive, Personal, and Professional Development." *Science Education* 91: 36–74.
Innovation, Universities, Science and Skills Committee (IUSSC). 2009. *Students and Universities, 11th Report*. London: House of Commons.
Jenkins, A. 2004. *A Guide to the Research Evidence on Teaching-research Relations.* York: Higher Education Academy.
Jenkins, A., T. Blackman, R. Lindsay, and R Paton-Saltzberg. 1998. "Teaching and Research: Student Perspectives and Policy Implications." *Studies in Higher Education* 23: 127–41.
Jenkins, A., R. Breen, R. Lindsay, and A. Brew. 2003. *Reshaping Teaching in Higher Education: Linking Teaching and Research*. London: Kogan Page.
John, J., and J. Creighton. 2011. "Researcher Development: The Impact of Undergraduate Research Opportunity Programmes on Students in the UK." *Studies in Higher Education* 36 (7): 781–97.
Kane, R., S. Sandretto, and C. Heath. 2004. "An Investigation into Excellent Tertiary Teaching: Emphasising Reflective Practice." *Higher Education* 47: 283–310.
Kelly, M., H. Davey, and N. Haigh. 1999. "Contemporary Accounting Education and Society." *Accounting Education* 8: 321–40.
King, R. 2004. *The University in a Global Age*. Basingstoke: Palgrave Macmillan.
Leslie, P. L., L. K. Harvey, and G. J. Leslie. 1998. "Chief Academic Officers' Perceptions of the Relationship between Faculty Research and Undergraduate Teaching." *Sociological Spectrum* 18: 185–99.
Levy, P., and R. Petrulis. 2012. "How do First-year University Students Experience Inquiry and Research, and What are the Implications for the Practice of Inquiry-based Learning?" *Studies in Higher Education* 37 (1): 85–101.
Lindsay, R., R. Breen, and A. Jenkins. 2002. "Academic Research and Teaching Quality: The Views of Undergraduate and Postgraduate Students." *Studies in Higher Education* 27: 309–27.
Locke, W. 2012. "The Dislocation of Teaching and Research and the Reconfiguring of Academic Work." *London Review of Education* 10 (3): 261–74.
Lubbe, I. 2015. "Educating Professionals – Perceptions of the Research-teaching Nexus in Accounting (A Case Study)." *Studies in Higher Education* 40 (6): 1085–1106.

MacCallum, R. C., and J. T. Austin. 2000. "Applications of Structural Equation Modeling in Psychological Research." *Annual Review of Psychology* 51 (1): 201–26.
McKee, A. 2002. "Evidence-based Practice in Health Sciences." *Exchange* 3: 19–20. www.exchange.ac.uk/issue3.asp.
Nehme, M. 2014. "The Nexus Between Teaching and Research: Easier Said Than Done'." *Legal Education Review* 22: 241–6.
Neumann, R. 1994. "The Teaching-research Nexus: Applying a Framework to University Students' Learning Experiences." *European Journal of Education* 29: 323–39.
Plumlee, R. D., S. J. Kalchelmaier, S. A. Madeo, J. H. Pratt, and G. Krull. 2006. "Assessing the Shortage of Accounting Faculty." *Issues in Accounting Education* 21: 113–25.
Prosser, M., E. Martin, K. Trigwell, P. Ramsden, and G. Lueckenhausen. 2005. "Academics' Experiences of Understanding of their Subject Matter and the Relationship of This to Their Experiences of Teaching and Learning." *Instructional Science* 33: 137–57.
Ramsden, P., and E. Martin. 1996. "Recognition of Good University Teaching: Policies from an Australian Study." *Studies in Higher Education* 21: 299–315.
Ramsden, P., and I. Moses. 1992. "Associations Between Research and Teaching in Australian Higher Education." *Higher Education* 23 (3): 273–95.
RCUK. 2015. *Bringing cutting edge science to the classrooms*. https://www.sciencelearningcentres.org.uk/audience/secondary-post-16/cutting-edge-and-contemporary-science/.
Robertson, J. 2007. "Beyond the 'Research-teaching Nexus': Exploring the Complexity of Academic Experience." *Studies in Higher Education* 32 (5): 541–56.
Robertson, J., and C. H. Bond. 2001. "Experiences of the Relation between Teaching and Research: What do Academics Value?" *Higher Education Research and Development* 20: 5–19.
Romainville, M. 1996. "Teaching and Research at University: A Difficult Pairing." *Higher Education Management* 8: 135–44.
Serow, R. C. 2000. "Research and Teaching at a Research University." *Higher Education* 40: 449–63.
Shin, J. G. 2011. "Teaching and Research Nexuses across Faculty Career Stage, Ability and Affiliated Discipline in a South Korean Research University." *Studies in Higher Education* 36 (4): 485–503.
Simons, M., and J. Elen. 2007. "The 'Research-teaching Nexus' and 'Education Through Research': An Exploration of Ambivalences." *Studies in Higher Education* 32 (5): 617–31.
Smeby, J.-C. 1998. "Knowledge Production and Knowledge Transmission: The Interaction between Research and Teaching at Universities." *Teaching in Higher Education* 3: 7–20.
Spronken-Smith, R., and R Walker. 2010. "Can Inquiry-based Learning Strengthen the Links Between Teaching and Disciplinary Research?" *Studies in Higher Education* 35 (6): 723–40.
Stappenbelt, B. 2013. "The Effectiveness of the Teaching–Research Nexus in Facilitating Student Learning." *Engineering Education* 8 (1): 111–21.
Swain, M. R., and D. E. Stout. 2001. "Survey Evidence of Teacher Development Based on AECC Recommendations." *Journal of Accounting Education* 18: 99–113.
Tien, F. 2000. "To What Degree Does the Desire for Promotion Motivate Faculty to Perform Research? A Test of Expectancy Theory." *Research in Higher Education* 41: 723–52.
Vidal, J., and M. A. Quintanilla. 2000. "The Teaching and Research Relationship Within an Institutional Evaluation." *Higher Education* 40: 217–29.
Visser-Wijnveen, G. J., J. H. Van Driel, R. M. Van der Rijst, N. Verloop, and A. Visser. 2010. "The Ideal Research-teaching Nexus in the Eyes of Academics: Building Profiles." *Higher Education Research & Development* 29 (2): 195–210.
Visser-Wijnveen, G. J., J. H. van Driel, R. M. van der Rijst, A. Visser, and N. Verloop. 2012. "Relating Academics' Ways of Integrating Research and Teaching to their Students' Perceptions." *Studies in Higher Education* 37 (2): 219–34.
Webster, C. 2002. "Constructing the Research-Teaching Link in the Built Environment Disciplines." *Exchange* 3: 15–16. www.exchange.ac.uk/issue3.asp.
Willcoxson, L., M. L. Manning, N. Johnston, and K. Gething. 2011. "Enhancing the Research-Teaching Nexus: Building Teaching-Based Research from Research-Based Teaching." *International Journal of Teaching and Learning in Higher Education* 23 (1): 1–10.

Wilson, A., S. Howitt, P. Roberts, G. Åkerlind, and K. Wilson. 2013. "Connecting Expectations and Experiences of Students in a Research-immersive Degree." *Studies in Higher Education* 38 (10): 1562–1576.

Zamorski, B. 2002. "Research-led Teaching and Learning in Higher Education: A Case." *Teaching in Higher Education* 7 (4): 411–27.

Zimbardi, K., and P. Myatt. 2012. "Embedding Undergraduate Research Experiences within the Curriculum: A Cross-disciplinary Study of the Key Characteristics Guiding Implementation." *Studies in Higher Education* 39 (2): 233–50.