

WHAT IS THE ROLE FOR EFFECTIVE PEDAGOGY IN CONTEMPORARY HIGHER EDUCATION?

EDITED BY: Carl Senior, Dilly Fung, Christopher Howard and Rowena Senior
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WHAT IS THE ROLE FOR EFFECTIVE PEDAGOGY IN CONTEMPORARY HIGHER EDUCATION?

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The number of students entering into Higher Education (HE) continues to grow and as such the sector now stands at the threshold of a major shift in its philosophy. No longer does the academic prerogative belong to a generation who valued learning for the sake of enlightenment. Many contemporary undergraduate students enter their programmes of study with a primary desire to improve their position on the subsequent employability market. Universities have been quick to meet this need and institutional offerings have followed suit, enabling students to gain experience in a range of additional and subsidiary programmes that focus on the provision of 'value added' benefits. Here, students are encouraged to develop expertise in a range of topics from entrepreneurship and enterprise to intellectual property and even leadership skills. The first round of casualties that fall victim to such a shift are those programmes of study embedded within the humanities. As is evidenced by the falling numbers of enrolling students, the incoming cohort is less likely now to engage with such programmes, while participation in programmes that have a clear employability component has never been so high.

To ensure that the HE sector continues to enable graduates to become effective citizens who contribute to the betterment of society a range of general questions need to be addressed. What does it mean to be an 'authentic' university in the modern era? What are the real student expectations of HE and how are education providers framing and meeting these expectations? Is a new breed of academic leadership needed that will both meet the expectations of the students and guide the aspirations of academic staff? Finally, do we need an opportunity to reflect on the effective design and delivery of curriculum? Should the undergraduate student body play more of a role in the design of the curriculum or should the undergraduate student body play more of a role in the design of the curriculum or should they remain the recipients of a programme that has been designed by subject specialists?

The scope of this book is wide but it brings the design and delivery of higher education programmes under the empirical gaze of educational psychology. That is to say, all chapters centre on the impact of higher educational programmes on the student-teacher relationship, student learning, achievement and identity. It is therefore crucial to explore the psychological impact of higher education institutions and how these can then be used to inform innovative educational practice and policy.

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Editorial: What Is the Role for Effective Pedagogy in Contemporary Higher Education?

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Keywords: higher education institutions, policy making, student satisfaction, consumer satisfaction, market access

Editorial on the Research Topic

What Is the Role for Effective Pedagogy in Contemporary Higher Education?

“Improvise, Adapt and Overcome!”
Clint Eastwood, Heartbreak Ridge

Across the globe the Higher Education (HE) sector is undergoing a startling metamorphosis. No longer is HE the sole preserve of the privileged few; it is now for the masses. However, a new narrative is forming and it is one that clearly demarcates the role of the university and the student—here the student is the *consumer* of a product and not just a learner¹. Students are now positioned as “entrepreneurs of the self” where HE is a “choice” to increase human capital and hence an individual’s competitiveness within global economic markets (Foucault, 2008). Yet how far does a university have to go to embrace this consumer-centric narrative? There is a strong and respected body of evidence showing that a positive service encounter can indeed lead to a vast array of advantageous aspects such as customer loyalty, repeat patronage intentions and even positive word-of-mouth (e.g., Pugh, 2001; Caruana, 2002; Guenzi and Pelloni, 2004). Clearly these outcomes would be of great benefit to most, if not all, educational institutes. However, the very same body of literature also describes the need for customers to identify themselves within an authentic relationship (Tzokas et al., 2001). In light of the fact that the relationship between a student (customer) and University (service provider) is one that is sensitive to a variety of different outcomes that may be outside the control of the university administrators, such as postgraduate employability success and even (quite controversially) assessment success² it is safe to say that there are a myriad of factors that may impact the vital service provider relationship between students and higher education institutions. Therefore, it may not be effective (or even common sense) to adopt a full consumer model just yet.

But consumer expectations are indeed central to a positive service encounter so an ambiguous attitude toward the relationship that the student and their University enjoys is likely to lead to anything but a positive experience (Goldney, 2008; Pinar et al., 2011). Now, is the time for

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¹In the UK this consumer-based approach owes its birth to the publication of a series of influential government sponsored papers on the future of the UKHE sector that were published in 1999. These papers were collectively called “*The Reports of the National Committee of Inquiry into Higher Education*” but colloquially known as the “Dearing Report” after the lead author, Lord Ronald Dearing and it clearly initiated the movement that saw effective pedagogy move away from the traditional didactic arena and toward a more market structured environment.

²A good university will provide excellence in teaching to inspire effective learning that is assessed independently.

institutional leaders to take a stand and declare the role that their students take in their learning and what position this plays in the larger organizational culture. To rephrase this stance within the narrative on consumer psychology one could ask, how does the student body actually inform the university brand such that the organization can develop an authentic relationship with its core customer base?

The ready embrace of consumerist ideology across the global HE sector will most likely see a rise of an open market structure that is highly sensitive to market forces (e.g., Porter, 2008). Economic theory (e.g., Fama, 1970) defines such a market place as one consisting of a large number of rational profit maximizers (e.g., universities) that try to predict future market values and where important information is freely available to all participants (e.g., the now central position of published student satisfaction metrics). One could quite easily argue that contemporary HE is firmly embedded within such an environment. Indeed, given the almost pathological obsession that some institutional managers have in spending money on a variety of student facing initiatives one can also be forgiven for thinking that we have embraced a form of “conspicuous consumption” that institutes are using to try and better their position in the global HE marketplace (Hamilton and Tilman, 1983; O’Cass and McEwen, 2004).

Yet while there are strong moves toward a more market-oriented consumer approach within HE a values-based resistance is forming. The papers that were submitted to this Research Topic are testament to the role of students not as consumers of a product, but as junior scholars, learners and co-creators of the experience at the very heart of effective pedagogy.

The papers included within this research topic can be generally divided into three sections with each relating to one aspect of effective practice in contemporary HE. The first of these sections focus on the expectations and practice of lecturing staff; Hassel and Ridout and Correia and Navarrete examine the differences in expectations and attitudes toward HE in both the student and teacher’s mindset. Both identify the potential impact that a misalignment between the expectations of staff and students may have. Additionally, both make recommendations to ensure that teaching practice is aligned so it meets the expectations of the modern-day student. Cui et al. and Zhao and Zhang focus on the means by which increasing a teacher’s enthusiasm can lead to an increase in professional identity, which ultimately leads to an improvement in the students’ experiences. Bashir et al. demonstrate that students who enter HE via different

routes demonstrate different levels of IT competency. This is an important finding as such competency often forms the bedrock of the transferable and professional skillset that, as Senior et al. found, the modern-day student seeks to obtain in HE.

The next set of papers delve deeper and uncover the mechanistic principles by which university practices can be aligned to meet student expectations. Senior et al. describe the very real need for universities to bring students to the very heart of its activity as true partners before it can deliver an effective pedagogy in these consumer-driven times. By adopting a student-as-partner narrative, it is possible to embed the lived experiences of students alongside the effective delivery of academic programmes (see e.g., Senior et al., 2014). As is seen with the work of Moores et al., compelling evidence supports the role of experiential work-based learning and the benefit that it has in supporting a more overarching and inclusive benefit. This theme is continued with Nash and Winstone, who consider the very core of the relationship between students and their university and examine how feedback is both delivered and received.

In the concluding collection of articles, Tislington and Senior and Knight and Senior both highlight institutional strategies that could be adopted to benefit the student learning experience. Finally, Sitaraman reminds us that we should not stray too far from our core purpose and that is to teach despite the various pressures that may result in a competitive marketplace.

In summary we provide three points to assist in getting the maximum benefit within this manifesto for effective practice:

- Embrace students as partners in all aspects of academic culture. Do not pay lip service to this relationship but instead develop real opportunities for students to engage. This is the authentic relationship that will lead to a positive student encounter.
- Drive only innovation that has proven to be effective. Do not succumb to the need for conspicuous consumption. The contemporary University should deliver excellence by meeting students’ developmental needs. And finally,
- Do not believe the hype. A university can still deliver effective education even in times of obsessive consumerism.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Are Academics Wrongly Assuming Bioscience Students Have the Transferable Skills and IT Competency They Need to Be Successful Beyond the Degree?

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Acquisition and development of key transferable skills is an important requirement for all graduate employees. The aim of the current study was to investigate a potential skills shortage in bioscience students and, if revealed, explore ways of addressing it. A research questionnaire, which included mixed methodology, was used to collate information from a cohort of students across levels four, five, and six enrolled on biological and biomedical science undergraduate programs. A total of 131 students participated in the study. The questionnaire was designed to establish students' confidence using packages such as the Microsoft Office Suite and whether they required additional support with certain programs; further areas explored students' self-assessment of key skills such as written communication, referencing, self-confidence, presentation skills, and team working. No statistically significant gender differences (males $n = 49$; females $n = 82$) were observed in participant responses ($p > 0.05$). Of the total number of students included in the survey, 91% rated themselves as competent using Word and 64% felt least confident using statistical software and performing statistical analysis in Microsoft Excel. Comparing responses by year of study revealed no statistical differences in reported abilities ($p > 0.05$). These findings indicate areas of potential key skills shortages, particularly using data handling software, which may not be sufficiently addressed if prior knowledge is incorrectly assumed. Nearly half of students (50% of level six students) who were graduating felt unprepared performing statistical analysis in Excel. Inclusion of an IT component to support skills development in data handling software at Level 4 is recommended and teaching key software packages are necessary. Furthermore, opportunities for students to develop their presentation skills and report writing abilities are required. This in turn should improve the student experience and develop the transferable skills, which are increasingly sought by employers.

Keywords: graduate employability, IT skills, statistical analysis, biological, undergraduate, Microsoft Office, transferable skills, employable graduates

INTRODUCTION

Acquisition and development of key transferable skills are an important requirement for all graduate employees. The Quality Assurance Agency benchmarks relating to all subjects include various statements about acquiring transferable skills. Transferable skills cover many different areas, however, in the employment context can be broadly described as a skill set that is required for a career to allow participation in a flexible and adaptable workforce. The National Committee of Inquiry into Higher Education (Dearing, 1997) report stated that there were four key skills that were required for all graduates irrespective of discipline: communication skills, the use of information technology, numeracy, and learning how to learn (Fry et al., 2009). However, soft skills such as team working, personal skills, and the ability to work well with others are also critical, as they allow new graduates to make an immediate contribution to a business (Bennett, 2002).

It was quoted in the report of Sir Ron Dearing (1997) “*There is much evidence of support for the further development of a range of skills during higher education, including what we term the key skills of communication, both oral and written, numeracy, the use of communications, and information technology and learning how to learn. We see these as necessary outcomes of all higher education programmes.*” This suggests that higher educational institutions have a responsibility to facilitate the development of many skills in their undergraduates. However, in order to encourage development in students, it is imperative that the current abilities of students are acknowledged. Students’ mathematical ability is an area, which has received attention within the literature. Tariq (2002) reported a decline in basic numeracy skills among first-year bioscience undergraduate students, and later reported many disciplines, including the physical and biosciences, found their undergraduates were unprepared for the mathematical demands of the curriculum (Tariq, 2009; Tariq and Durrani, 2009).

In a society where there is an increasingly competitive global market, employability patterns are also changing; employees are expected to keep up with this change and take charge of their own careers and job security. However, the gap between higher education and industry seems to have stretched rapidly; with an increasing level of graduates who are unable to find jobs whereas, employers still report problems seeking skilled workers with the required knowledge and skills (Tran, 2013).

Internationally, great emphasis has been put on the acquisition of transferable skills with the process of acquiring them being both lifelong and developmental (Hager and Holland, 2006). Inevitably, there is debate on the definition of the term transferable skills and how students can attain these skills. One definition is to find skills, which can be applied across different cognitive domains and subject areas, or across a variety of social and employment situations (Tran, 2013). Therefore, the term “transferable skills” is used to cover an umbrella of abilities that are essential in contemporary life. These skills have a fundamental role in work, and education is perceived as a platform to prepare individuals for work (Hager and Holland, 2006; Tran, 2013).

An assumption of technological literacy in undergraduates can be problematic, especially considering the integral use of computers in higher education courses. Previous research reported 71.7%

of medical students have access to a computer at home (Dørup, 2004). Thus, in light of this increased general exposure to the Internet and IT usage, it would be plausible to assume students would be more IT literate; however, this is not confirmed. There are many ways to define IT literacy; a commonality among definitions is that students need to be able to use basic computer functions and relevant programs in a resourceful way to achieve certain outputs (Wilkinson, 2006). Ezziene (2007) highlighted that IT literacy was paramount to today’s empowerment and identified education as an important basis for its development. One use of computers includes their application in conducting statistical tests and this remains an essential part of students’ curricula following secondary school (Mills, 2002). DeVaney (2010) explored students’ anxieties and attitudes toward statistical courses. The findings revealed although technology was embedded into courses, some students may face technological issues involving the use of computers and specific programs; such as SPSS, which is used to conduct statistical analysis. The students who participated in DeVaney’s research were enrolled on a statistical course, and it is currently unknown whether bioscience students face the same difficulties in using computers to conduct statistical analysis.

Writing skills are also a core part of Higher Education, with written communication considered as a critical student learning outcome, and the proficiency of a large proportion of assignments and examinations is tested through writing; therefore, students need to be able to effectively communicate and express they have understood the learning outcomes of the course (Sparks et al., 2014). Some authors have reported there being a “literacy crisis” in the UK, causing a concern across the Higher Education sector (Ganobcsik-Williams, 2004; Appleby et al., 2012). Others have described the shortcomings in student writing directly impacting the ability of students to learn (Davies et al., 2006). Irrespective of discipline, one of the key requirements listed in almost all job specifications is good written and verbal communication; this is indicated at the application stage and may be formally assessed at the interview. Data from employers echo that of higher education; one study sampled 431 employers from a range of industries and reported that 93% of respondents stated that written communication was a “very important” skill, yet 28% of respondents ranked the writing skills of graduates entering the workforce as “deficient” (Casner-Lotto and Barrington, 2006; Sparks et al., 2014). Throughout their career trajectory, graduates are expected to communicate daily, and identifying a potential skills shortage could highlight an area whereby further development at higher education is beneficial.

Students’ perceptions about their own efficacy are important. Bandura’s (Bandura, 1993) work on perceived self-efficacy highlighted the connections between students’ beliefs about their own efficacy to monitor their own learning and conquer academic endeavors as being crucial in defining their own ambitions, their drive, and academic triumphs. Research has shown that international students who report feeling less confident in their ability to complete their educational programs also demonstrate less confidence in their academic ability (Telbis et al., 2014). In light of the current competitive labor market, it is important that students are able to confidently demonstrate their education and

experiences are relevant to the jobs they apply for to enhance the perceptions readers of their applications may form of them (Knouse, 1994; Tomlinson, 2008).

Aim and Rationale of the Study

There has been a body of literature dedicated to the potential mismatch between the skills employers require and those universities perceive to be important for future employment (Tanyel et al., 1999). The purpose of the current study, however, was to explore whether undergraduate students entering Higher Education come pre-equipped with the basic knowledge of software skills required for them to complete their studies. It is anticipated that the majority of students enrolled on science courses will have completed A-levels or equivalent. It has been noted that universities are sometimes quite inconsistent in that they are discontent students and do not have enough mathematical abilities but then have not expressed any maths requirements in their entry criteria (Higton et al., 2012). This is indicative of the potential discrepancy between the entry requirements for the degree courses and the necessary knowledge and skills students need to be successful. The overall aim of this study was to investigate the potential skills shortage in current bioscience students and explore ways of providing support if required. Due to the exploratory nature of the study, the research team did not formulate hypothesis in advance of the analysis.

RESEARCH METHOD: QUESTIONNAIRE SURVEY

A research questionnaire was produced and approved by the Centre for Learning Innovation and Professional Practice Ethics Committee at Aston University. This was used to collate information from a cohort of Life and Health Sciences students across levels four, five and six enrolled in biological and biomedical sciences. Furthermore, as the questionnaires were anonymous, students were able to answer controversial questions more openly and state areas of difficulties without feeling a sense of pressure. The questionnaires were conducted over a 2-week period at the start of laboratory classes and lectures and completed surveys returned at the end of each session. The questionnaire was designed to determine students' confidence using Microsoft and whether they felt that they required additional support with certain programs within the Office™ Suite. The questions asked aimed to determine a broad understanding of students' abilities to use programs as opposed to niche functions, e.g., participants were asked to respond as appropriate to the question; *How confident are you now in using the following programmes to create tables/graphs/statistical tests/PowerPoint presentations/writing reports?* The options included Microsoft Word, Microsoft Excel, Microsoft PowerPoint, or Specialist statistical software. Therefore, students were not asked about their confidence in performing any specific tests/functions using certain programs but focused on the output. Individual module requirements differ within the biosciences and this approach allowed students to reflect on the range of different tests/functions, which may be required by their degree programs. Questions required students to self-rank using

Likert-type scales from “1” to “5” with accompanying statements such as “Poor,” “Not very good,” “Fair,” “Good” and “Excellent.”

RESULTS

Of the 150 questionnaires administered, 131 were completed and returned (87% return rate). The demographics of the responders are summarized in **Table 1**.

Subjects Taken at Further Education

The study determined that the courses students had previously completed as part of their further education prior to commencing their degree course. The results from the questionnaire demonstrated that of the students surveyed; 81.7% took A-levels, 12.2% completed a BTEC qualification, 4.6% completed an access course, and 1.5% completed the International Baccalaureate. Students were asked to report, which subjects they completed as part of their further education. The results indicated that 73% studied chemistry, 96% studied biology, 51% studied mathematics, 27% studied physics, 18% studied statistics, 15% studied IT/ICT, and 3% studied accounting.

Students were asked if they felt that the subjects they took in further education prepared them with the IT skills they required for higher education. Only 24.4% of students reported they “strongly agreed” they felt prepared, 29% “agreed,” 21.4% stated they “neither agreed nor disagreed,” 12.2% stated they “disagreed,” and 13% stated they “strongly disagreed.” This indicates that 25.2% of the students surveyed felt the subjects they took in further education did not adequately prepare them with the IT skills required for their higher education course.

A cross-tabulation was conducted to further explore the breakdown of courses students undertook at further education and the extent to which they felt prepared with the IT skills required by their higher education. Of the students who studied BTEC, 75% agreed that their further education prepared them with the IT skills they required. Of the students entering with

TABLE 1 | Demographic information of students who participated in study ($n = 131$).

	Frequency	Percent
Gender		
Males	49	37.4
Females	82	62.6
Course		
Biological sciences	69	52.7
Biomedical sciences	62	47.3
Year		
Four	67	51.1
Five	27	20.6
Placement	4	3.1
Six	33	25.2
Country		
Home/EU	128	97.7
International	3	2.3
Age range		
17–24	125	95
25–33	6	5

A-Levels, 53.3% agreed with the statement whereas only 16.7% of students who studied an Access course agreed. These data are presented in **Table 2**. There were only two international students in the sample; one disagreed with the statement and the other neither agreed nor disagreed. There were six access students, of which four students disagreed with the statement indicating they did not feel confident with the IT components of their course, however, due to the small sample size of participants within this group, it is difficult to draw any solid conclusions. A Chi Square test revealed that there was no statistically significant association between students who took BTEC and A-Levels at further education and whether or not they felt prepared with the IT skills required for Higher Education ($p > 0.05$).

IT Software Packages

Another aim of the study was to determine if students had sufficient prior knowledge of operating common business software packages prior to entering Higher Education (see **Table 3**). Of the students questioned, 83% reported that they were not formally taught how to use any specialist statistical software, and 32% stated they were not taught how to use Microsoft Excel.

Students were then asked to self-rank their confidence on a Likert scale using the same commonly encountered software packages. The findings can be seen in **Table 4** and demonstrate

TABLE 2 | Courses taken at further education and confidence with IT skills.

Scale	Further education level			
	A-levels (%)	Access (%)	International BACH (%)	BTEC (%)
1.00 Strongly disagree	13.0	33.3	–	6.3
2.00 Disagree	10.3	33.3	50.0	12.5
3.00 Neither agree/disagree	23.4	16.7	50.0	6.2
4.00 Agree	29.9	–	–	37.5
5.00 Strongly agree	23.4	16.7	–	37.5

TABLE 3 | Programs in which student received no formal training prior to entry into Higher Education.

Program	Frequency	Percentage
Microsoft Word	23	17
Microsoft Excel	42	32
Microsoft PowerPoint	22	16
Statistical software	109	83

TABLE 4 | How confident students are now at using the following programs.

Program	Not confident		Fairly confident	Confident	Very confident
	1	2	3	4	5
Microsoft Word	8%	0%	1%	24%	67%
Microsoft Excel	3.1%	5.3%	24.4%	29.8%	37.4%
Microsoft PowerPoint	1.50%	3%	11.5%	25%	59%
Statistical Software	40.6%	24.2%	18.8%	8.6%	7.8%

students were least confident in using statistical software (64%) and 91% of students reported feeling “confident” or “very confident” using Microsoft Word.

One section of the questionnaire addressed where students principally learnt key skills such as creating tables, graphs, statistical tests, PowerPoint presentations, and report writing. Only 42% of students stated through further education, 32% through university course, and 55% self-taught through books/internet.

The study asked students to self-rank their confidence in performing statistical analysis. The results revealed that only 2% of students reported feeling “very confident,” 21% reported feeling “confident,” 30% reported feeling “neither confident or not confident,” 28% reported feeling “unconfident,” and 19% reported feeling “very unconfident.”

Self-Ranked Abilities

Students were asked to self-rank the key abilities listed in **Table 5** alongside five statements. A majority rated themselves highly with the statements of “good” or “excellent.” However, for Harvard-style referencing, 29% ranked themselves as only “fair,” 46% as “good,” and only 15% as “excellent.” Most importantly, results indicated that students were less confident when performing statistical tests in Microsoft Excel with 20% ranking themselves as “not very good,” 37% ranking themselves as “fair,” 39% ranking themselves as “good,” and only 2% ranking themselves as “excellent.” A similar pattern was observed for numeracy skills with 21% ranking themselves as “fair,” 44% as “good,” and only 28% as “excellent.”

A Pearson’s Chi Square test was conducted for each of the skills listed in **Table 5** to reveal if there were any differences in the self-reported confidence between males and females. Results revealed there were no statistically significant differences between the two genders ($p > 0.05$).

For the purpose of conducting a Pearson’s Chi Square test, data obtained from the question asking students to indicate their abilities in a range of skills was recoded to exclude the neutral responses from the analysis. This combined “excellent” or “good” responses in one category and the responses “not very good” or “poor” in the other category. The Pearson’s Chi Square revealed

TABLE 5 | How bioscience students self-ranked their transferable skills.

Ability	Poor (%)	Not very good (%)	Fair (%)	Good (%)	Excellent (%)
Written communication	1	2	11	55	31
Harvard style referencing	1	9	29	46	15
Statistical analysis using Excel	2	20	37	39	2
Numeracy skills	1	6	21	44	28
Spoken Communication	–	2	16	51	31
Self-confidence	1	5	25	46	23
Team working skills	1.5	–	5.3	49.6	43.5
Presentation skills	–	3.1	18.3	50.4	28.2

that there was no statistically significant association between Further Education course and whether or not students felt confident in their written communication skills $\chi(3) = 3.775$, $p = 0.287$. There was also no significant difference between further education course and self-reported ability to reference using Harvard style, ability to conduct statistical analysis using Microsoft Excel, numerical skills, spoken communication ability, and self-confidence ($p > 0.05$). There was a significant difference between Further Education course and ability to work in a team; $\chi(3) = 30.093$, $p = 0.001$. This is because within the access category ($n = 2$), there was an equal split between those who felt their skills were excellent and those who felt their skills were poor. Most respondents indicated their ability to work in a team was excellent. There was no significant difference between Further Education course and reported ability in presentation skills; $\chi(2) = 3.621$, $p = 0.164$.

Further analysis involved investigating students' self-ranked abilities by year of study. Overall, a Pearson's Chi Square test revealed no statistical differences in responses across the three levels in performing statistical analysis using computer programs and more specifically Microsoft Excel ($p > 0.05$). Although, a higher percentage of level four students (61%) ranked themselves as "poor" or "not very good" at performing statistical analysis using computer programs, compared to 22% of level five students and 41% of level six bioscience students.

Analyzing data on Excel forms a key part of laboratory practical report writing; however, only 34% of level four students reported their abilities as "good" or "excellent" compared to 48% of level five and 50% of level 6 students. Although level 6 students self-ranked their abilities more highly, this data suggest that nearly half of students who were near graduating felt unprepared with

a task that is highly sought by from employers, particularly for research/academic related roles.

In the last section of the questionnaire, students were asked to highlight up to three areas in which they required additional support. **Figure 1** shows that overall 49% required support with Microsoft Excel (creating graphs/performing statistical tests), 37% required support with statistical analysis, 24% required additional support with report writing, 16% required support with presentation skills, 15% required support with referencing, and 13% stated they wanted support with mathematical skills. Interestingly, 98% of the students stated that they had not undertaken any courses externally/outside their degree program to improve their current IT skills (although a range of academic support services were available at the institution they attended).

DISCUSSION

Understanding the level at which individuals self-report their transferable-skills abilities is important. Previous literature has focused on conducting skills tests and has reported actual abilities of students, however, in higher education, academics often see a disparity between what students think they will achieve and the actual marks they attain. Moreover, higher education institutions often assume students come pre-equipped with certain skills that are required by the program from their preceding further education. Therefore, the current study was conducted to recognize how bioscience students self-ranked various key skills and to highlight areas in which students require additional support.

Within the sample who participated, there were disproportionate numbers of females to males; 62% of participants were female,

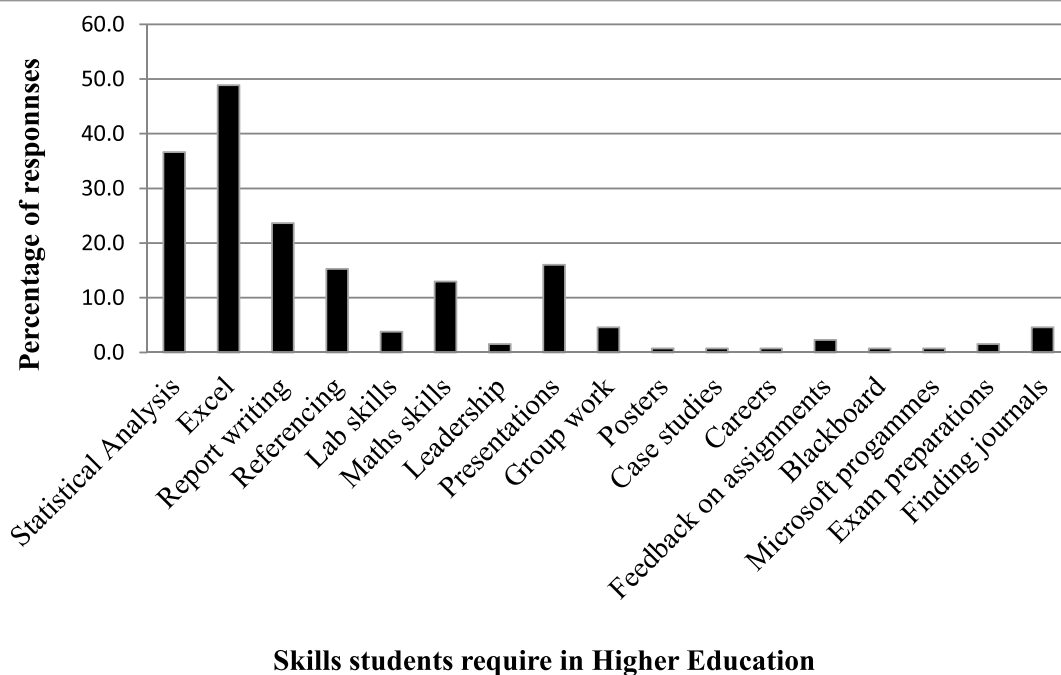


FIGURE 1 | Skills bioscience students identified where they required additional support.

this was anticipated as HESA reported that, in 2011–2012, more than 60% of students enrolled in Biological Sciences programs across the UK at undergraduate level were females. Furthermore, data revealed that not only did the total number of students enrolled on all courses increase by 13.5% between 2003–04 and 2011–12, but an increase of 38% was revealed in biological sciences, placing it within the top three courses to observe large increases in student number (Universities UK, 2013). With the large increase in student numbers, there are more pressures on higher education institutions to produce employable graduates who end up in positive destinations.

The use of IT is becoming increasingly important across all subjects throughout the educational life of a student. In 2002, The ImpaCT2 project concluded that in the UK prior to GCSE's, 67% of students had rarely used ICT in mathematics lessons, however, at GCSE, the figure rose to over 80% (Harrison et al., 2002). The study also reported that an increased level of ICT usage enhanced students' performance by over half in science at GCSE (Harrison et al., 2002). These findings indicated that because students were using computer programs so early in their academic years, they should already have basic skills such as creating appropriate graphs and selecting the correct analysis for data sets (Cox et al., 2004). However, the results from the current study revealed that a high percentage of undergraduate students required more assistance and they needed to be taught how to conduct statistical tests in specialized programs and Excel.

The findings from the current study demonstrated most students' IT skills were self-taught. Interestingly, BTEC students felt the most confident in their IT skills ability, followed by those who had completed A-levels (although this was not statistically significant, see Table 2). This finding suggests that BTEC courses may have intrinsic components, which sufficiently prepare students with the IT skills they need for higher education, alternatively, it could be BTEC courses that build students' confidence in this area hence their higher perceptions of their IT skills.

In contrast, the students who had completed an Access to Higher Education (Access) course reported feeling the least confident in their IT skills, which suggests that they may need additional support with IT skills. Previous research suggests that access students may experience difficulties in transitioning to Higher Education due to their personal circumstances (Reay et al., 2002). This article draws focus on the importance of mature students "*in the expansion and reform of higher education*" in the UK, as they are important in achieving the aim of widening participation (Reay et al., 2002, p. 5). It is essential to bear in mind that there were only six students who had completed an Access course and a larger sample would be needed to draw any firm conclusions. Within the Biosciences, there are courses such as the BSc Biomedical Science whereby universities request one A-level in a specific subject (typically biology), on top of the BTEC qualification; this is usually based on a professional or regulatory body requirement. Access for mature students aged 21+ is considered on an individual basis. Nevertheless, in order to successfully improve the teaching and learning experience for those students who may need additional support with IT skills, it is important that universities are sensitive to the individual abilities of students and their prior further educational background.

Being able to perform and apply mathematics is fundamental for undergraduate students across many STEM subjects (Tariq et al., 2010). There is a strong connection between mathematics and biology, as mathematical models provide scientists with important data relating to the growth, survival, and replication of microorganisms. In order to achieve their full potential, students require both functional mathematics such as analyzing data in the form of graphs and charts as well as more academic applications such as algebra and statistical analysis (Tariq et al., 2013). Of the students who participated in this study, almost all studied biology at further education, however, only 51% took mathematics. Coincidental with this, one of the key skills in which students reported the least confidence was statistical analysis for which numbers and the application of mathematics is required. Importantly, a study conducted by Croft et al. (2009) reported that students who lacked the required mathematical skills and enrolled on degree programs faced grave challenges as many endured academic failure and a loss of self-confidence. Further to this, the university also suffers in terms of student retention and progression, and inevitably, this affects the cost-effectiveness of the course (Tariq et al., 2013).

Recently, a report released by the United Kingdom's Advisory Committee on Mathematics Education (ACME) investigated the mathematical requirements of Higher Education courses and stated that in many disciplines, programs required a higher level of quantitative analysis, yet, many students lacked the mathematical skills required to succeed in their chosen discipline (Advisory Committee on Mathematics Education ACME, 2011; Tariq et al., 2013). Therefore, ensuring that students have an ample understanding of performing statistical analysis is essential in their progression through Higher Education.

Employers have also stated that in order to succeed in an interview, new graduates require strong communication and problem-solving skills because effective writing, speaking, and critical thinking enables the accomplishment of business goals. Furthermore, managers reported that 36% of graduates demonstrated a skills shortage in data analysis using Excel and other specialist software and the sooner graduates developed these skills the more employable they would become (Dishman, 2016).

Results from the current study showed that report writing and correctly referencing in Harvard style were two areas that students highlighted in which they would like more support. Up until students reach university, referencing sources is unfamiliar as it is not covered at A-level, therefore, some emphasis on this in further education would be beneficial in preparing students for university as the penalties for plagiarism can have serious consequences.

However, tutors simply showing students how to write reports and use correct referencing will not promote deeper learning. An article released by Appleby et al. (2012) investigated the literacies that undergraduate students acquired at university, and the association of these to employability. They interviewed students who had previously studied A-levels, where many students reported they were almost "spoon fed," largely copying information from the board without critical thought or application of knowledge. They were simply memorizing information in order to pass exams (Appleby et al., 2012). It is important that students seek additional

support in areas where they feel their skills are weak, however, ninety-eight percent of students in the current study stated they had not sought any additional IT support outside their degree course despite the provision of additional support being available through their institution.

The findings in the study by Appleby et al. (2012) also suggested that STEM employers were seeking graduates with a range of communication skills, in which written communication was included; however, other skills such as team working, problem solving, and maturity were more valued assets. Significantly, the employers in the study stated they preferred not to have “spoon fed” employees; having the ability to use references was not seen as a transferable skill whereas comprehending how to learn the new skills and the knowledge behind it was. This study also highlighted that students often worked on assignments in groups and offered each other help in developing written skills by proof reading and commenting on work—almost forming a network of academic support (Appleby et al., 2012).

Almost two decades ago, Harvey (2000) stated that graduate employability should not be the sole priority of Higher Education, stressing the need for students to become “lifelong learners.” However, it is clear that students need more than just good grades to secure graduate employment (Salas Velasco, 2012). Employers require both *hard skills* (knowledge of the field and practical skills such as being IT literate) and *soft skills* (communication, teamwork, and leadership) (Salas Velasco, 2012). Previous research has established, even at a simple level, that there is a discrepancy between the important skills required by employers and the skills in the graduates they employ (Collet et al., 2015).

Reports have noted that companies did provide training to graduates in some of the skills they listed as essential to the post (communication, IT, organization, and teamworking); this shows that companies do commit to developing employees’ skills in some areas. By demanding certain core skills at the application stage, employers reported an improvement in the quality of the subsequent applicants. Many higher education institution courses aim to embody key skills within courses to improve the employment perspectives of graduates, however, job advertisements only provide an objective measure of employers’ demands; they do not describe the level of competence required in each skill area. Until there is an understanding of the definitive skills and attributes required by companies, universities cannot accurately predict what students need to know (Bennett, 2002).

The current study asked students to self-report their abilities in the absence of actual skills tests. This may be a potential limitation as students may have an inaccurate perception of their own abilities; for example, previous research has shown students tend to overestimate their mathematical ability (Pajares and Kranzler, 1995). In addition, assessing through the use of self-reporting is an indirect measure as students may be influenced by social

desirability and may alter responses accordingly (Dunn, 2015). However, longitudinal data has suggested that students can provide reasonably accurate estimates of their own abilities at a single point in time (Bowman, 2010). This is further supported by research examining students’ assessment abilities when peer marking work, whereby low achievers did not inflate marks in comparison to tutor grades (Stefani, 1994). Furthermore, it has been suggested that students with higher cognitive abilities are usually more able to accurately predict their performance than those with lower cognitive abilities (Truxillo et al., 2008). We can, therefore, have some confidence that those students reporting a high level of confidence in a particular skill ability would be more competent than a student ranking themselves as weak. It is particularly important for students to be able to convey their competencies and strengths when it comes to applying for jobs (Knouse, 1994). Students tend to have a realistic view of the areas in which they are weak and would benefit from additional support.

CONCLUSION

Overall, the results clearly indicate that it is sometimes incorrect to assume students are taught all the key skills they require at Higher Education during Further Education. Therefore, incorporating these key skills at Level 4 would be advantageous for students and tutors. Results from this study also indicated that teaching key software packages and providing more opportunities for students to make presentations are required. Not only will this improve the student experience and help in the transition from Further Education to Higher Education, these transferable skills are increasingly sought by employers as essential additions to core discipline material when seeking employable graduates.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of the Centre for Learning Innovation and Professional Practice Ethics Committee at Aston University with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Life and Health Sciences ethics committee at Aston University.

AUTHOR CONTRIBUTIONS

AB designed the study, executed the data collection and analysis. AB is the main author of the write-up of this research. SB contributed toward the write-up of the article and design of this study. AC contributed toward the write-up of the article and design of this study.

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Responsibility-Sharing in the Giving and Receiving of Assessment Feedback

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Many argue that effective learning requires students to take a substantial share of responsibility for their academic development, complementing the responsibilities taken by their educators. Yet this notion of responsibility-sharing receives minimal discussion in the context of assessment feedback, where responsibility for enhancing learning is often framed as lying principally with educators. Developing discussion on this issue is critical: many barriers can prevent students from engaging meaningfully with feedback, but neither educators nor students are fully empowered to remove these barriers without collaboration. In this discussion paper we argue that a culture of responsibility-sharing in the giving and receiving of feedback is essential, both for ensuring that feedback genuinely benefits students by virtue of their skilled and proactive engagement, and also for ensuring the sustainability of educators' effective feedback practices. We propose some assumptions that should underpin such a culture, and we consider the practicalities of engendering this cultural shift within modern higher education.

Keywords: feedback, assessment, student engagement, teaching excellence, culture, sustainability

In higher education, as in many other walks of life, the delicate processes of giving and receiving feedback are challenging to negotiate. The essence of this challenge has been captured perfectly by Stone and Heen (2014, p. 3), who observed:

"Interesting. When we give feedback, we notice that the receiver isn't good at receiving it. When we receive feedback, we notice that the giver isn't good at giving it."

Who is to blame when feedback does not improve learning, does not enhance student satisfaction, or indeed does not get used at all? As Stone and Heen's observation implies, many students can seem quick to blame educators for giving poor feedback, whereas many educators can seem equally quick to blame students for engaging poorly with the feedback. These conflicting perspectives can lead to a sense from both parties that the feedback process is futile. In this discussion paper we argue that if our aim is to ensure feedback has a strong impact, then we must find ways to foster a culture of shared responsibility between educators and students.

RESPONSIBILITY IN HIGHER EDUCATION

To begin considering the importance of shared responsibility in the context of giving and receiving feedback, it is valuable first to consider the climate of responsibility-sharing within higher education more broadly. In today's higher education systems around the world, there are growing concerns over the perceived movement toward "consumerist" approaches to learning and teaching

(Bunce et al., in press). These concerns center on the notion that students in higher education are increasingly being positioned (and often are positioning themselves) as the passive recipients or customers of a service that, in more and more cases, they have paid considerable sums to receive. Many fear that this consumer model of education leads students to become detached from their personal responsibilities in the learning process, and to an unrealistic accountability on educators to deliver results and to resolve all challenges (McCulloch, 2009). Indeed, these fears were somewhat validated by a recent survey of the attitudes and academic performance of 608 UK undergraduate students (Bunce et al., in press). In that study, the students' learner identities—including their attitudes such as enjoying and valuing learning, and behaviors such as attending classes and engaging with reading—strongly predicted their academic performance. But more importantly, this relationship was statistically mediated by the students' consumer identities: students with weak learner identities tended to score highly on measures of consumer identity, and in turn, performed less well academically. The negative association between consumer identity and academic achievement serves as a strong cautionary note, underscoring wider concerns about the fundamental importance of responsibility taking in education.

Against the backdrop of a movement toward consumerism fueled by wider socio-political and economic changes, a contrasting movement has been underway in educational theory and best practice—one that seeks to place greater value on student-centered approaches. For example, Cannon and Newble (2000, p. 16) write that a valuable approach should “emphasize student responsibility and activity in learning rather than what the teachers are doing.” Others argue that although the student needs to take on responsibility and autonomy within the learning process, the key factor is interdependence, rather than the student being completely independent or dependent (e.g., Lea et al., 2003). Similarly, McCulloch (2009, p. 178) proposes a “co-production” alternative to the consumerist approach, which reduces the emphasis on the role of the educator, and apportions greater responsibility to the student by recognizing that “both student and university bring resources to the educational process, and that both make demands and levy expectations on each other during that process.”

These approaches all share a commonality in agreeing that high-quality teaching alone is insufficient for delivering high-quality learning. The notion of needing a shared responsibility between educators and students has long-standing support in the educational literature. Biggs (1999), for example, argues that having a complete model of teaching competence requires us to focus not only on the behavior and responsibilities of the educator, but also on those of the student. He encapsulates this argument with an excellent quote from Thomas Shuell, who wrote:

“It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does”. (Shuell, 1986, p. 429, as quoted in Biggs, 1999).

Considered together, these diverse perspectives show substantial consensus that students' progress in higher education

can be facilitated by, or indeed is wholly contingent on, their ability and willingness to share responsibility for their learning. With this point in mind, it stands to reason that similar kinds of responsibility-sharing should be beneficial within the specific context of receiving assessment feedback. This, as we will argue shortly, is undoubtedly the case. But to what extent do current learning cultures within higher education encourage or require students to take responsibility for how they seek and implement feedback?

RESPONSIBILITY IN THE CONTEXT OF FEEDBACK

Feedback is essential to learning: we cannot reasonably expect students to develop academic skills and understanding without them receiving such crucial information and direction (Black and Wiliam, 1998; Hattie and Timperley, 2007). Yet within higher education, feedback is the most prominent source of students' dissatisfaction with their programmes of study. In the UK for example, data from the annual National Student Survey (NSS) have consistently shown that even though almost all university students are satisfied overall with their course, only around three-quarters are satisfied with their experiences in the domain of assessment and feedback (Higher Education Funding Council for England, 2016).

In response to this perennial problem, many institutions have placed responsibility squarely with educators for improving the quality of the feedback they give to students. In many cases, these efforts have involved urging educators to provide more and more detailed feedback to students, often doing so by completing ever more structured and intricate pro formas (e.g., Case, 2007). Yet the NSS data show that despite these efforts, only relatively modest improvements in satisfaction with feedback have transpired over the space of many years (Higher Education Funding Council for England, 2016). These weak effects probably come as little surprise to experts on assessment and feedback, who identify these kinds of solution as symptomatic of what is often termed the “transmission view” of feedback (e.g., Nicol, 2010).

The transmission view conceives of assessment feedback as a process whereby information and advice are delivered in a linear manner from expert to novice. The linear structure of this process, critically, implies relatively little responsibility on students' behalves for making feedback effective. Rather, whenever feedback processes are judged to have been unsatisfactory or ineffective, the cause is typically attributed to some shortcoming in the quality or timeliness of the information that was transmitted. Evidence for the dominance of the transmission perspective can be gained from even a cursory glance through many higher education institutions' policies and guidelines on feedback, wherein recommendations can focus entirely on what academics should do, and how their feedback comments should be phrased. Indeed, one might argue that the survey items in the NSS also reinforce this transmission perspective, by placing sole emphasis on the active delivery of feedback information to students, and the passive receiving of

TABLE 1 | Assessment and Feedback items in the 2017 UK National Student Survey (NSS).

1	The criteria used in marking have been clear in advance.
2	Marking and assessment has been fair.
3	Feedback on my work has been timely.
4	I have received helpful comments on my work.

this information by students (see **Table 1**, and Nicol, 2010). The items were amended in 2017, although these amendments appear to have fallen short of establishing a move away from a transmission-centered discourse.

Despite its ubiquity, scholars in the area of assessment and feedback have called for the “old paradigm” transmission view to be replaced by a “new paradigm” in which the feedback process is instead seen as two-way dialogue (Nicol, 2010; Carless, 2015). For example, Carless (2006, p. 192) conceptualizes feedback as “a dialogic process in which learners make sense of information from varied sources and use it to enhance the quality of their work or learning strategies”. This conceptualization is valuable because it emphasizes the active role necessarily played by the student in the feedback process, invoking a partnership of responsibility between educator and student rather than the responsibility resting solely with the educator. In a similar vein, Nicol (2010) speaks of the importance of educators and students “sharing the burden” in this process, and the UK’s Higher Education Academy (2012) advocates placing greater emphasis on students’ engagement with feedback. Giving ever more detailed feedback, they suggest, can lead to unsustainable workload pressure on educators, whilst often having minimal impact on students’ learning (for similar arguments from the schools sector, see Independent Teacher Workload Review Group, 2016). Deeley and Bovill (2017) argue that a staff—student partnership approach in general can raise students’ intrinsic motivation. However, they caution that this approach is often perceived as more difficult to achieve in the area of assessment and feedback relative to other areas of learning and teaching, because historically the responsibility for assessment and feedback has been seen as resting solely with educators. One of the key implications of a new paradigm perspective, then, is that although the effectiveness of feedback still rests partly on the quality and timeliness of the information that is communicated, it also, critically, rests on how well and how proactively the student engages with this information.

STUDENTS’ ENGAGEMENT WITH FEEDBACK

There is an implicit perception held by many students and educators, that improvements in students’ skills and performance will occur simply by virtue of feedback being provided (Crisp, 2007). But in reality, simply receiving feedback—no matter how high in quality—can never lead students to improve unless they actively receive, digest, and act upon it—what we have previously termed *proactive recipience* of feedback (Winstone et al., 2017,

in press). Perhaps because the transmission view of feedback has been so ubiquitous in higher education, the student’s role in engaging with feedback has often been ignored or under-represented in the research literature, leading to what Burke (2009) called a “blind spot” in our understanding of the issue.

Fortunately, the tide is beginning to turn on this matter, and in particular the work by Margaret Price and colleagues has been influential in shifting the spotlight of attention toward engagement (e.g., Handley et al., 2011; Price et al., 2011). In fact, their body of work challenges our very understanding of engagement with feedback. Handley et al. (2011), for instance, caution against misinterpreting students “doing time” with feedback as evidence of their strong engagement. They argue that a student who merely skim-reads their feedback, without taking further action, is doing little more than paying lip service. More important, they argue, is what they term students’ “readiness to engage” with feedback: their attitude of commitment and willingness to expend effort on implementing advice, rather than just being willing to receive it. Indeed, whereas readiness to engage may be an important precursor to proactive recipience, it is not necessarily the only one. In a systematic literature review, we identified four broad types of skills that have been assumed to play roles in supporting students’ proactive recipience: self-appraisal, assessment literacy, goal-setting and self-regulation, and motivation (Winstone et al., 2017). Supporting students to develop these skills should in principle help them to develop as proactive recipients of feedback.

How convincingly do students demonstrate proactive recipience? At first glance, the higher education literature paints a bleak picture. There we find numerous accounts of poor—and in some cases entirely absent—engagement with feedback. At a basic level, we find reports of students failing to even collect their written feedback (e.g., Sendziuk, 2010; Scott, 2014), and evidence that they are wholly aware of their shortcomings in this regard, as illustrated by a student in one study who commented “*I don’t really take much notice of [feedback] to be honest*” (Rae and Cochrane, 2008, p. 222). Other reports suggest that students merely skim-read the written comments that their educators provide (Gibbs and Simpson, 2004), and that for many students, even those who read beyond this cursory level, their initial reading of the written feedback represents the end of their engagement with it (Robinson et al., 2013). Additionally, studies report finding little evidence that feedback is actually put into practice in students’ future work (e.g., Crisp, 2007).

But findings such as these are firmly at odds with Higgins et al.’s (2002, p. 59) characterisation of students as “conscientious consumers” who are eager to receive feedback, and show strong engagement with it. In their survey, 82% of first-year undergraduate students in business and humanities disciplines agreed with the statement “I pay close attention to the comments I get” (Higgins et al., 2002, p. 57). And like Higgins et al., many other groups of researchers find cause for optimism. For instance, Zimbardi et al. (2017) used learning analytics to track first- and second-year undergraduates’ engagement with feedback. The authors found not only high levels of engagement among their students, but also evidence that those students who engaged for longer durations typically achieved larger grade increases

on their subsequent assignments. In qualitative studies, many student participants reveal considerable insight into the benefits of engaging with feedback. For example, one student in Orsmond et al.'s (2005, p. 375) interviews stated *"When reading feedback it makes you realize what you could have done, rereading an essay with the feedback in mind helps you to see work in a different light"*. Likewise, in Wingate's (2010, p. 529) interviews, one student stated *"I looked at all the mistakes like clumsy expressions, and I thought this time I really need to think what I am going to say. So I got a book from the library, called 'Writing at University', or so, and started reading that on the train and everywhere where I could read."*

To gain our own sense of this issue, we asked 96 of our psychology undergraduates to complete a short online survey about the summative feedback they receive from their lecturers (see Winstone and Nash, in press, for further details). One of the questions we asked was "When you receive feedback on a piece of coursework, what do you do with the feedback?". Students were invited to respond in open text format. Their responses revealed considerable variation in the depth of their engagement. There was some reason for optimism, with some students demonstrating deep engagement with their feedback. One, for example, wrote:

"I highlight the bits I think will be most helpful, and write them on post-it notes ready for further work. I focus on improvements which I can make, and try to see my downfalls and strengths".

Unfortunately though, relatively few of the students' responses gave indications of going beyond shallow and cursory reading of feedback information. The following responses illustrate this problem:

"I tend to skim read the feedback sheet, mainly look at the comments written on the actual piece of coursework."

"I keep all feedback but rarely look at it after the day I receive it despite good intentions."

"I often give it a glance over when I first receive it, but hardly ever go back to it when doing another assignment of a similar nature even though I know it may be helpful!"

Piecing these varied research findings together, it is clear that not all students recognize the necessity of engaging proactively with feedback, and that even the efforts of those who do are not always adequate or effective. One might, at this point, conclude that the case is therefore closed: clearly, students themselves are to blame for why feedback so often fails to make a difference. This conclusion, we would argue, is neither helpful in correcting the problem, nor is it correct. To see why, we must consider what barriers exist that limit or prevent students' effective engagement with feedback.

BARRIERS TO ENGAGING WITH FEEDBACK

Based on a small-scale literature review, Jonsson (2013) proposed five key issues that limit students' usage of the feedback

information they receive: (1) the advice may be insufficiently useful or useable; (2) feedback may be too generic, non-specific, or lacking in individualisation; (3) the tone of feedback may be too authoritative; (4) students may be unaware of the strategies they could use to implement feedback; and (5) the language used in feedback may be difficult to understand. These proposed barriers give us some considerations that educators might consider with regard to the format and content of their feedback. Yet it is notable that with the exception of (4), all of these explanations attribute failures in proactive recipience to shortcomings of the feedback information itself—something that, as we have argued above, resonates with a transmission rather than dialogic view of feedback, and appears to place responsibility squarely with educators.

Is it the case, then, that educators alone could in fact solve most of the issues with students' engagement with feedback, simply by paying greater attention to the tone and content of their feedback messages? We strongly doubt it. Rather, we believe that the five barriers identified in Jonsson's (2013) review underestimate the true breadth of barriers that can exist in this context. In a recent study of this issue, we conducted activity-oriented focus groups with undergraduate psychology students, in which we elicited participants' reflections on how they use feedback, but paid principal attention to their spontaneous discussions of what *prevents* them from using feedback (Winstone et al., in press). By scrutinizing the dialogue from these focus groups, we conducted a thematic analysis that revealed four broad kinds of psychological barrier, as follows:

Awareness

One reason why students apparently fail to engage with feedback is that they simply cannot understand it, do not know what it is for, or perhaps do not even realize that they have received feedback. Many researchers have observed that educators and students are often severely misaligned in their understandings of the definition and purpose of feedback. In work by Adcroft (2010), for example, educators and students disagreed even on how frequently feedback was being given—88% of educators believed they were giving frequent feedback, but only 12% of students agreed. Moreover, Jonsson's (2013) review highlighted that students do not always understand the terminology and academic jargon used within feedback. One student in our focus groups exemplified this point, stating *"sometimes on the feedback, it's just a lack of understanding of what it means...that holds you back from using it"*.

Cognisance

A second reason is that students can lack knowledge of the opportunities available for them to implement their feedback effectively, or—as identified in Jonsson's (2013) review—can lack knowledge of strategies they could possibly take as a means to help them act upon the feedback. Whereas it is easy to take for granted that students know what to do with feedback, evidence suggests that this is not routinely the case. For example, Weaver (2006) showed that only 50% of students surveyed had ever received guidance on how to use feedback; similarly, Burke (2009) reported that only 39% of student respondents to her

survey had received guidance prior to starting university on how to use feedback. In short, students might know that there is a particular skill they need to improve, but they must also know how to enact that change, what steps to take, and how to affirm that those efforts have been successful.

Agency

A third reason is that students can feel insufficiently equipped to deal with feedback, or feel that doing so would be futile. In some cases, this lack of agency can arise because students believe that the skills or qualities they are being advised to develop are fixed, rather than modifiable through effort. For example, despite repeatedly receiving criticism about their writing style, they may believe that this style is something intrinsic to themselves and therefore impossible to address. Students may also perceive that their prior attempts to respond to feedback have failed to “pay off” in terms of leading them to see enhancements in their performance and/or grades over time (Winstone et al., in press). Yet another common cause of limited agency to implement feedback can arise as a byproduct of the common modular structure of many degree courses, wherein students can find it incredibly difficult to see a transferability of advice from one assessment or module to the next (Orsmond et al., 2005; Jonsson, 2013).

Volition

Finally, students can simply lack the motivation and enthusiasm to engage with feedback, being unprepared to invest the time or effort. Doing so requires the “readiness to engage” that Handley et al. (2011) have described, and a further “commitment to change” (Bing-You et al., 1997, p. 43), yet we found many of the student participants in our focus groups quite ready to acknowledge that these are not typically their priorities. Likewise, many academics perceive students’ priorities similarly, reporting that students lack intrinsic motivation, and seek to do the minimum needed to attain a particular grade (King and Bunce, under review). Students’ apparent apathy toward feedback information can in some cases be attributed to their primary interest in grades rather than in understanding their performance (Hounsell, 2007), and in other cases attributed to avoidance of the strong emotions that anticipating and receiving feedback can evoke (Higgins et al., 2002).

REMOVING BARRIERS TO PROACTIVE RECIPIENCE

Having identified a number of conceptual and specific barriers to engaging with and implementing feedback, one might ask: Whose responsibility is it to remove or mitigate these barriers? Based on Stone and Heen’s (2014) quote at the start of this paper, we might predict that students would typically believe it is their educators’ responsibility, whereas educators would typically believe it is their students’ responsibility. Is this the case? In our survey of psychology undergraduates, we asked them “What might be done, or what might you do, to encourage you to make better use of the feedback you receive?” (Winstone and Nash, in press). Of the 89 responses we received to this particular

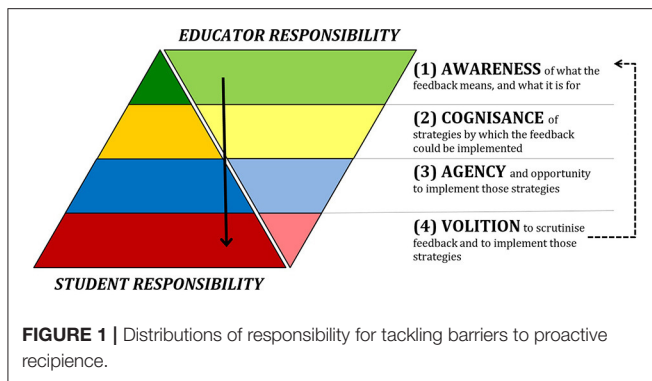
question, 66% indeed focused solely on things their educators could do (e.g., “*Feedback should be more specific and detailed so I know exactly what to do when the next assignment falls*”). In other words, only 34% mentioned anything they, the students themselves, could do (e.g., “*Take better notes of the feedback, write it down, keep a list/tally of all the feedback I receive. This way I can go back to it when I feel I am falling back into old habits*”). This finding resonates with those from many other studies. For example, one student in research by Hounsell et al. (2005, p. 14) argued “*Maybe if they could give you more help with the assignments, and maybe a bit more feedback. You could have a monthly meeting with someone... to say to you... ‘This is what was wrong with this assignment, this is what wasn’t’*”.

To the contrary, when we asked 68 university lecturers and college teachers what they believed was the single biggest factor preventing their students from using feedback better, almost half foremostly blamed the students’ weak motivation or volition (Winstone and Nash, in press). Indeed, when lecturers in Carless’s (2006, p. 224) focus groups described factors that impede students’ strong engagement with feedback, they emphasized students’ strong focus purely on grades (“*Students don’t use feedback for learning purposes; they only use it to see how well they’ve done, especially compared to others*”) and a lack of motivation to proactively seek feedback (“*[students] are not interested to meet their tutors to get feedback on how to improve their learning*”).

Together, these findings and the literature as a whole give the distinct impression of having reached an impasse. Many diverse barriers, we can see, stand in the way of students engaging proactively with the feedback they receive, and by extension, stand in the way of optimizing their skill development. But a culture of mutual blame between students and educators seems to prevent reasonable headway being made toward breaking down these barriers. As we argued at the start of this paper, when both students and educators mutually blame the other for the failings of feedback to make a difference, it is easy for both parties to conclude that the feedback process is futile.

Finding a resolution to this impasse, we believe, requires us to think more concretely about where different responsibilities could lie. We make several assumptions about the answer to this question, and illustrate these assumptions in **Figure 1**. The first assumption is that—mutual blame aside—both educators and students have essential roles to play; indeed, that overall these respective roles are approximately equal in significance, as represented by the respective sizes of the “educator” and “student” portions in **Figure 1**. Second, despite this equivalence of responsibility at the overall level, we assume the respective responsibilities of educators and students for resolving each individual kind of barrier are *not* equal. Rather, it is quite apparent from the discussion above that resolving certain barriers demands greater responsibility from students, whereas resolving others demands greater responsibility from educators. The relative sizes of the different levels within each portion of **Figure 1** signify this second assumption.

Consider again the four kinds of barrier identified in our focus group research: awareness, cognisance, agency, and volition (Winstone et al., in press). Our third assumption is



that when the barriers are sequenced in this particular order, they signify decreasing levels of responsibility on educators to resolve the issues, and increasing levels of responsibility on students. Considered in this way, it is perhaps unsurprising that both students and educators seem most readily to spot those barriers over which they themselves have the least control and responsibility. For instance, we have already noted that educators frequently identify students' volition to engage as being particularly critical. It seems reasonable to argue that students themselves must be primarily responsible for resolving this particular barrier. Certainly there are steps an educator might constructively take to encourage students to be motivated to engage, and to model the benefits of doing so. But it is the student who ultimately has greater power in this regard, and must be willing to co-operate and put in the "hard graft" required to implement feedback (Carless, 2015). Conversely, we have noted that students frequently identify as being particularly critical of various issues aligned with the barrier of awareness. They point out for example that the feedback they receive is insufficiently detailed, or that they do not understand it. In this case it seems reasonable to argue that educators must have primary responsibility for ensuring that the advice they give is clear and actionable. There are steps a student can take to enhance their understanding of feedback information and its intended purpose, but it is ultimately the educator who has greater power to ensure clear and effective conveying of meaning and purpose.

The fourth of our assumptions represented in **Figure 1** is that the barriers follow a hierarchical, directional structure; that is to say, we must at least partly resolve those barriers at upper levels of the graphic before we can reasonably expect to resolve those at lower levels. For instance, it might be impossible to tackle a student's poor motivation to reflect on assignment feedback (i.e., a problem of volition), if this problem is largely underpinned by their belief that they will never again complete similar assignments, and hence that using the feedback would be pointless (i.e., a problem of agency). One might dispute this assumption by proposing that a student's volition, above all else, is the most fundamental ingredient of proactive recipience. We agree that volition is crucial, but would question the extent to which fostering volition is possible for a student who neither understands their feedback, knows anything they could do with it, nor believes they have the capability to improve. One

implication of this fourth assumption, then, is that despite the approximately equal overall balance of responsibilities, educators are those with the greatest power to instigate changes in students' proactive recipience.

A fifth and final assumption illustrated in **Figure 1** is that by increasing students' volition to engage with feedback, we can in turn create a virtuous cycle, making it easier both for students and educators to further break down the residual barriers at each level. Increased volition, for example, might lead students to invest greater time in reading and absorbing the written feedback they receive. It might also make them more likely to accept offers of dialogue: one study reported that only 31% of undergraduates who were offered discussions around their feedback actually took advantage of this offer, and few of these students showed evidence that they were highly familiar with the feedback they had received (Duncan, 2007). Increasing students' willingness to avail themselves of dialogue opportunities should, in turn, offer educators better opportunities to fulfill their own responsibilities.

How responsibility-sharing can be implemented in practice will undoubtedly vary across different disciplines and levels of education. Nevertheless, guided by the assumptions we have drawn, there should in all contexts be ways in which students and educators can work to remove the barriers to engaging with assessment feedback. For example, consider a common situation in which students receive written feedback after completing an essay. To overcome a lack of awareness of what feedback means and what it is for, the educator's responsibilities should include ensuring that the feedback they provide is clear, transparent, and linked to grading criteria. Students, on the other hand, have responsibilities including seeking clarification over the meaning of the feedback they receive. In overcoming barriers to cognisance, educators might build time in the curriculum for training students in the skills underlying the implementation of feedback, and avoid making assumptions about students' knowledge of strategies for acting on feedback. Students, for their part, might take responsibility for selecting which strategies to use in which situations, testing out new strategies, and deciding when to seek support beyond their usual "toolkit" of strategies.

In overcoming issues of agency, educators in this context might ensure that their comments are not too specific to one assignment in a way that limits transfer, for example by linking the comments to programme-level (rather than just module-level) learning outcomes, and illustrating how they might apply to other modules. Students themselves might recognize that improvement is not always instantaneous, and that they need to put in the "hard graft" to transfer feedback from one context to another (Carless, 2015). This might involve, for example, synthesizing feedback to draw out common themes across assignments. Finally, in terms of volition, educators' task is to employ sustainable feedback practices and ensure ample opportunities for dialogue, whilst also framing feedback in a motivating way such that improvement feels achievable for students. Students must in turn be willing to engage with the emotions that arise from receiving feedback, and adopt a positive, constructive "commitment to change" (Bing-You et al., 1997) in response to advice.

On a general level, a variety of interventions might help students to engage better with feedback, for example the use of self- and peer-assessment exercises, providing feedback literacy workshops, or withholding students' grades until after they have responded to the advice (Winstone et al., 2017). The evidence supporting the effectiveness of these kinds of interventions varies substantially, and all have strengths and limitations. But when choosing and designing any such intervention, the key focus should be not solely what the intervention should be, but rather, what skills it should ideally hone among students: fostering self-appraisal, assessment literacy, goal-setting and self-regulation, and/or engagement and motivation (Winstone et al., 2017).

Moreover, we propose that an equally important ingredient is a broader type of dialogue concerning the process and psychological experience of receiving feedback in general. It is apparent that most students in higher education have received little or no prior guidance on how to use feedback effectively (Weaver, 2006; Burke, 2009), and for this reason we must initiate and develop conversations with students about why engaging with feedback is important, what the barriers are, and the kinds of emotional responses we naturally have when faced with actual, implied, or anticipated criticism. These conversations should equip students to better anticipate and resist their own defensive reactions to feedback. With an increasingly diverse student body, these conversations might ideally also acknowledge that students' demographic and cultural backgrounds can shape their experiences of receiving feedback. One study, for example, qualitatively analyzed the personal reflections of Chinese postgraduates who were studying in the UK (Tian and Lowe, 2013). The data suggested that differences in academic cultures between China and the UK can create dissonance for students when receiving feedback. Many of the students reported feeling heartbroken and discouraged after receiving formative feedback, for instance, principally due to the sheer number of comments given. As they were not accustomed to receiving formative feedback, they interpreted their educators' extensive comments as a sign they were failing, rather than as a means of supporting their future improvement. These emotional reactions in turn limited the students' engagement with the feedback. This example clearly illustrates the importance of developing conversations around the experience of receiving feedback that are sensitive to cultural variations in students' expectations of education.

OBSTACLES TO RESPONSIBILITY-SHARING

It would be naïve to imagine that making a case for responsibility-sharing, and setting out simple, descriptive assumptions of what it might involve, would be sufficient to actually deliver such a culture. Indeed, regardless of how we might undertake to foster responsibility-sharing between educators and students, several individual, institutional, and wider cultural obstacles might stand in the way. These obstacles need to be taken into consideration just as do the barriers to proactive recipience that we have already discussed.

One potential obstacle to responsibility-sharing is winning students' "buy-in" to and co-operation with this approach. This will undoubtedly be challenging within the apparently thriving consumer culture in higher education. We would therefore need to work hard to convince students of the rationale for demanding their proactive partnership in the feedback process. Given that the extent to which students' perception of the "value for money" of their course has declined in recent years (Neves and Hillman, 2017), it is important to convince students that playing such a proactive role is the *only* way they can ever get value for money in the domain of feedback. To this end, it will be crucial to frame proactive recipience as more than a purely academic skill, which helps students to understand why they earned the grades they earned. Rather, we must foster students' understanding that proactive recipience is a transferrable, sustainable, and lifelong skill that should support their employability and capacity to advance in their post-university careers. Some students, of course, will inevitably be more difficult than others to convince of the distal benefits of accepting their responsibilities in the present. But research tells us that students who naturally think about the future more than the past tend to be more engaged in and motivated by their academic achievements, and furthermore tend to perform more strongly (Husman and Lens, 1999; Horstmannshof and Zimitat, 2007). It is therefore important that we find ways to "sell" the long-term relevance of becoming effective consumers of feedback, not just the short-term benefits.

Students are not the only ones who might resist shifting toward a culture of responsibility-sharing—many educators will share students' skepticism. Indeed, educators' workloads are a key determinant of feedback practice (e.g., Hounsell, 2007), and the arguments we have made above imply that creating a culture of responsibility-sharing will involve even further investment from educators. As we have already noted, educators already view assessment and feedback as time-intensive, demanding activities, and so taking on new initiatives may seem implausible (Nicol, 2010). Why would an educator be willing to invest even more time and resources in undertaking activities to overcome the barriers we have discussed? We suggest that the investment of time in these activities in the short-term has the potential to secure the sustainability of feedback-related workload in the longer-term. If we can break down barriers that, in turn, equip and enthuse students to be proactive in seeking, creating, understanding and using feedback, then we as educators will no longer have to shoulder the overwhelming burden of responsibility by delivering more and more feedback with questionable effects.

Educators who accept the importance of responsibility-sharing may nevertheless feel that they are swimming against the tide, and fear that any efforts to shift toward such a culture will be seen as counter to achieving the high levels of student satisfaction against which teaching quality is increasingly assessed. Requiring students to play a role, even if we accept that this role is essential, can feel risky in this present context. But increasingly we do see more distal goals—beyond immediate student satisfaction—featuring in teaching quality metrics, such as measures of graduate employment and so-called "learning

gain” (e.g., McGrath et al., 2015). With these more distally focused metrics in mind, it seems reasonable to conceive that a shift toward responsibility-sharing could still be quite consistent with institutional goals. That said, institutions themselves have roles to play in fostering supportive climates, wherein these important dialogues with students around responsibility-sharing can be initiated and developed. Likewise, the wider bodies responsible for quality assurance, including students’ unions and policy makers, must recognize their own responsibilities for engendering cultures that promote and reward proactive reciprocity: cultures in which educators do not find it risky to expect students to share the responsibility of making feedback effective. Dialogue with these policy makers is needed.

Finally, we propose that individual educators’ attempts to promote proactive reciprocity and responsibility-sharing are unlikely to have substantial effects unless students also receive congruent messages from the different educators with whom they have contact, and indeed from their institutions themselves. In short, achieving these goals will very much require a cultural shift as we have described it, rather than being fully achievable by dedicated individuals in isolation.

CONCLUSION

Educators in higher education are reporting spiraling workloads as they attempt to offer students effective feedback with which they are satisfied. Yet it is increasingly apparent not only that this approach is unsustainable for educators, but that it is highly unlikely to ever be effective for students either. No matter how quick, how detailed, or how high-quality the

feedback our students receive, feedback can never be effective unless they use it, and therefore educators alone do not have the power to ensure that feedback is impactful. Sharing responsibilities in the specific domain of feedback is therefore essential.

We have argued that numerous barriers can stand in the way of students engaging proactively with the feedback they receive, and the approach to responsibility-sharing set out in this paper assumes that both students and educators have equal but partly distinct roles in tackling these barriers. This approach further assumes an inherent degree of interdependence: neither students nor educators can necessarily fulfill all their roles without the other party doing the same. Developing a culture of this kind is, we believe, a sustainable way of shifting the burden of responsibility, rather than only shifting the blame.

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“I Can’t Get No Satisfaction”: Measuring Student Satisfaction in the Age of a Consumerist Higher Education

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One could be excused for failing to recognize today’s universities as the inheritors of the global higher education system that arose more than 70 years ago from the ashes of the Second World War. A wave of post-war optimism ushered in a global movement with a utopian vision in which arbitrary divisions such as class, gender, and race would be transcended in the pursuit of academic enlightenment (Scott, 1995). Universities were to be one of the key drivers of this change. But, contemporary academia is a distinctly different beast. The enlightenment values of the liberal education model, once the dominant philosophy in universities across the world, are gradually being supplanted by a consumerist ideology (Furedi, 2011): Yesterday’s “*Cathedrals of learning*” are being replaced by today’s “*Supermarkets of facts*”¹.

The rise of the consumer model of universities, derided by many, has brought distinct benefits that the enlightenment model failed to achieve. One could perhaps marvel at the fact that here is a single philosophy that has effectively transcended national boundaries. By advocating a consumerist philosophy, managers of Higher Education (HE) institutions have been able to employ the full gamut of market forces to drive innovation in their day-to-day practice (Christensen and Eyring, 2011). Not least of the achievements arising from this, has been the massive expansion of the franchise such that university education, once the prerogative of a small social elite who valued learning for the sake of enlightenment, is now the expectation of a large proportion of the population whose primary desire is to improve their position on the subsequent employment market (Tomlinson, 2008). Today’s universities have been quick to meet this need and institutional offerings have followed suit, enabling students to gain experience in a range of additional and subsidiary programmes that focus on the provision of “value added” benefits (Deane and Stanley, 2015). Here, students are encouraged to develop a wide range of transferable skills from entrepreneurship and enterprise to a knowledge of intellectual property rights and even leadership skills.

The embrace of the Business-to-Consumer model of HE also presents university managers with many challenges (See e.g., Deloitte’s, 2015; “Making the grade” report). What does it mean to be a university in the modern consumerist era? How can the traditional values of scholarship and standards be preserved in a customer-focussed institution? How does the HE sector continue to enable graduates to become effective citizens who contribute to the betterment of society? Most important of all from the consumer model perspective, “What do students actually expect from HE and how are education providers framing and meeting these expectations?” The key metric for this last question is student satisfaction, yet, despite its almost ubiquitous position as a tool for university managers, the concept of “student satisfaction” remains ephemeral and surprisingly little is known about what makes a student satisfied with their experience of HE or how it can be measured effectively.

Only in the last 10 years or so has work emerged that has started to examine the institutional drivers of student satisfaction (Mai, 2005). Clemes and colleagues examined the

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¹Phrase attributed to the late Dr. Mike Harris of the University of Birmingham, UK.

various relationships between a range of institutional factors and their relationship to satisfaction in the student cohort (Clemes et al., 2008). They found a significant relationship between satisfied students and the quality of the teaching with a mediating role for institutional reputation. A significant predictive relationship was also reported between satisfaction and intended future outcomes post-graduation. Alves and Raposo (2007) also examined the behaviors that effectively predicted student satisfaction and also revealed that the quality of teaching experience was a key driver. More surprisingly, they also found that institutional reputation was actually a more influential predictor of student satisfaction than teaching quality. So, it would seem that students are satisfied if they receive good teaching at a reputable institute.

Alves and Raposo (2007) went on to examine the effects of having a cohort of satisfied students. They found that satisfaction bred loyalty. Students who were satisfied were more loyal to the institution and were more likely to engage with alumni activities and maintain an ongoing relationship with their alma mater. As universities in many countries expend considerable effort and money on establishing a body of loyal graduates that may one day reward them with a financial return, this is clearly an important finding. Gibbons et al. (2015) show that NSS scores have a small but statistically significant effect on University applications at a subject level, but suggest that this effect is primarily driven by league table positions (rather than original data).

The measurement of student satisfaction is one that undoubtedly vexes institutional managers around the world because, despite its importance, measuring satisfaction is not trivial and presents a number of challenges (see e.g., Cashin, 1990). For example, how can the new and emerging expectations of students be measured in an effective fashion? How can data be collected in a timely manner to ensure that managers can effect improvement in the immediate learning environment? How can we encourage the free flow of information from the consumers to the managers and vice versa that is so important to maintaining success in the modern competitive HE environment? Within HE, managers collect information on student satisfaction using a range of mechanisms designed to ensure that the expectations of the student are met at every stage of their progression through university. Timetabled one-to-one meetings between staff and students, drop-in sessions and staff-student consultative committees are now so pervasive that only the most insulated of academics can have failed to recognize the changing zeitgeist. Although these devices may be effective at the individual level, these strategies probably have little impact at the institutional level and almost none across the sector as a whole.

To address this problem, most developed countries use some form of national survey that they deliver to students to collect a range of measures of student satisfaction. Japanese academic managers make use of results from the Japanese College Student Survey (JCSS) and the Japanese Freshman Survey (JFS) both of which have been studied extensively (see e.g., Yamada, 2013). The National Survey for Student Engagement (NSSE) is used in the USA (Kuh, 2003). The Course Experience Questionnaire (CEQ) is employed in Australia (Ramsden, 1991; Wilson et al., 1997) and in the UK the National Student Survey (NSS; Richardson et al., 2007) is completed by almost 300,000 final year undergraduate

students each year. In the UK, national league tables of the NSS results are published annually and are readily available to anyone contemplating applying to university. As such, NSS scores are an important driver of institutional change and woe betide the subject group or individual teacher who is perceived to be adversely affecting student ratings. Despite its influence, however, there is considerable debate as to whether the NSS offers sufficient discrimination between Universities to be useful, or measures fairly across different subject disciplines (Cheng and Marsh, 2010; Yorke et al., 2014).

The one consistent finding of all this work is that high quality teaching is an important factor in student satisfaction; a finding that should surprise no one. Excellence in teaching is the *sine qua non* of a modern university and the power of consumer choice alone is enough to ensure that a university which does not deliver its key product (effective teaching) to its consumer base (students) does not remain in business (see e.g., Mathooko and Ogutu, 2015; Milian et al., 2016). But why then is so much effort and cost² dedicated to measuring aspects of student attitudes when the results are so clearly aligned with common sense?

One reason may be that the role of universities is changing. The rise of wide scale reforms across the global HE sector are inexorably driving University management away from the delivery of effective teaching toward the delivery of a more transferable and professional skillset that is more closely aligned to the graduate expectations of successful employment. On first consideration such a development may seem at odds with the traditional and clearly non-vocational model of a university which first emerged in the mid-nineteenth century with the early writings of Cardinal John Henry Newman³. Yet, even within this early philosophy there existed a clear advocacy for the development of skills acquired through general critical and reflective abilities that were applicable to any role in the workplace. In this model, university learning was less about employment and more about the ability to be successful in society, whereas in contemporary HE the development of a focused professional skillset has become an increasingly dominating influence. Indeed, in our view, it is likely that today's satisfied students are most likely to be those who have experienced a programme of study that aligns itself directly with their expectations for subsequent and very specific employment.

Such a shift is inevitable and, as we have previously argued, in order to deliver an effective learning experience the modern day university manager needs to embrace the full scope of the student activities that occur both on and off campus (Senior et al., 2014). This portfolio of experience should include the development of professional skills that they have acquired outside the classroom and in the world of work. However, as noted above this can be a vast and wide portfolio of professional skills (see also Bridges, 1993; Moores and Reddy, 2012; Reddy and Moores, 2012). Whilst institutions across the global HE sector are readily aligning the student experiences within the campus to meet these external

²In the UK student satisfaction is measured with the annual National student Survey (NSS) that costs £2.4M to develop and deliver. Source: <http://webarchive.nationalarchives.gov.uk/20120118164922/http://hefce.ac.uk/pubs/board/2004/93/B39.pdf>

³John Henry Newman, in his seminal essay "*The Idea of a University*" (1852) made a powerful and influential case for the liberal ideal of a university.

expectations and deliver a truly engaged model of scholarship, they tend to lack the means to measure these activities and to ensure that modern day students are satisfied with the learning experience they receive (Van de Ven, 2007).

Upon reflection, we now make three recommendations for institutional managers and policy directors to consider. First, the academic environment has changed; managers can no longer expect students to be satisfied with excellent teaching alone. Students expect the provision of excellence with regards to professional skills that they can transfer to the post-graduation workforce and thereby harvest the economic and social benefits that attracted them to University study in the first place. Second, there needs to be a detailed and thorough statistical examination of the current means by which student satisfaction is measured across the HE sector. In our view, current measures of student satisfaction are no longer adequate in scope to meet the changing needs of students and the developing roles of universities. Third,

and perhaps most important, there is a need to better understand the concept of student satisfaction and how this is driven by the increasingly important economic consequences that studying in HE has for individual students. In short, student satisfaction is a key concept in the modern consumerist HE sector, but it is one that we still don't fully understand and don't know how to measure.

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The Dampening Effects of Perceived Teacher Enthusiasm on Class-Related Boredom: The Mediating Role of Perceived Autonomy Support and Task Value

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Class-related boredom is commonly experienced by students and it has an impact on their learning engagement and achievements. Previous research has found that perceived teacher enthusiasm might contribute to reducing students' class-related boredom. However, the mechanism through which perceived teacher enthusiasm affects class-related boredom remains unexplored. The purpose of the present study was to investigate the mediating role of perceived autonomy support and task value in the relationship between teacher enthusiasm and class-related boredom. College students ($N = 734$) completed questionnaires on perceived teacher enthusiasm, boredom proneness, perceived task difficulty, perceived autonomy support, perceived task value, and class-related boredom. Results showed that after controlling for the effects of demographic variables, boredom proneness, and perceived task difficulty, both perceived autonomy support and task value fully mediated the relationship between perceived teacher enthusiasm and class-related boredom. These findings suggest that students who perceive more teacher enthusiasm might perceive more autonomy support and task value, which in turn reduce the students' class-related boredom. Limitations in the present study have also been discussed.

Keywords: class-related boredom, teacher enthusiasm, task value, autonomy support, mediating role

INTRODUCTION

As a type of "user experience," class-related boredom is a common emotion experienced by students in various school settings. It was found that low perceived value of class-related tasks might be a major cause of students' boredom (Pekrun, 2006; Pekrun et al., 2007, 2010). Therefore, strategies to increase task value and reduce the level of boredom in classroom settings have attracted the attention of researchers and educators (Perkins and Hill, 1985; Larson and Richards, 1991; Pekrun et al., 2010). Enthusiastic teaching behavior was conceived as an important environmental factor for improving the task value perceived by students (Hatfield et al., 1994; Pekrun, 2006; Pekrun et al., 2007; Frenzel et al., 2009). Previous studies primarily focused on the behavioral aspects of teacher enthusiasm and

their effects on students' learning motivation, achievement, and positive emotions (Keller et al., 2015). However, few studies have explored the mechanism through which teacher enthusiasm affects students' class-related emotions, especially regarding negative emotions such as class-related boredom (Goetz et al., 2013; Keller et al., 2014). Furthermore, the level of teacher enthusiasm perceived by students may play a more important role in their learning outcomes as compared to that reported by the teachers themselves (Keller et al., 2014, 2015). However, the question of whether and how perceived teacher enthusiasm can significantly predict class-related boredom remains unclear.

Theories about the Relationship between Teacher and Student Emotions

Previous research has used the emotion contagion theory (Barsade, 2002; Keller et al., 2014) and emotional crossover theory (Becker et al., 2014, 2015) to explain the direct effects of teachers' emotions on students' emotions in the classroom. However, researchers have found that the paths were more complex than a simple direct association. Over the past decade, Pekrun's control-value theory of achievement emotions has become one of the most well-known theories in the domain of achievement emotions (Pekrun, 2006; Pekrun et al., 2007). Pekrun's theory provided a background for exploring the mechanism through which teacher emotions affect students' learning outcomes.

According to the theoretical framework of the control-value theory of achievement emotions, teacher enthusiasm is a component of value induction and can affect students' achievement emotions through the mediation of the control and values perceived by students (Pekrun, 2006; Pekrun et al., 2007). Regarding boredom, according to Pekrun's integral theoretical framework, high/low control may cause boredom, while appropriate control may not do so. Additionally, perceived valuelessness was one of the most important antecedents of boredom (Pekrun, 2006; Pekrun et al., 2007). Teacher enthusiasm (corresponding to value induction in the control-value theory of achievement emotions) may have positive effects on students' perceived task value which in turn may have major effects on reducing student boredom. Based on the control-value theory of achievement emotions, the present study focused on the mediating role of task value between teacher enthusiasm and students' class-related boredom. Given that the study by Kunter et al. (2008) found that teachers' enthusiasm for teaching predicted students' perceived social support, we aimed to investigate the mediating roles of perceived autonomy support and task value in the relationship between students' perceived teacher enthusiasm and class-related boredom. Considering the possible influences of boredom proneness and task difficulty (corresponding to control in the control-value theory of achievement emotions) on class-related boredom (Mann and Robinson, 2009), we aimed to control for these two variables (i.e., boredom proneness and task difficulty) and focused mainly on the mechanism through which

students' perceived teacher enthusiasm affects their class-related boredom.

There may be differences between students' perceived teacher enthusiasm and teachers' self-reported enthusiasm. In recent years, researchers have begun to pay more attentions to students' perceptions of the classroom environment and its effect on the learning process (Marsh, 2007; Marsh et al., 2009, 2012; Fauth et al., 2014). Individual students' perceptions of their classroom environment were related to their learning outcomes, and therefore, could be used as reliable indicators at the individual level (Lüdtke et al., 2009; Keller et al., 2014, 2015). Thus, in the current study, we focused on perceived classroom environment and learning process at the individual level.

Class-Related Boredom

Academic boredom is one of the most widespread emotions experienced by students in the framework of academic emotions, and it can be classified into class-related boredom and learning-related boredom (Pekrun et al., 2002, 2010). Class-related boredom is a type of state boredom experienced by students in the course of class activities (Pekrun et al., 2010). Class-related boredom functions at a higher level than learning-related boredom does, as experienced by students (Tze et al., 2015). The boredom experienced by students can provide important information, such as that regarding the working or learning environment, or that when seeking to prevent excessive involvement in uninteresting tasks or the generation of severe psychological problems (Elpidorou, 2014). Furthermore, many studies found that class-related boredom had several negative effects on academic performance and health. For example, class-related boredom experienced frequently or for a long time may result in a relatively stable bored belief or trait boredom, which may affect school learning, career choices (Watt and Vodanovich, 1999; Wigfield et al., 2002), and lifelong learning (Goetz et al., 2003) in relevant domains. A recent meta-analysis by Tze et al. (2015) investigated the relationship between boredom and academic outcomes. Their results showed that boredom has negative effects on learning motivation, the use of learning strategies, and achievement.

Perceived Teacher Enthusiasm

Teacher enthusiasm has been regarded as one of the most important teaching qualities and class-related environmental factors (Locke and Woods, 1982; Brophy and Good, 1986; Patrick et al., 2000; Long and Hoy, 2006; Kunter et al., 2008, 2011, 2013; Keller et al., 2013, 2014, 2015). Despite the long history of research on teacher enthusiasm in educational psychology, earlier studies focused mainly on teachers' external behaviors in the course of teaching, such as voice, tone, facial expression, and body posture (i.e., gestures) (Brophy and Good, 1986). Later, Kunter et al. (2008) asserted that teacher enthusiasm expressed by external behaviors may not be consistent with teachers' own internal and experienced affect, and further research should be conducted to reveal stable and authentic teacher enthusiasm. Kunter et al. (2008, 2011) classified teacher enthusiasm into two categories:

enthusiasm for the subject and enthusiasm for teaching. More recently, Keller et al. (2014, 2015) proposed an integrated teacher enthusiasm construct. Keller et al. (2014) found that the new construct of integral teacher enthusiasm affected students' interest in learning through the full mediation of perceived teacher enthusiasm. Thus, students' perceived teacher enthusiasm may provide more direct and rich information about the relationship between teacher enthusiasm and students' outcomes.

Dampening Effects of Perceived Teacher Enthusiasm on Class-Related Boredom

Abundant empirical studies have found that teacher enthusiasm positively affected students' learning outcomes (Patrick et al., 2000; Long and Hoy, 2006; Kunter et al., 2008, 2011, 2013; Keller et al., 2013, 2014, 2015). Studies by Kunter et al. (2008, 2011, 2013) and Keller et al. (2013, 2014, 2015) found that teacher enthusiasm correlated with the high quality of teaching and students' positive learning outcomes (e.g., enjoyment in learning). Frenzel et al. (2009), Kim and Schallert (2014) found that perceived teacher enthusiasm could predict students' learning enjoyment and interest. Additionally, studies revealed that students' interest in learning was a negative predictor of boredom (Daschmann et al., 2014), and interest in specific tasks was negatively correlated with boredom (Tanaka and Murayama, 2014). Based on the separated and reciprocally related, yet not mutually exclusive, relationships between positive and negative emotions (Cacioppo and Berntson, 1994; Schimmack, 2001; Smith et al., 2006; Schimmack and Colcombe, 2007), perceived teacher enthusiasm might induce situational interest (Kim and Schallert, 2014) and reduce class-related boredom (Goetz et al., 2006). Accordingly, we could infer that perceived teacher enthusiasm may negatively predict class-related boredom.

Mediating Model

The control-value theory of achievement emotions proposed an integral framework of achievement emotions with their antecedents and outcomes (Pekrun, 2006; Pekrun et al., 2007). In this theoretical framework, instruction, value induction, and autonomy support were identified as important environmental variables that may affect various achievement emotions (both activity emotions and outcome emotions) through perceived control and value as mediators. One of the components of value induction, i.e., teacher enthusiasm, was conceived to be a facilitator of task value. Therefore, teacher enthusiasm may affect emotions through the mediation of perceived task value (Pekrun, 2006; Pekrun et al., 2007). Autonomy support was an important environmental variable in the theoretical framework; however, the relationships between the specific components of value induction, perceived task value, discrete emotions, and autonomy support have not been addressed. For example, the relationships among teacher enthusiasm, autonomy support, perceived task value, and class-related boredom are yet to be explored in depth. Additionally, the theoretical framework did not indicate whether various environmental variables could predict discrete emotions through different

mediating paths (Pekrun, 2006; Pekrun et al., 2007). Recent quantitative results did not support particular hypotheses in the theoretical framework, for example, achievement goals did not affect academic achievement through the mediation of achievement emotions (Lüftenegger et al., 2016). Therefore, further studies need to be conducted to examine the theoretical framework.

Perceived Autonomy Support as a Mediator

The teachers' autonomy support that is perceived by students is an important perceived environmental variable in the classroom. Teachers' autonomy support was derived from the self-determination theory (SDT), and it refers to teachers' behaviors such as providing choices, encouraging autonomy, listening to students, and understanding the feelings of students (Deci and Ryan, 1987; Deci et al., 1991).

Enthusiastic teachers may provide students with more autonomy support, which in turn may be perceived by students. Based on the SDT (Deci and Ryan, 1987; Deci et al., 1991), we hypothesized that enthusiastic teachers may fulfill their psychological needs in the course of teaching, learning them to experience more positive emotions and feelings. Furthermore, as an internal incentive, these positive emotions and feelings may facilitate teachers to provide more autonomy support for their students during teaching. This hypothesis was supported by empirical studies. Earlier research showed that enthusiastic teachers might provide more autonomy support for students or they may exert less personal control over them (Rosenshine, 1970). Research by Kunter et al. (2008) showed that teachers with more enthusiasm for mathematics could provide more cognitive autonomy support for students. At the same time, teachers with more enthusiasm for teaching could provide more social support for their students. Studies on intrinsic motivation showed that teachers who experienced pleasure and internal incentives provided more support for their students, ultimately facilitating students' learning motivation (Roth et al., 2007; Klusmann et al., 2008; Kunter et al., 2008; Frenzel et al., 2009). Generally, teacher enthusiasm and autonomy support are core components of the classroom learning environment, which may have potential influences on students. Therefore, we hypothesized that students who perceived more teacher enthusiasm may also perceive more autonomy support from their teachers.

Students' perceived autonomy support may reduce their class-related boredom. Previous research showed that perceived autonomy support positively affected students' learning outcomes (e.g., Reeve et al., 2004; Tsai et al., 2008; Sierens et al., 2009; Jang et al., 2010; Sakiz, 2012). For example, Tsai et al. (2008) found that perceived autonomy support among Grade -7 students positively predicted their interest in mathematics. Sierens et al. (2009) found that if teachers did not provide solid autonomy support, undergraduate students were less likely to achieve high levels of self-regulation, in spite of structured instruction and clear expectations. Additionally, some study results showed that autonomy support was negatively and significantly correlated with negative emotions (Daschmann

et al., 2011; Kaplan and Assor, 2012). Especially, Tze et al. (2014) found that perceived autonomy support was negatively associated with class-related boredom. Therefore, we hypothesized that students' perceived autonomy support could negatively predict class-related boredom.

In summary, based on the results of prior studies, we hypothesized that perceived autonomy support might mediate the relationship between perceived teacher enthusiasm and class-related boredom.

Perceived Task Value as a Mediator

On the one hand, teacher enthusiasm may facilitate task value. According to the emotional contagion theory (Barsade, 2002), teacher enthusiasm leads to increased positive emotions and perceived task value by students. Based on the social cognitive theory of learning (Bandura, 1977; Pekrun, 2000) and the theory of social constructivism (Wild et al., 1992, 1997), students' perceived teacher enthusiasm toward a subject and teaching is considered to affect their perception and evaluation of task value. New empirical research conducted by Keller et al. (2014) found that perceived teacher enthusiasm significantly predicted students' learning value (included in the construct of individual interest). On the other hand, according to the control-value theory of achievement emotions, students' perceived valuelessness is an important contributor to boredom (Pekrun, 2006; Pekrun et al., 2007). Therefore, we hypothesized that perceived task value might play a mediating role between perceived teacher enthusiasm and class-related boredom.

Perceived Autonomy Support and Perceived Task Value as Mediators

Students' perceived autonomy support may facilitate their perceived task value and may reduce their class-related boredom. Based on the SDT, the autonomy support perceived by students may fulfill their psychological needs, which may facilitate their perceived task value, interest, learning motivation, and achievement (Deci et al., 1991). According to the control-value theory of achievement emotions, autonomy support affects emotions and learning outcomes through the mediation of perceived control and value (Pekrun, 2006). Patall et al. (2013) found that provision of choice (a core component of autonomy support) was related to greater course value perceived by students. Therefore, we hypothesized that perceived task value might mediate the relationship between perceived autonomy support and class-related boredom.

Perceived choice, a core component of perceived autonomy support, was confirmed to lead to individual perceptions of autonomy and sense of competence, and in turn, it was considered to affect individuals' motivation and performance outcomes (Patall et al., 2008, 2010, 2014; Patall, 2012, 2013). Furthermore, Ruzek et al. (2016) found that perceived autonomy mediated the relationship between teacher emotional support, and students' engagement and motivation (Ruzek et al., 2016). According to the integral framework of the control-value theory of achievement emotions, teacher enthusiasm is one of the components of value induction (Pekrun, 2006; Pekrun et al., 2007). Therefore, we hypothesized that perceived

autonomy support may mediate the relationship between teacher enthusiasm and students' perceived task value. Combining the above two hypotheses, we concluded that both perceived autonomy support and perceived task value might mediate the relationship between teacher enthusiasm and class-related boredom in serial paths. That is, students may perceive more autonomy support and task value from their enthusiastic teachers, and they may experience lower class-related boredom.

In summary, it is necessary to explore the dampening effects of perceived teacher enthusiasm on class-related boredom and to reveal the mechanism behind these effects. Few studies on teaching and learning have addressed whether perceived teacher enthusiasm can reduce the level of negative emotions (e.g., class-related boredom). The present study aimed to explore the positive effects of teacher enthusiasm on a wider range of class-related emotions as well as on learning outcomes, and to reveal the mediating role of perceived autonomy support and task value.

Overview of the Current Study

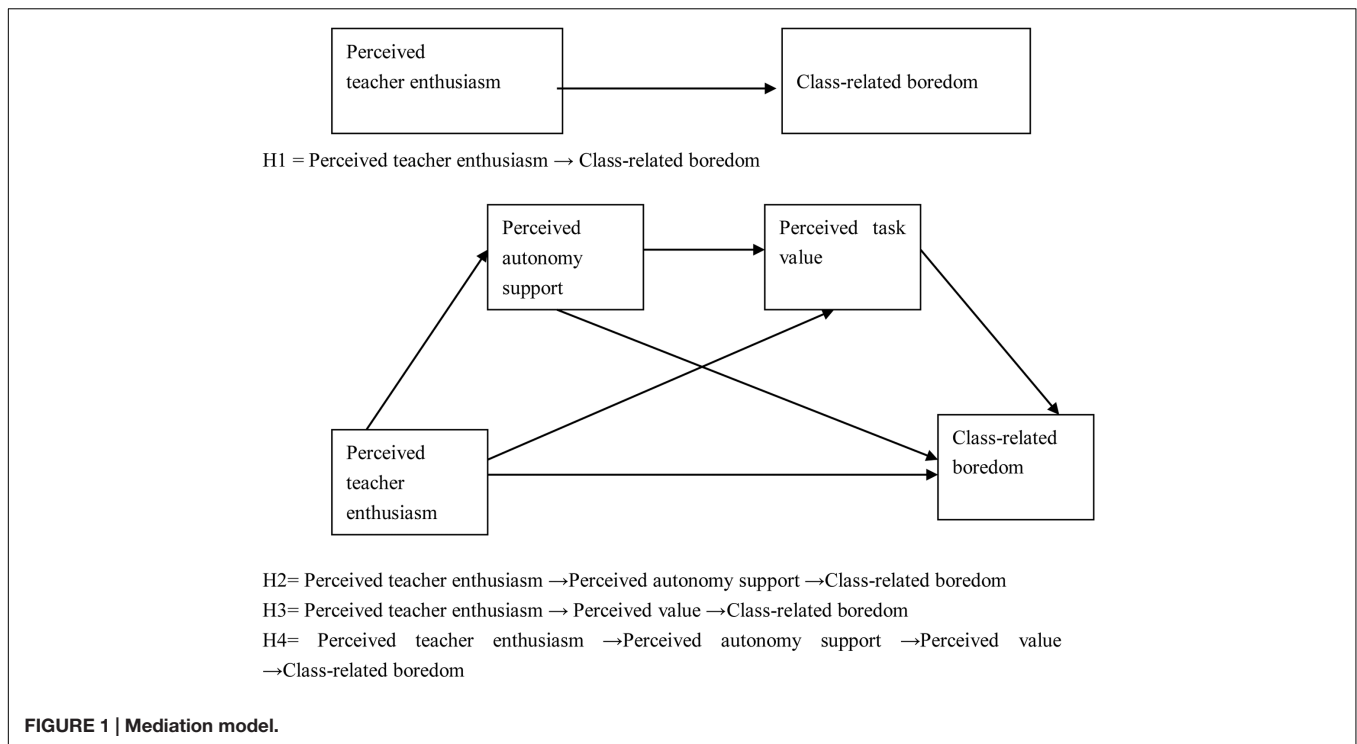
Based on the above literature review, we proposed the following four hypotheses. Hypothesis 1: Perceived teacher enthusiasm has a negative effect on class-related boredom; Hypothesis 2: Perceived autonomy support plays a mediating role in the relationship between perceived teacher enthusiasm and class-related boredom; Hypothesis 3: Perceived task value plays a mediating role in the relationship between perceived teacher enthusiasm and class-related boredom; and Hypothesis 4: Perceived teacher enthusiasm can significantly predict class-related boredom through the serial mediating role of perceived autonomy support and perceived task value.

To test these hypotheses, we constructed a hypothetical multiple mediation model to investigate whether perceived teacher enthusiasm could dampen college students' class-related boredom via students' perceived autonomy support and task value (see **Figure 1**).

MATERIALS AND METHODS

Participants and Procedures

The Research Ethics Committee of School of Psychology, Beijing Normal University. The survey was conducted with 734 (91.6% female) college students majoring in clinical medicine, nursing, pharmacy, or medical technology, with a mean age of 19 years ($SD = 1.09$ years). Prior to participation, students were informed about the goals of the study, duration, procedure, and confidentiality of their data. Participation in the study was voluntary, informed consent was assured, and students did not receive compensation for their participation. Participants were assured that all of their responses would remain confidential and would not influence their course grade. All students were asked to evaluate their class-related feelings toward courses including "basic nursing science," "normal human tissue and anatomy," "medical nursing," "diagnostics," "cosmetic technique," "biochemistry," "organic chemistry," and others.



Measures

Boredom Proneness Scale-Short form (BPS-SF)

Boredom proneness was measured using the BPS-SF, a 12-items self-report instrument (Vodanovich et al., 2005). According to Huang et al. (2010) and the current study, two items were deleted (i.e., “I find it easy to entertain myself” and “It seems that the same old things are on television or the movies all the time; it’s getting old”), as they did not fit a Chinese college student model according to a confirmatory factor analysis; thus, 10-items were ultimately used. Two example questions are, “It is easy for me to concentrate on my activities” and “Many things I have to do are repetitive and monotonous.” Responses are indicated on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). A higher aggregate score indicates a higher level of boredom proneness. The Cronbach’s alpha was 0.65 for this scale in the present study.

Perceived Task Difficulty

Two items (i.e., “Today’s class was hard for me” and “Compared to other courses, today’s class was hard for me”) from the studies by Eccles and Wigfield (1995), Wigfield and Eccles (2000), and Tanaka and Murayama (2014) were used to assess perceived task difficulty. Responses to both items are indicated on a five-point Likert scale ranging from 1 (not at all true of me) to 5 (very true of me). A higher aggregate score indicates a higher level of perceived task difficulty. The Cronbach’s alpha was 0.77 for this measure in the present study.

Perceived Teacher Enthusiasm

Three items (i.e., “Our teacher in this class teaches with enthusiasm,” “Our teacher in this subject enjoys teaching

compared to other courses,” and “Our teacher in this class tries to inspire students about the subject”) from the study by Keller et al. (2014) was used to assess perceived teacher enthusiasm. Responses are indicated on a five-point Likert scale ranging from 1 (not at all true of me) to 5 (very true of me). A higher aggregate score indicates higher levels of perceived teacher enthusiasm. The Cronbach’s alpha was 0.85 for this measure in the present study.

Perceived Autonomy Support

The Learning Climate Questionnaire (LCQ) was used to assess perceived autonomy support (Williams and Deci, 1996). This questionnaire has been widely used to assess perceived autonomy support in classroom investigations (Filak and Sheldon, 2008; Zhou et al., 2009; Reeve, 2013; Tze et al., 2014). According to Chen and Guo (2014) and the current study, two items were deleted (i.e., “I am able to be open with my instructor during class” and “I don’t feel very good about the way my instructor talks to me”), as they did not fit a Chinese college student model as per the confirmatory factor analysis; therefore, 13-items were used. Two example questions are, “I feel that my instructor accepts me” and “My instructor answers my questions fully and carefully.” Responses are indicated on a five-point Likert scale ranging from 1 (not at all true of me) to 5 (very true of me). A higher aggregate score indicates a higher level of perceived autonomy support. The Cronbach’s alpha for the 13-items scale was 0.94 in the present study.

Perceived Task Value

Two items (i.e., “What I learned in today’s class was useful” and “Compared to what I studied in other courses, what I studied in today’s class was useful”) from the studies by Eccles and Wigfield

TABLE 1 | Mean, standard deviation, and intercorrelations of all measures.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
(1) Boredom proneness	3.59	0.69	—					
(2) Perceived task difficulty	2.93	0.96	0.12**	—				
(3) Perceived teacher enthusiasm	3.78	0.90	−0.17***	0.01	—			
(4) Perceived autonomy support	3.56	0.70	−0.31***	−0.01	0.54***	—		
(5) Perceived task value	3.76	0.88	−0.26***	0.06	0.50***	0.55***	—	
(6) Class-related boredom	2.22	0.84	0.37***	0.28***	−0.26***	−0.40***	−0.35***	—

N = 734; ***p* < 0.01, ****p* < 0.001.

(1995), Wigfield and Eccles (2000), and Tanaka and Murayama (2014) were used to assess perceived task value. Responses to both items are indicated on a five-point Likert scale ranging from 1 (not at all true of me) to 5 (very true of me). A higher aggregate score indicates a higher level of perceived task value. The Cronbach's alpha of this scale was 0.76 in the present study.

Class-Related Boredom

Eleven items from the class-related boredom scale included in the Achievement Emotions Questionnaire (AEQ) were used to assess college students' class-related boredom in this study (Pekrun et al., 2005, unpublished). Two example questions are "The lecture bores me" and "I think about what else I might be doing rather than sitting in this boring class." Responses are indicated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A higher aggregated score indicates a higher level of class-related boredom. The Cronbach's alpha for the 11-item tool was 0.94 in the current study.

Statistical Analyses

Firstly, we examined the descriptive statistics and intercorrelations of the study variables using PASW statistics for Windows (Version 18, IBM, Corp., Armonk, NY, USA), and the mean, standard deviation, and intercorrelations of the sample and related variables were obtained. Subsequently, we examined the pattern of relationships in our theoretical model through a path analysis using Mplus 7 (Muthén and Muthén, 1998–2013). The path analysis was used to test the direct and indirect relationships among variables, which can provide estimates of the magnitude and significance of the causal connections hypothesized between variables. The BC bootstrap method with 1000 bootstrap samples was selected to confirm the significance of the mediating effects of perceived autonomy support and task value on the link between perceived teacher enthusiasm and class-related boredom experienced by students. This method is included as an option in Mplus and it produces the most accurate confidence limits with the largest power for detecting mediation effects (Cheung and Lau, 2008).

RESULTS

Descriptive Analyses

Table 1 shows the means, standard deviations, and intercorrelations of the dependent variables in this study:

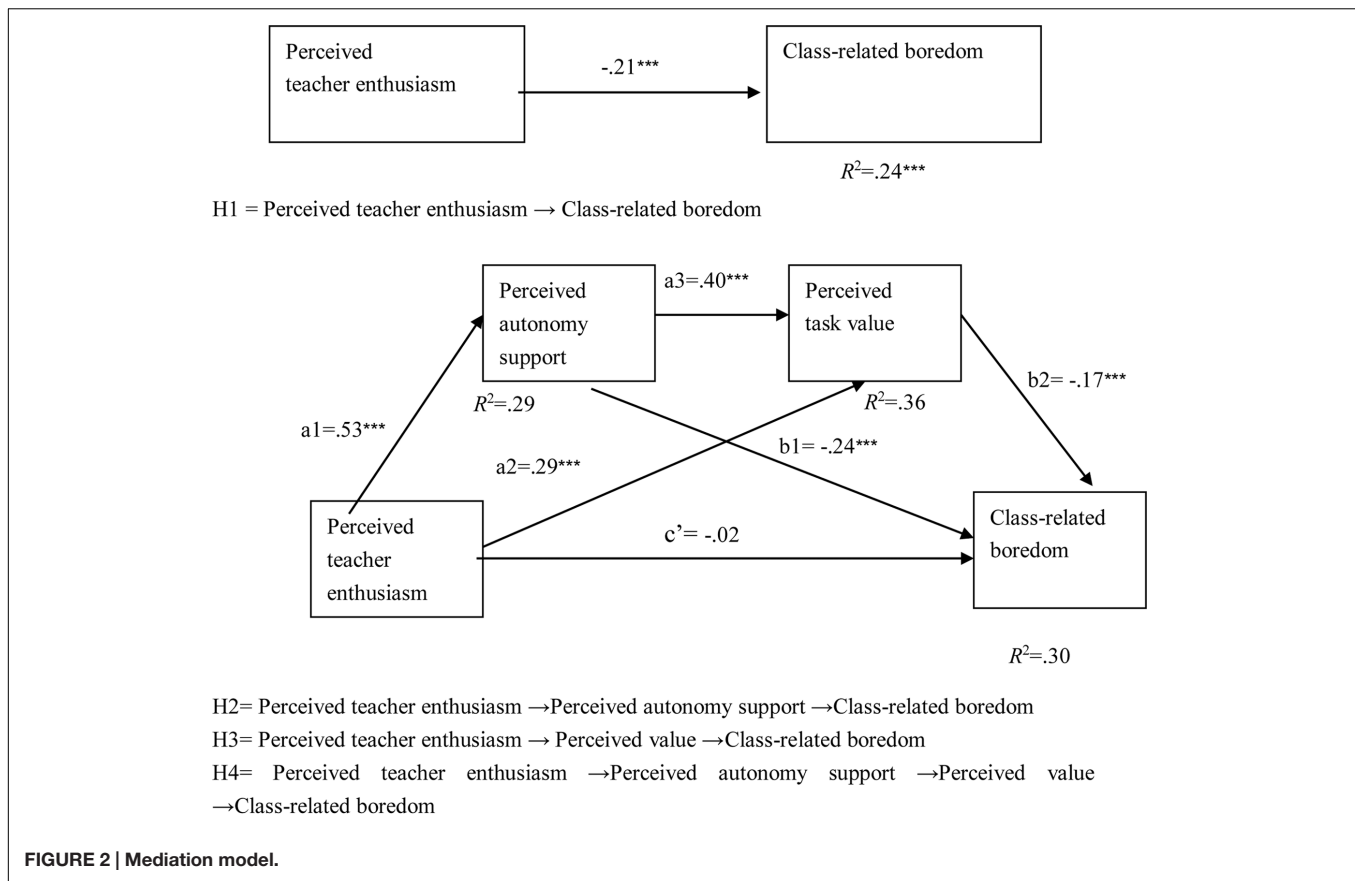
boredom proneness, perceived task difficulty, perceived teacher enthusiasm, perceived autonomy support, and perceived task value (*n* = 734). To be more specific, class-related boredom was positively related to boredom proneness ($r = 0.37, p < 0.001$) and perceived task difficulty ($r = 0.28, p < 0.001$) but negatively related to perceived teacher enthusiasm ($r = -0.26, p < 0.001$), perceived autonomy support ($r = -0.40, p < 0.001$), and perceived task value ($r = -0.35, p < 0.001$). Additionally, perceived teacher enthusiasm was positively related to perceived autonomy support ($r = 0.54, p < 0.001$) and perceived task value ($r = 0.50, p < 0.001$), while perceived autonomy support was positively related to perceived task value ($r = 0.55, p < 0.001$).

Testing the Mediating Model

Based on the proposed mediating model shown in Figure 1 and the intercorrelations of all of the measures in Table 1, a path analysis was conducted in Mplus 7 (Muthén and Muthén, 1998–2013), to test the total effect of perceived teacher enthusiasm on class-related boredom and the three specific mediating effects. The standardized estimated path coefficients for these effects have been shown in Figure 2.

Firstly, after controlling for the effects of gender, age, grade, boredom proneness and perceived task difficulty, perceived teacher enthusiasm significantly predicted class-related boredom ($\beta = -0.20$, standardized $\beta = -0.21, p < 0.001$). Secondly, in the mediation model, after controlling for the effects of gender, age, grade, boredom proneness, and perceived task difficulty, perceived teacher enthusiasm significantly predicted perceived autonomy support ($\beta = 0.42$, standardized $\beta = 0.53, p < 0.001$) and perceived task value ($\beta = 0.28$, standardized $\beta = 0.29, p < 0.001$); perceived autonomy support significantly predicted perceived task value ($\beta = 0.50$, standardized $\beta = 0.40, p < 0.001$) and class-related boredom ($\beta = -0.28$, standardized $\beta = -0.24, p < 0.001$); and perceived task value significantly predicted class-related boredom ($\beta = -0.17$, standardized $\beta = -0.017, p < 0.001$).

Additionally, as shown in Table 2, the assessment of the indirect effects in this multiple mediator model suggested a significant indirect serial mediated effect of perceived autonomy support and perceived task value (95% CI = [−0.05, −0.02]), as well as two separate indirect effects through perceived autonomy support (95% CI = [−0.17, −0.09]) and perceived task value (95% CI = [−0.08, −0.03]) in the relationship between perceived teacher enthusiasm and class-related boredom. These results suggested that perceived autonomy support and perceived task



value fully mediated the effect of perceived teacher enthusiasm on class-related boredom.

DISCUSSION

Partially based on the control-value theory of achievement emotions (Pekrun, 2006; Pekrun et al., 2007) and the SDT (Deci and Ryan, 1987; Deci et al., 1991), the current study examined mediating models on the relationships among perceived teacher enthusiasm, perceived autonomy support, perceived task value, and class-related boredom in Chinese college students. The present findings suggest that perceived autonomy support and perceived task value may fully mediate the effect of perceived teacher enthusiasm on class-related boredom as serial and parallel inductors. These findings have implications for research on the relationship between teacher enthusiasm and students' class-related emotions.

Perceived teacher enthusiasm consistently and indirectly predicted class-related boredom through the full mediation of perceived autonomy support and perceived task value, which provides strong evidence for the positive role that teacher enthusiasm plays in reducing the level of class-related boredom among college students. Our findings showed that although teacher enthusiasm may not predict class-related boredom significantly and directly, enthusiastic teachers may provide more autonomy support and may induce a higher task value of the course for their students, which may reduce students' class-related boredom. As posited in the integrated model of the control-value theory of achievement emotions (Pekrun, 2006; Pekrun et al., 2007), through the mediation roles of perceived control and value, external environmental variables (such as teacher enthusiasm and autonomy support) may decrease the levels of class-related boredom in college students. A high level of perceived teacher enthusiasm and autonomy support further

TABLE 2 | Indirect effects of perceived teacher enthusiasm on class-related boredom.

Paths of indirect effect	Effect size (standardized β)	95% CI
Perceived teacher enthusiasm → Perceived autonomy support → Class-related boredom	$0.53 \times (-0.24) = (-0.13)^{***}$	$[-0.17, -0.09]$
Perceived teacher enthusiasm → Perceived value → Class-related boredom	$0.29 \times (-0.17) = (-0.05)^{**}$	$[-0.08, -0.03]$
Perceived teacher enthusiasm → Perceived autonomy support → Perceived value → Class-related boredom	$0.53 \times 0.40 \times (-0.17) = (-0.04)^{***}$	$[-0.05, -0.02]$

$N = 734$. The path coefficient in the model is standardized coefficient (standardized β). $^{**}p < 0.01$, $^{***}p < 0.001$.

improves college students' perceived task value in class-related learning, which eventually results in lower class-related boredom and other positive learning outcomes. As situational factors, teacher enthusiasm and autonomy support were found to be important predictors of class-related boredom, considering the reciprocal relationship between positive and negative emotions (Cacioppo and Berntson, 1994; Schimmack, 2001; Smith et al., 2006; Schimmack and Colcombe, 2007), which is aligned with the research results of Winberg et al. (2014) on positive emotions. Our results also showed that perceived autonomy support and perceived task value fully mediated the relationship between perceived teacher enthusiasm on class-related boredom as serial and parallel inductors, which suggests the importance of the two mediators in this process. Furthermore, for the mediating role of autonomy support between teacher enthusiasm and its outcomes, Winberg et al. (2014, p. 288) argued that teacher enthusiasm would facilitate "a relatively autonomous extrinsic type of motivation." Similarly, the results of Ruzek et al. (2016) showed that perceived autonomy mediated the relationship between teacher emotional support and students' engagement and motivation. In addition to the short-term class-related variables, future research should further clarify whether teacher enthusiasm and autonomy support continuously drive individuals to achieve long-term school success and make career choices.

Additionally, after controlling for the effects of perceived teacher enthusiasm, perceived autonomy support had a unique contribution to the prediction of college students' perceived task value and class-related boredom. From the perspective of the SDT, perceived autonomy support can fulfill psychological needs, which eventually results in a higher perceived task value and other positive learning outcomes (Deci et al., 1991). In line with this, abundant research has confirmed the effects of autonomy support and its core components on learning processes and outcomes, including class-related values, emotions, and motivations (e.g., Reeve et al., 2004; Patall et al., 2008, 2010, 2014; Tsai et al., 2008; Sierens et al., 2009; Jang et al., 2010; Daschmann et al., 2011; Kaplan and Assor, 2012; Patall, 2012, 2013; Tze et al., 2014).

The findings of the current study have important practical implications. Both perceived teacher enthusiasm and perceived autonomy support serve as significant predictors of task value and can thus be used as important tools to reduce the most frequent and harmful academic experience (i.e., class-related boredom). Thus, when designing courses or interventions for reducing class-related boredom, researchers, educators, and counselors should also focus on both teacher enthusiasm and autonomy support. Related courses or activities should guide teachers to develop and provide more enthusiasm and autonomy support for their students. Colleges may also consider designing assistant programs and training sessions for teachers to promote teacher enthusiasm and related behaviors aimed at providing autonomy support to students. In turn, this would promote students' perceived task value in the class and would reduce their class-related boredom, which would eventually result in more positive learning outcomes. According to the findings of the serial mediating role of perceived autonomy and task value between

teacher enthusiasm and class-related boredom, first and most importantly, we should guide and facilitate teachers' enthusiasm for their subjects and teaching.

Despite the theoretical and practical implications discussed above, the current study has several possible limitations. Firstly, according to the model of the control-value theory of achievement emotions, in addition to perceived teacher enthusiasm and autonomy support, teaching quality, students' subjective control, and achievement goals also play unique roles in reducing students' class-related boredom (Pekrun, 2006; Pekrun et al., 2007). However, these factors were not included in the current study. Future research should include these variables when examining the effects of teacher enthusiasm on students' learning. Secondly, the current study utilized college students' self-reporting, and it was conducted at the conclusion of one semester. The one-sided self-report answers and the upcoming final examination may have affected the level of teacher variables and class-related boredom. To test the accuracy of the mediating model, future research should attempt to overcome this limitation by measuring more teacher (or teaching) and student intraindividual variables at several time points and levels, to better estimate how teacher enthusiasm and autonomy support influence college students' learning outcomes. Thirdly, as the current study was conducted with a sample of students from a medical college in China, whether the findings discussed above could be generalized to other college and university students remains to be determined. Lastly, the current study was conducted with reference to compulsory medical courses. Thus, further research needs to determine whether our findings could be generalized to other optional and non-medical college or university courses.

CONCLUSION

This study expands upon existing knowledge regarding the relationship between teacher enthusiasm and class-related boredom, and its findings are novel and insightful, both theoretically and practically. This study not only clarifies that medical college students' perceived teacher enthusiasm negatively predicts their class-related boredom, but it also supports the role of their perceived autonomy support and task value as mediators in this relationship. In short, the results suggest that medical college students' perceived autonomy support and task value mediate the dampening effect of their perceived teacher enthusiasm on class-related boredom. To this end, the present study offers an important foundation for future work.

AUTHOR CONTRIBUTIONS

GC and MY contributed to the conception construction and design of the study and to the analysis and interpretation of data. XZ contributed to the collection of data. Also, GC wrote the drafted paper and MY made critical revisions. All authors approved the final manuscript for publication.

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On the Very Model of a Modern Major Manager: The Importance of Academic Administrators in Support of the New Pedagogy

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The shifting nature of organizational practice within higher education (HE) is such that the contemporary university may, at this stage of its evolution, be completely unrecognizable from the haven of liberal education first described by Cardinal Newman in the early nineteenth century (see, e.g., Senior et al., 2017a). Unlike these small elite institutions, the modern day university is more akin to the pluralistic “multiversity” first described by Charles Kerr in 2001. This model for an effective institute is one that is immediately recognizable as a modern day enterprise with a diverse portfolio of large-scale research activities informing an equally diverse portfolio of large-scale academic programs (Kerr, 2001). One only has to spend a short period of time in any modern day university to realize that Kerr’s model for a university is very much the dominant design within the global HE sector. Such diversity breeds a new psychology in the individuals who govern HE institutes and needs to be considered to ensure that despite its complexity HE is still delivered effectively.

Throughout most HE institutes, the delivery of effective academic programs is dependent on a number of key stakeholder groups namely the students, the Professoriate as well as the academic administrators.¹ Each stakeholder group contributes to academic program delivery and governance processes, but the nature and distribution of the contribution has been influenced by the rate at which institutional complexity is developing. Thus, the growing complexity of an institute may impact effective governance and this, in turn, may adversely impact the student learning experience.

Akin to Kerr’s concept of a multiversity, a contemporary university is a vibrant and almost constantly changing environment that inspires a unique type of mentality in the individuals who chose to work in the field. Indeed, this particular employment sector is distinct insofar as its workers, i.e., the Professoriate² are remarkably satisfied with the working environment. While financial remuneration varies considerably across the sector, this is not the prime incentive for engagement within this profession (Luna-Arocas and Tang, 2004). Rather it is the opportunity to engage autonomously within a collegial working environment (Ambrose et al., 2005). Members of the Professoriate benefit from a so-called psychological contract with various organizational components that serve as both intrinsic and extrinsic motivators [Murlis and Hartle (1996); see also Cullinane and Dundon (2006)]. The professorial contribution to governance process tends to be carried out by means of reputation. This may be a result of their profile as a scholar or leader of a (most likely international) research program; their acknowledged disciplinary expertise; or their experience and status as an academic or professional (Corrall and Lester, 1996).

¹ We recognize that additional stakeholder groups, such as technical staff or professional practitioners, are also essential to the delivery of some academic programmes.

² We fully acknowledge that academic staff can constitute a range of other titles than merely being a “Professor” but for the sake of simplicity we have grouped all together here.

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Conversely, students are more likely to engage directly with the governance of a particular program if they can see how such engagement directly benefits post-graduate employment (Senior et al., 2017b). Such engagement is tenuous at best and despite the obvious advantages for experiential learning (Carini et al., 2006), there still remains considerable work to be carried out to explore the means by which students can be encouraged to be more involved in the governance of their learning.

Compared to the relatively static roles of the Professoriate and student, the role of the university administrator has undergone considerable changes and now represents what many regard as being a fundamental stakeholder in the governance of most HE institutes (Whitchurch, 2006). However, despite the importance of the administrator's role, satisfaction in this group of stakeholders is remarkably low (Glick, 1992) with many administrators citing a range of issues from a lack of a clear professional identity, lack of an incentive to innovate, to a reduced role in effective management of the managerial process (Volkwein and Parmley, 2000). Such a low level of occupational satisfaction experienced by the administrative cohort may be in part due to their (mis) perceived position within the academic community where they are often regarded by academic colleagues as being “*underachieving, overpaid supernumeraries, who jobs are part of an unnecessary bureaucracy and prime candidates for replacement by smart machines*” (Corrall and Lester, 1996, p. 84).

Here, we adopt a different view and argue that academic administrators are not only essential for the successful day-to-day execution of the various service provisions of a successful university and its academic programs but are central to the realization of the modern day multiversity as described above. The importance of their role can be understood when one considers their removal. This scenario has already been initiated with some institutes reducing administrative staff numbers to save costs; thus, transferring more administrative responsibilities to the Professoriate. This strategy may at first seem to produce cost savings in the short term but it is one that will inevitably see the Professoriate move away from the development and delivery of the core academic service that they are contracted to deliver, i.e., research and scholarly informed teaching; a move that will ultimately lead to a diminution of the overall learning experience for the key consumer group in a university, namely the student.

There is no doubt that as the modern day university increases in scope and size, a number of issues with regard to its inherent complexity will arise that will influence the relationship between these three stakeholder groups. These issues will likely manifest as tensions between the individuals who inhabit each of these roles and when such boundary disputes occur they have the potential to significantly impact on the learning environment. However, there are positive opportunities and benefits if the stakeholder relationship can adapt effectively to change. The contemporary HE environment is inherently flexible and, thus, innovative practice can be embedded as a central ethos throughout the management of academic programs. How could such organizational flexibility be used to empower academic administrators who, as reported above, report very low job satisfaction and may not feel inclined to innovate within their role?

As previously noted, Kerr's vision of a multiversity is a complex and ever-changing environment that is both sensitive to external factors, such as competition and legislation as well as internal drivers, such as student satisfaction. Given such complexity, it is inevitable that occupational roles will cross over. Such boundary-crossing behaviors occur when an individual role may cross over with the activities of another person's work and when it does this can cause a variety of disputes (e.g., Ashforth et al., 2000). Within academia—examples of such boundary crossing can be seen with roles such as the research active technician or even the subject specialist librarian who may even have PhDs but whose primary purpose is to deliver academic support services. In addition to this, the development of the professorial administrator, which is rapidly becoming *de rigor* in most academic institutions presents a clear example of the type of hybrid role exemplified by the boundary crossing ethos facilitated by the everyday complexity within a modern day university. Here, institutional managers are faced with a problem—move forward and professionalize the administrative workforce and raise occupational satisfaction but risk disputes arising from colleagues whose roles crossover. One possible solution to empower the cadre of administrators would be to further develop the relationship between the administrators, professoriate, and the students.

There have been previous attempts to consolidate the roles of the various governance stakeholder groups in HE and they have had a variety of results (Kanji et al., 1999). However, what they all have in place is the formation of a common steering core—a dedicated cadre of individuals who are responsible for the day-to-day management of the delivery of academic programs (Whitchurch, 2006). Here, we not only argue that the development of such a common core facilitates innovation but it is also a crucial and essential component to the sustained delivery of excellence across the sector. Within such a common core a genuine partnership between skilled, informed, and valued academic and administrative staff who combine their individual expertise to create a collective enhancement of the student experience and the University's operations can be formed. There is obviously a degree of value of this so-called “third space” between which may exist the Professoriate, student stakeholders, and the administrators to implement effective governance (Whitchurch, 2008).

However, is the development of a common steering core sufficient to ensure that administrative innovation is facilitated? An additional strategy that is also starting to become more and more prevalent is the move to professionalize the central cadre of administrators (Gornitzka and Larsen, 2004). Such a strategy would allow academic administrators to develop a full set of professional skills required to enhance their role in the successful management of academic programs. There is no doubt that the current advocacy for an increase in administrative professionalization has much to offer. As the ranks of professional administrators increase, this could expand operational innovation and effective management practices ultimately resulting in increased student satisfaction. There is also the subsidiary benefit of an increase in the professional qualifications leading to further awards and the development of in-house programs (e.g., an MBA in Academic Administration, etc.) to support such a move. At the individual

level a professional qualification is likely to see individuals who are more empowered to lead and to debate their professorial colleagues on program delivery matters. However, given the complexity of a modern day university, the professionalization of a common core of academic administrators has considerable benefits for the effective delivery a large-scale portfolio of programs. How can HE institutes both support the development of essential administrative staff and at the same time ensure that these individuals are empowered to innovate?

To address this possible issue and also facilitate an excellent learning experience an additional stage in the professionalization process is proposed. One that is informed by organizational psychology and that is to move away from the development of pseudo-teams and more toward the formation of effective or “real” administrative teams (West and Lyubovnikova, 2012). These real-teams could perhaps constitute the common steering core of a department or even an institute. They would comprise administrators with enhanced program management and governance responsibilities working collectively with the Professoriate, thus, removing historical perceived boundaries between these staff groups. Compared to a pseudo-team, a real-team is effective as team members meet together to serve a common goal with the additional opportunity to reflect on their learning during the completion of a specific task.³ Such reflective thinking allows the team members to improve on subsequent activities (Schippers et al., 2015). There is considerable evidence

stating that multidisciplinary true teams are highly effective in ensuring that organizational goals are successfully met in a timely manner (Richter et al., 2011). Moreover, members of real teams also report being more empowered to innovate their practice (Schippers et al., 2015). It is, therefore, perhaps quite surprising that the presence of multidisciplinary real teams is remarkably absent throughout HE given the complex role that effective academic administrators are tasked with executing on a daily basis.

The unique complexity of the administrative role in HE drives a ubiquitous threat of boundary disputes occurring that may ultimately impact the student learning experience. Developing a common core of professional administrators with greater responsibility for the management and delivery of the academic portfolio, working closely with the Professoriate, can help address these disputes. It both empowers the academic administrator as well as the Professoriate which will in turn facilitate job satisfaction. Furthermore, by ensuring that the people who inhabit this “third space” or common core have an opportunity to reflect on their day-to-day activities, it may be possible to develop an effective administrative mechanism by where innovation is common practice. This proposed model would ensure that the delivery of the academic portfolio is constantly refined to ensure that it meets the growing expectations of the modern day student.

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All authors have contributed equally to this work.

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On the Tacit Aspects of Science Pedagogy in Higher Education

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In this article, we examine the concept of tacit knowledge and its implications for science education. We suggest that the history of scientific ideas and the personal nature of learning imply that higher education in scientific fields, wherein the generation of new knowledge, insights and understanding is paramount, would greatly benefit by acknowledging the irreducible role of the non-formal and the incidental in scientific innovation and advances.

Keywords: implicit knowledge, apprenticeship, history of ideas, non-formal learning, history of science, affective learning, higher education, higher-order thinking skills

What a misfortune it is that we should thus be compelled to let our boys' schooling interfere with their education! – *Post-prandial Philosophy* by Grant Allen (1894) .

INTRODUCTION

The idea of 'tacit knowledge' has its origins in the writings of Michael Polanyi, elaborated in detail in his book *The tacit dimension* (Polanyi, 1967). In his book, he suggested that the successful performance of tasks requiring multiple skills, specifically scientific inquiry, requires not only a thorough knowledge of the procedures and techniques involved in a purely objective sense, but also a personal component of insight, experience and even creativity that cannot be not easily explicated by the practitioner himself. This is summarized in his maxim "We can know more than we can tell." The presentation of this issue by Polanyi endows the process of scientific innovation with an aura of both mystery and uncertainty. Polanyi's idea of 'tacit' knowledge took root in his philosophical opposition to the Soviet ideological position enunciated by Nikolai Bukharin that scientific inquiry would automatically proceed in accordance with the exigencies of the 5-year plans formulated by the socialist state (Polanyi, 1967). As Schmidt (2012) points out perceptively, Polanyi's ideas were formulated with intention of insulating 'pure' science from notions of state control. This concern was expressed by positing a component of skilled performance that could not, by definition, be codified in any objectively meaningful way. By endowing science and scientific advancement, especially in 'pure science,' with an irreducibly personal and vital component, Polanyi seems to indicate the eventual inability of state-mandated regimens to encourage, and by implication completely account for, scientific innovations. In pedagogy too, a personal and vital component is present in the acts of both teaching and learning that contributes an intangible, but nevertheless valuable aspect to the lived experience of both the teacher and the taught.

THE REINTERPRETATION OF THE 'TACIT' BY NONAKA AND TAKEUCHI (1995)

In industrial settings, the tacit dimension was reinterpreted with specific reference to 'skilled performance' and efforts were made through close observation of the master-craftsman-apprentice relationship to explicate what had remained implicit. Analogously, in both science and the pedagogy of science, the transfer of skills from teacher to student

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is also of undeniable importance. The very notion of specifying 'learning outcomes' implicitly indicates that a transfer of codifiable skills and knowledge is what is normally expected in the pedagogical context. To summarize, there are two aspects to the pedagogy of science: the effective transfer of knowledge and skills from teacher to taught, and a more intangible aspect of innovation that comes only by an uncertain combination of deep knowledge, personal involvement, intuition and creativity. It is to these issues that we now turn.

When the literature on tacit knowledge is searched for studies about the tacit components of knowledge in attaining preferred outcomes, a clear dichotomy is observed between the 'pure' and the 'applied' sciences, mirroring Polanyi's original concern about safeguarding pure sciences from state control. The representation of studies is greatly skewed toward engineering and medicine, i.e., applied and professionalized fields of scientific endeavor. Thus, pure science practitioners have, by and large, not investigated the role and impact of tacit knowledge in their field to the same extent that their colleagues in the applied sciences have. This is understandable because the applied sciences have to grapple with the issue of effective skill transfer and therefore, productive apprenticeship, practically on a daily basis. Therefore, the fields of engineering and medicine are acutely conscious of the need to codify (and thereby preserve by depersonalizing) useful and actionable knowledge, and the repeated requirement for heuristics in the sense of 'rules of thumb' to enable reliable judgments during problem-solving. We suggest that the vocational narrative of 'pure' science supports self-motivated and disinterested inquiry into phenomena that de-emphasizes the codification of 'best practices' for innovation. The idea of serendipity, of "chance favoring the prepared mind" (*vide* Louis Pasteur) is deeply embedded and highly appreciated in this ideational framework, which is not conducive to the kind of efforts that Nonaka and Takeuchi make in order to render explicit formerly tacit knowledge. Thus, the unstated 'tacit' that requires 'chance' to meet the 'prepared mind' permits the pure sciences to 'tacitly' dispense with the need for codification of their 'best practices' simply because they don't exist in an objective sense.

As in the case of Polanyi responding to a contention by Bukharin who was grounded in Soviet ideology, the writings of Nonaka and Takeuchi also had a reactive context (Nonaka and Takeuchi, 1995). As their book is summarized by the publisher Oxford University Press:

"How has Japan become a major economic power, a world leader in the automotive and electronics industries? What is the secret of their success? The consensus has been that, though the Japanese are not particularly innovative, they are exceptionally skilful at imitation, at improving products that already exist. But now two leading Japanese business experts, Ikujiro Nonaka and Hiro Takeuchi, turn this conventional wisdom on its head: Japanese firms are successful, they contend, precisely because they are innovative, because they create new knowledge and use it to produce successful products and technologies. Examining case studies drawn from such firms as Honda, Canon, Matsushita, NEC, 3M, GE, and the U.S. Marines, this book reveals how Japanese companies translate tacit to explicit knowledge and use

it to produce new processes, products, and services" (see OUP website¹).

The last statement is especially important, that Japanese companies owe their effectiveness and ascendancy to their ability to 'translate tacit to explicit knowledge.' Incidentally, it seems to indicate that other organizations could achieve similar excellence by following suit. But note that the case studies are mostly concerned with industries, and definitely not with educational institutions. Indeed, the element of depersonalization consequent on making tacit knowledge explicit arises precisely because industry needs to have well-defined and reproducible means and methods of production, and can ill-afford to allow useful knowledge to remain the preserve of a few 'gifted' employees in the form of tacit knowledge. Uncodified and non-verbal knowledge is therefore a genuine problem for manufacturing processes. This is because the absence of such knowledge is never observable *a priori* but can at best be inferred only *a posteriori*, after the manifestation of anomalous outcomes that, in extreme, may even be physically dangerous, e.g., an incorrectly executed step or omitted precaution in the usage of heavy machinery.

This analysis of the relative importance of codifying tacit knowledge in the 'pure' and 'applied' sciences is itself founded on an assumption that we now make explicit: That there is an objective and therefore observable, dichotomy between the 'pure' and the 'applied.' The prevailing narrative assumes that the 'pure' is worth pursuing not only for its own sake, but because it may eventually lead to 'applications' in the real world. Thus, there is an element of utilitarianism in the funding of 'pure' science that is intermittently highlighted, especially in situations where funding limitations become an overriding concern, e.g., the Large Hadron Collider (Llewellyn Smith, 2010). Likewise, biologists have used the phrase 'bench to bedside' to indicate the ultimate utility of their investigations that are manifestly undertaken initially out of innate curiosity about the nature of living organisms. However, the actual history of science is replete with instances of cross-fertilization between the administratively convenient compartments titled 'pure' and 'applied' (Sitaraman, 2012). Given the foregoing discussion, educators in the scientific field would be well-served by investigating the actual nature of scientific innovation.

THE NARRATIVE FALLACY² AND THE EDUCATOR

Institutions of higher education, by which we mean those that emphasize research and innovation within the student body under the guidance of faculty members who are trained practitioners, are expected to not only impart skills that enable students to effectively undertake technical procedures relevant to their field of study. Supported as they are by infusions of a combination of public or private funds, they are also expected

¹The knowledge-creating company: how Japanese companies create the dynamics of innovation (1995). Available at: <https://global.oup.com/academic/product/the-knowledge-creating-company-9780195092691?cc=in&lang=en&#> (accessed March 24, 2017).

²See (Taleb, 2010).

to continuously contribute to the creation of new knowledge, novel interpretations of existing knowledge, and synthesis of multiple, often disparate, strands of information leading to a greater understanding and application of the topic at hand. Thus, the emphasis in higher educational institutions shifts decisively toward higher order thinking skills as stated in Bloom's taxonomy (Bloom, 1956), with the seldom-stated, but nevertheless real hope that the 'next great invention or discovery' would emanate from the ranks of their faculty and students. For example, the British physicist Sir Peter Higgs, Nobel Laureate in Physics (2013) stated in an interview to *The Guardian* that the authorities of Edinburgh University retained him on the rolls in spite of the paucity of 'regular' research publication in the hope that he might win a Nobel prize based on his 1964 work on the eponymous Higgs boson (Aitkenhead, 2013).

This institutional drive to attain and maintain high rankings in the highly competitive area of university education creates a certain tension between researcher and institution based on what may be deemed 'important' or 'cutting-edge' in science at a given time, but does not explicitly acknowledge the process by which science has historically evolved. Thomas Kuhn in his 1962 study of the sociology of science divided the scientific enterprise not into the familiar categories of 'pure' and 'applied' but into 'normal' and 'revolutionary' (Kuhn, 2012). We suggest that normal and revolutionary are not only qualitatively distinct categories in terms of the objective impact of the scientific advance in question. Rather, these objective attributes are additionally indicative of underlying cognitively distinct categories as well. The reason for such an inference is based on the nature of activities involved in each domain.

In Kuhn's framework, the domain of normal science is the incremental addition of detailed knowledge and insights based on the prevailing consensus by a process of 'puzzle-solving.' Any hypotheses that are framed are rooted in accepted general principles and models. Notably, this type of scientific endeavor is clearly amenable to both institutionalization and professionalization. Almost by definition, this does not lead to the kind of 'great' advances and inventions that are highlighted in a narrative history of science because, while the incremental accretion of knowledge in a field may be of immense interest to insiders, it does not necessarily arrest the attention of either the student or the public at large. According to Kuhn, major advances and innovations occur almost organically when the accumulation of non-conforming information crosses a critical threshold that he termed as a 'crisis' in the discipline. The idea of a disciplinary crisis is certainly an apt metaphor in some historical instances. For example, it accurately reflects the kind of experimental problems that laid the foundations for the historical development of Einstein's special theory of relativity and quantum mechanics. However, it is not readily applicable in other cases, for example, Gregor Mendel's work (1866) on inheritance in pea plants and his theory of 'genes,' that were not precipitated by any recognition of a pre-existing 'crisis' in the field of biology. Instead, the theory of dominant and recessive genes was proposed as a model to account for the relative proportions of offspring displaying distinct external features or phenotypes when pure-breeding parents of different phenotypes were crossed. Therefore,

textbooks repeatedly emphasize that Mendel was 'ahead of his times,' which statement implies that he was not responding to any disciplinary crisis. Mendel published his work 7 years after Charles Darwin published his celebrated *Origin of Species* in 1859. Very importantly, though the *Origin* went through five more editions that involved significant revisions under Darwin's supervision, the last being published in 1872, Darwin labored unaware that Mendel's postulate of 'genes' could provide a crucial concept with explanatory power for the actual mechanism of both heredity and evolution. It was only with the "modern synthesis" initiated at the beginning of the twentieth century by Hugo de Vries that the relationship between genes and organismal evolution was perceived.

The history of science therefore contains not only celebrated accounts of serendipity, improbable coincidences and idiosyncratic insights, but also less frequently mentioned instances of missed chances and lost time. We therefore suggest that the actual history of science is less amenable to 'narrative-building' than we would like. This, in turn, implies a certain loss of control of processes and events, which is worrying in the professional realm wherein employees and organizations alike are expected to direct efforts toward repeatedly and reproducibly achieving (often monetarily) tangible outcomes. Institutional mechanisms are sought to be formulated to encourage scientific advances that have historically defied the reduction to a 'standard narrative' or, in corporate parlance, a 'standard operating procedure' (SOP). For example, Nonaka and Takeuchi develop the idea of a 'hypertext' organizational structure that would be conducive to the creation and operationalization of formerly tacit knowledge, by being able to flexibly alternate between predictable and efficient bureaucratic processes and a problem-based task force approach (Nonaka and Takeuchi, 1997). However, the present work is more focused on the individual educator, and we suggest that this undoubtedly crucial issue of organizational facilitation for the exercise of individual abilities deserves a discussion on its own.

The interaction of a scientist with the environment and his/her simultaneous usage of prior experience and cognitive ability is of paramount importance in making those major advances that are eventually incorporated into 'narratives' of the history of science. The requirement for such a narrative is an expression of the deep-seated human need for order, coherence and certainty in a world of randomness and uncertainty, leading to a cognitive (but unconscious) highlighting of seeming certitude and retrospective predictability. A narrative is definitely valuable, as it may enable us to deduce general principles from seemingly unconnected pieces of information, but it overstays its welcome when it becomes an end in itself. As educators, we also unconsciously subscribe, *mutatis mutandis*, to some version of this narrative fallacy when undertake comparisons of pre- and post-test scores after devising some creative educational intervention. We would not analyze these results if we did not really believe that it would eventually lead to something beyond the attainment of the immediate learning outcome of interest. Specifically, we hope that we are thereby enabling not only the effective transfer, retention and application of new concepts and information, but also empower our students to "learn how to learn" the selfsame

concepts, procedures and ideas. While this student-centered view is unexceptionable, it also begs the question of the emphasis on objectively measurable outcomes in our work of teaching and mentoring. One suspects that, once an objective measure is emphasized at an institutional level, teachers (like all other professionals conscious of their careers) react in accordance with Goodhart's 'law' that suggests that a metric ceases to be useful once it is adopted as a target, because people begin to try and manipulate it to their advantage. The San Francisco Declaration on Research Assessment, 2012 suggesting that journal metrics and other measures of 'prestige' not be used as *de facto* markers of research excellence is an indication of how objective and quantitative metrics, while convenient and efficient from an administrative perspective, may not truly serve the cause of scientific advancement.

THE UNCERTAINTY OF THE TACIT DIMENSION

From the history of science and the widespread professionalization of scientific research, we may well wonder if the entire issue of communicating tacit knowledge, thereby making it manifest and codifiable is in fact an admission of discomfort with uncertainty that humans generally have. After all, insurance policies address themselves to the one uncertain certainty we all agree on: Death is inevitable, yet its precise timing is unpredictable. As Michael Eraut (Eraut, 2000) points out perceptively, professional settings necessarily prompt descriptions that emphasize predictability and control in order to inspire confidence in the listener. Analogously, in the realm of science pedagogy too, there is a clear and ongoing attempt to improve teaching, and thereby learning outcomes, preferably in terms of reproducible and quantifiable metrics. Even subjective issues like interest and presentation style are often sought to be quantified by asking respondents to estimate scores on a numerical scale, which can be treated as a conventionally quantitative measure. If the goal of higher education is to promote research and innovation, it will need to employ approaches that explicitly recognize the uncertainties and risks associated with the successful production and valorization of new knowledge. Indeed, funding agencies often refer to their range of sponsored activities as comprising their 'research portfolio' consisting of research programs and individual projects with varying investment, risk and reward profiles. The Science and Engineering Research Board (SERB) of the Government of India has introduced a separate category of extramural grants that are termed 'high risk high reward' that is an explicit acknowledgment of this uncertainty (see SERB website³).

The tacit is therefore characterized by both uncertainty and a lack of formalism. The dilemma before the teacher is to ensure the adequate availability of opportunities for non-formal learning, but without materially compromising the overall didactic goals and rigor of a given program of study. Given the inevitably personal nature of tacit knowledge, it would help to

consciously recognize that learning outcomes are by no means guaranteed, even if they arise in the context of well-controlled and previously tested interventions with tangible results. This is because a change in audience inevitably occurs with successive groups of students having varied abilities and preferences. Rather, the aim of teaching should include not only the attainment of learning outcomes, but the encouragement of deep and introspective engagement with the study material. Thus, the inevitable evaluation strategy may be itself evaluated not only by the improvement of test scores in the conventional sense, but also the degree of introspection and deep learning it fosters. Contrary to positivist notions of improving learning outcomes, such an opportunity would actually result in students realizing that their interests and abilities (as well as the lack thereof) preclude further deep engagement with the subject at hand. It is therefore germane for teachers to accept the personal and subjective nature of the cognitive process that underlies the successful transfer and acquisition of knowledge and skills. The personal value for a student to conclusively recognize that his/her interests and skills lie elsewhere than the subject they have enrolled themselves in is also a valuable learning outcome that materially affects career choices. Thus, teachers and educational institutions would gain much by explicitly recognizing the role of chance and the essential non-codifiability of 'best practices.'

Another key issue when it comes to application is the actual amount of time a given course or program of study has to devote to develop such valued tacit capacities. It is one thing to accept the principle that non-conventional opportunities for learning have to be accommodated, but quite another to determine what specific proportion of a given course should be devoted to such activities. To this, we propose that the cause is better served by awareness-raising, rather than by codifying a SOP to improve tacit skills. From the viewpoint of learning outcomes, the time investment turns out to be a 'high-risk investment,' but one with potentially major payoffs or losses. This has to be balanced with low-risk investments of the conventional kind, such as creatively designed didactic modules, paper presentation and writing, evaluation schemes designed to test for specific learning outcomes (insofar as they can be specified), and so on. Only by having a wide range of approaches can we hope to facilitate, however, imperfectly, the process by which advances in knowledge and innovations in practice occur in the real world.

The foregoing discussion may prompt the accusation that the reduction of humans to black boxes is implicit in the idea of improvements in pedagogy for groups. As educators know from experience, every batch of contemporary university students is a group of very different individuals who have come together by accident as a result of an (hopefully) impartial admission process. Therefore, beyond the fulfillment of the stated 'minimum eligibility requirements' for the given course, there is very little such individuals have in common. When careful attention is paid to both the abilities and deficiencies of the individuals who comprise the student body, we find not only those who are genuinely interested or invested in the program, but also those who are not really interested in the subject, but lack an outlet or opportunity to express their other talents and abilities. In higher education it is therefore critical that, in addition to

³High Risk High Reward. Available at: <http://serbonline.in/SERB/HRR> (accessed February 27, 2017).

improvement, we also offer opportunities for introspection to our students. Specifically, the didactic and interrogative components of the course should enable them to discover *for themselves* whether they have indeed made the correct choice of a course of study, and whether there is sufficient alignment with their personal career objectives and priorities. This, of course, is impossible unless students also have the chance discover during the process of introspection whether or not their abilities and interests are aligned with the demands of the course at hand. Importantly, while we can learn from failure, we instinctively shrink from the suggestion of failure. This process of learning from one's mistakes is essential to one's growth as an individual who seeks new external information and understanding, as well as a critical appreciation of one's own strengths and weaknesses within the context of personal aspirations. Thus evaluation modules designed by the teacher have, or may acquire, functions in addition to the conventional one of determining student proficiency in a particular subject. It is now to this deeply personal aspect of self-discovery by students that we now turn.

EFFECTIVE PEDAGOGY IS DEEPLY AFFECTIVE

A very important aspect of pedagogy that is often missed in studies of curriculum improvement is the idea of 'pleasure in pedagogy.' In their book *The Slow Professor*, authors Maggie Berg and Barbara Seeber devote an entire chapter to this issue, in which they draw our attention to the issue of affect, when deep emotional involvement with the subject at hand creates a form of pleasure that transcends even the objective fact of grappling with a difficult problem and solving it (Berg and Seeber, 2016). Sir Peter Higgs (quoted earlier) also remarked that he wouldn't have had the kind of 'peace and quiet' that he enjoyed in 1964 in the academic atmosphere of today (Aitkenhead, 2013), indicating that there are other issues at work in producing major advances in scientific knowledge.

In fact, we suggest that, in addition to the satisfaction of expending honest effort at explaining and understanding, there is an additional element of the esthetic that informs such pleasure. Brooks (2009) states in the context of medical education that "True expertise is transmitted not by lectures or textbooks, but by guided practice." Even the intellectually and physically taxing work of scientific research, with its methodological norms (and strictures) may be valuable to the dedicated researcher in ways that cannot be expressed except perhaps in terms of an esthetic ideal. The objective non-practitioner may, with some justification, feel that "there are better things to do." The important fact is that a sense of wonder, discovery and esthetic pleasure is what ultimately not only enables, but more importantly, sustains a deep interest in any subject, and amounts to a truly lasting 'learning outcome' at the individual level. As we readily confess, it is this attribute that reminds us of the 'great teachers' that we have encountered during the course of our own education, even long after we have lost touch with the subject they taught. Perhaps it is this that remains forever 'tacit' and yet, powerfully informs the tasks of both the skilled and the learned.

In science education, the stress is understandably on measurable outcomes, not only because these are measurable outcomes, but also because the idea of measurement itself is deeply embedded in scientific culture. However, as educators specifically engaged with higher education, we would do well to recognize the irreducibly personal nature of all knowledge that contributes to a satisfying, even memorable educational experience for the student, regardless of the eventual utility of the subject matter in their subsequent career. Finally, we note that Hafler et al. (2011) perceptively point to the lack of acknowledgment of faculty as learners, something that greatly contributes to the dedication and innovation that faculty members are expected to bring to their task, and enriches their own experience of the didactic process.

An additional fact to be appreciated is that humans have instinctively felt at ease with the determinism that a well-formulated dichotomous framework can bring to our understanding of our world and thereby simplify decision-making. Classic examples are "pairs of opposites" such as living and non-living, plant and animal, night and day, likes and dislikes and so on. However, we would like to emphasize that we do not wish to imply a similar (irreconcilable) dichotomy in the case of tacit and explicit knowledge. Rather, we concur with the idea of a continuum of knowledge enunciated by Nonaka and von Krogh (2009) wherein tacit and explicit knowledge are "mutually complementary," and not objectively separate and mutually exclusive as may be implied by a dichotomous view. Their view that the ongoing dynamic interaction between the two types of knowledge eventually results in knowledge creation provides a valuable conceptual framework for teachers to retrospectively analyze and prospectively plan their academic activities.

Another point that needs to be noted is that the work of Nonaka and Takeuchi as summarized by Stillwell (2003) indicates that a collectivist organizational framework is an underlying assumption in those studies and theorizations. In such a system, the very first process envisaged is socialization wherein "each person's tacit knowledge is converted to tacit knowledge now also held by other members in the microcommunity." This is followed by externalization, combination and eventual internalization by other members of the community. The final objective in this context is that the knowledge and proficiency levels be harmonized to the extent possible across the organization. This can, to a great extent, mirror some successful academic processes, such as building a collaborative research team and also carrying out 'normal science' at an individual level. However, we feel it does not adequately represent the disproportionate contributions that specific individuals and their insights in often improbable circumstances have historically brought to the process of knowledge creation and innovation resulting in 'revolutionary science' (see "The Narrative Fallacy and the Educator").

Ours therefore is a case for viewing science education as not only a science, but also an art with potentially as many styles as practitioners. Polanyi's idea of tacit knowledge is a useful concept that *can* vitally and creatively inform our pedagogical efforts, but internalization and expression are highly dependent on the abilities and interests that faculty members bring to their task beyond meeting the essential objective qualifications for their

positions. And, just as in art, while proficiency in a variety of pedagogical techniques is a useful, even necessary requirement, it is by no means a sufficient one.

AUTHOR CONTRIBUTIONS

RS conceptualized this work, collected references, analyzed information and wrote the article.

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“The Rules of Engagement”: Student Engagement and Motivation to Improve the Quality of Undergraduate Learning

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Studying at university continues to grow in popularity and the modern-day university has expanded considerably to meet this need. Invariably as such expansion occurs pressures arise on a range of quality enhancement processes. This may have serious implications for the continued delivery of high quality learning experiences that both meet the expectations of incoming students and are appropriate to their postgraduation aspirations. Ensuring students become active partners in their learning will encourage them to engage with a range of quality enhancement processes. The aim of the current work is to examine the various factors that motivate students to engage in such a fashion. Three focus groups were carried out in a stratified manner to ascertain student motivations and to triangulate an effective set of recommendations for subsequent practice. The participants consisted of engaged and non-engaged first year undergraduate students as well as student-facing staff who were asked to comment on their experiences as to why students would want to engage as a course representative. Nominal group technique was applied to the emerging thematic data in each group. Three key motivational themes emerged that overlapped across all focus groups i.e., a need for individual representation that makes a change, a desire to develop a professional skillset as well as a desire to gain a better understanding of their course of study. A university that aligns its student experience along these themes is likely to facilitate student representation. As is standard practice recommendations for future work are described alongside a discussion of the limitations.

Keywords: students, quality, nominal group technique, focus groups, higher education

INTRODUCTION

A considerable body of evidence now exists supporting the range of advantageous outcomes that engaging with Higher Education (HE) has at both the level of state and individual (Bloom et al., 2006; King and Ritchie, 2013; Holmes and Mayhew, 2016). Indeed, a positive relationship has been revealed between HE and a higher level of earnings (Walker and Zhu, 2013), increased

employability skills (Mason et al., 2009; Towl and Senior, 2010) as well as engagement in civic behaviors such as voting (Dee, 2004). Graduates are also less likely to engage in criminal activity (Sabates, 2008). In light of these clear benefits it is perhaps unsurprising that the global HE sector remains vibrant with more and more people applying to study at HE than ever before (Altbach et al., 2009 see also Burgess et al., 2018).

The significant benefits associated with successfully graduating from a programme of study in HE has invariably seen a rise in the numbers of people wanting to take part in such learning (Walker and Zhu, 2008). Indeed, across the global HE sector the number of student enrolments have been increasing and show growth from 13.8% in 1990 to 29% in 2010 (Varghese, 2013). To accommodate the increase in student applications institutions have had to change their organizational practice to ensure that they remain appealing to a wider and more diverse pool of applicants (see e.g., Trow, 2000). The rate of such expansion in the HE sector has led some scholars to describe it as “massification” which is a sociological term used to describe the process by which a particular concept is adopted into mainstream culture (Scott, 1995). The significance of this massification philosophy is such that the current global HE sector has changed so much over the last decade that it is almost unrecognizable (Teichler, 1998; Guri-Rosenblit et al., 2007). However the almost constant expansion on key stakeholder roles within HE are invariably starting to reveal some negative effects (Pechar and Park, 2017). As universities grow in size and complexity it is likely that this will place a strain on the quality of the provision (Lomas and Tomlinson, 2000; Lomas, 2002) which may in turn have an adverse effect on the levels of student engagement (Bryson and Hand, 2007). One way to potentially ameliorate such adverse effects is to ensure that the design and delivery of effective pedagogy be informed by the student experience or what has been termed the “student voice” (DeFur and Korinek, 2010).

The potential impact that massification may have on student engagement is not trivial as the drive for an ever-growing HE provision catering for an ever-growing cohort can only successfully occur if students are placed at the very heart of its quality (Hodson and Thomas, 2003). Placing students at the heart of quality processes ensures that the HE sector has both the ability to expand as well as meet the expectations of the students that it serves (Brown and Burdsal, 2012; Senior et al., 2014). By engaging students at the very core of the delivery of their programmes it may also be possible to drive effective learning. Students who feel that they are embedded within the activities of an academic department feel more aligned to their professional identity and subsequently start to develop effective learning strategies that facilitate the emergence of such an identity (Towl and Senior, 2010; Senior and Howard, 2014; Tissington and Senior, 2017 see also Carey, 2013).

From an organizational perspective the need to ensure that effective mechanisms for quality governance are in place has never been more important. Despite the traditionally established balances of rewarding research output more than teaching performance, academic staff are seeing more and more of their time being spent on teaching activities (Young, 2006; Winstone,

2017). This has not only resulted in an increase in teaching staff who may lack the appropriate qualifications, but has also driven a significant increase in dissatisfaction within the professoriate who tend to regard their professional identity as being more aligned to their research activities (Smeby, 2003). Indeed there is an emerging literature focusing on the effects that such shifts in professional identity may have on the detriment of quality throughout HE (Bathmaker, 2003; Beblavý et al., 2015).

However such significant sectoral growth ensures that the development of effective quality governance structures is complex. Today's universities are more akin to the pluralistic complexity of the so-called “multiversity” (Kerr, 2001). An organizational structure that can best be imagined as an entity consisting of a central steering core with many semi-autonomous and interlocking research programmes that in turn inform the delivery of a large-scale teaching portfolio. A casual observer to any of the key HE institutions in the developed world will readily see that Kerr's model for a pluralistic multiversity is very much the dominant design.

In light of the significant organizational complexity that is evident within a contemporary university we have previously argued the need for significant change to the governance structures that will allow for the development of innovation (Knight and Senior, 2017). This new model would see the development of a common steering core consisting of academic members of staff, professional administrators *working alongside* student-stakeholders. The members of this common steering core would be allowed the opportunity to develop professional skills in management as well have protected time to reflect on how best to innovate effective delivery.

For such governance structure to succeed it would be necessary for all members to be motivated to engage with the various processes. It goes without saying that academic administrators would be the most motivated stakeholder group here and linking reputational advantages to a positive student learning experience could act as an extrinsic motivator for members of academic staff (Meyer and Evans, 2005). However, it is not known what motivations, if any, engender student participation within the full range of quality governance processes (see e.g., Ross et al., 2016). While it could indeed be argued that the opportunity to develop a set of professional skills that would be acquired when contributing to the quality of any academic programme is important, it has yet to be seen whether or not this is a sufficient mechanism for students to fully engage with the governance process.

Addressing the problem of facilitating student engagement is both fundamental to the success of a university and is at the core of a critical pedagogy that seeks to promote effective learning via the process of democratic engagement, mutual dialogue and cooperative working (Shor and Freire, 1987). At the heart of effective critical pedagogy is the importance of students being active partners of their learning rather than simply absorbing the information that they are given (Freire, 2000). To achieve this, students are encouraged to think critically about what they are taught and to challenge these views which in turn will enable them to make subsequent changes to their learning (Cole et al., 2014).

Taking in hand such Friirian logic it is clear that universities should develop effective strategies that facilitate student engagement. But how does an ever-expanding university continue to deliver on its underlying service imperative to provide excellence in teaching while also developing mechanisms to encourage students to be more involved in the management of such excellence? There is no doubt that what might be called “the student voice” is fundamental to effective governance in the modern-day university (Senior et al., 2014). The pertinent question is *how* do universities develop an effective relationship with students to ensure that they become partners in quality governance and have their voice heard?

That said, there have been some approaches to empower students to participate more often and more readily in the various organizational processes that are part and parcel of a mainstream university. Allowing students to participate fully in the ongoing research activities of academic staff is an effective means to develop a sense of community in the student cohort (Towl and Senior, 2010). This is in line with the Humboldtian tradition of HE that sees both student and academic staff members working together for advancement of scientific understanding (Pritchard, 2004). Engaging with ongoing research activity may be one way to develop a sense of a professional community with the student cohort, and this in turn may motivate students to engage further with the on-going governance processes at a university (Tissington and Senior, 2017). However, despite being an effective means to engender the experience of a learning community at the departmental level it is still not known if research activity (or indeed any other kind of potentially relevant activity) is effective in driving sustained student engagement in the wider remit of quality assurance.

Research Aims

There are two main aims to the current research. First, to examine the various motivational factors that may facilitate student engagement. The qualitative nature of the current research will ensure the generation of theory and contribute to an emerging framework that offers a more complete understanding of undergraduate student aspirations. The second is to apply the established qualitative approach of the Nominal Group Technique (NGT; see methods section for a detailed discussion on this technique) to examine student expectations around engagement of the quality provision of their delivery of their programme of study. It is hoped that the application of this technique to examine the psychology of student engagement will lead to the formation of a wider understanding of this crucial, but often overlooked aspect of HE pedagogy.

METHODS

Participants

So as to ensure that the full range of student expectations and attitudes toward engagement were captured the focus groups consisted of (a) students who self-identified as being highly engaged with the role of quality enhancement within their

respective courses e.g., an active course representative¹, as well as (b) a group of age matched students who self-identified as being non-engaged with the quality enhancement processes and finally (c) a group of student-facing academic staff. Here participants from the academic staff population were recruited via opportunity sampling from a cohort of ~100 members of staff who indicated that they spent more than 70% of their time interacting with students in a support capacity i.e., teaching fellows etc.

In order to ensure that each of the two student-based focus groups consisted of participants who strongly identified as being engaged or non-engaged recruitment was carried out via the institutional student union (SU) organization. The SU manages all aspects of the recruitment and training of local course representatives and as such we could be sure that the two student cohorts were clearly operationalized as consisting of “engaged” and “non-engaged” individuals.

The age of the participants in each of the two student-led focus groups ranged between 18 and 23 years. The three focus groups consisted of mainly female participants apart from one male participant who identified himself as being a highly-engaged student with the quality processes and attended the appropriate focus group (group a). All of the students were enrolled in the first year of a Psychology undergraduate degree programme.

Procedure

Three focus groups, each lasting approximately an hour were conducted with 5–8 participants. Each of the focus groups were carried out in a medium-sized university in the West Midlands, UK. Prior to engaging with a focus group each participant was informed of their rights to confidentiality and to withdraw at any point. The student participants were also informed that participation (or indeed subsequent withdrawal) would not have any impact in any academic assessments. Participants were also provided with an opportunity to ask any questions prior to the initiation of the protocol.

In this institution there is a relatively low level of student engagement with ~160 of a total 600 (27%) student volunteers being trained to become a course representative within the academic year of 2016/17. This is against a regional average of 558 out of 600 students (93%) being recruited in a comparator institution of equivalent size in the same area².

All procedures reported here were approved by the local institutional review board and as noted above all participants provided written consent prior to taking part in the focus groups³. The sample size was deemed appropriate for the current study as it was consistent with the critical realist assumptions that underpin this study (Parker, 1992) and with existing work in the field (e.g., Sims-Schouten et al., 2007) as well as studies that have utilized NGT (Lloyd-Jones et al., 1999). Each focus group was carried out in a dedicated room at the same time of day and, to minimize social desirability effects, were led by one of the authors

¹Engagement as a student course representative is more often than not a voluntary activity so by recruiting these individuals in the present study we can be sure that they strongly identify as being an engaged in supporting learning quality.

²Personal communication 29/06/2017

³Application reference 100316/02

who had not had any contact with any of the participants prior to the data collection and was not identifiable as a member of academic staff by the participants (AS).

Nominal Group Technique (NGT)

Originally developed in 1975, NGT is a structured alternative for facilitating small group discussions in order to achieve a consensus or plan a set of activities (see e.g., Van de Ven and Delbecq, 1974; Claxton et al., 1980; Horton, 1980). It has previously been used to examine a range of HE related questions including examination of the undergraduate student experiences and expectations (O'Neil and Jackson, 1983; Chapple and Murphy, 1996; Williams et al., 2006) and more recently been used to examine effective curriculum design in HE (Abdullah and Islam, 2011; Foth et al., 2016). Indeed, the ease in which NGT protocols can be carried out is likely to be the main factor in driving its uptake within pedagogic research (see e.g., Al-Samarraie and Hurmuzan, 2018).

NGT is also considered to be a more efficient means of analysing focus group data compared to more conventional qualitative techniques (Gallagher et al., 1993; Varga-Atkins et al., 2017). Due to the discursive and democratic nature of the NGT technique participation creates an effective balance between a friendly environment and the group members staying focused on the task at hand (Gallagher et al., 1993). In comparison to other qualitative research techniques such as participant observation or in-depth interviews, NGT diminishes facilitator bias within data collection. Participants occupy an active role within the research, rather than analytic themes or discourses being imposed upon them. It is also extremely time efficient as most sessions are completed within an hour to an hour and a half and the central methodological principle of this technique is that analysis is carried out in a democratically-decided fashion by the focus group participants within the session itself, where most other

methods require additional analysis via transcription etc. (Boddy, 2012).

As noted above when compared to the traditional focus group technique, NGT uses a more structured format to allow participants to analyze problems and arrive at solutions in a democratic manner (see Bailey, 2014; Patterson et al., 2017). It also avoids overly directive questions from a facilitator or topic guide that makes *a priori* assumptions about the importance of specific topics by raising them as questions. To achieve this, participants within each of the focus groups were presented with a single nominal prompt that was written down on a white board in the room, i.e., "What are the driving factors of student engagement in the quality enhancement of programmes?" They were guided through their understanding of a particular prompt in a step-by-step process which began with the participants being given 10 min to write down their ideas in response to the prompt (See **Table 1**). The facilitator then invited each of the participants to provide the rest of the group with their responses, which were recorded by the facilitator on the white board. This process allows each group member the chance to participate equally and indeed the facilitator plays a crucial role here by ensuring that each group member has an equal opportunity to contribute to the discussion in a "round-robin" fashion. After this stage, the facilitator then initiated the voting stage, which involved asking each participant to rank the importance of each of the responses on the board. At this stage a shortlist of the most appropriate and relevant answers to the prompt are developed on the board. This process is carried out by collating and removing any duplications. Participants were then asked to pick their top five as an individual. These ranking scores (a score of five for the highest ranked, and 1 for the lowest) are then collated by the facilitator while the participants have a short break. These collated scores are then added on to the white board and the pattern of voting discussed. This democratically driven process continued until the list could not be reduced any

TABLE 1 | Summary of each of the stages of the NGT protocol that were carried out in each of the three focus groups.

Step	Mins	Activity
1. Greetings and scene setting	5	Group members were greeted and any questions they had about the nature of the activity were addressed. Consenting carried out here.
2. The nominal question is posed	10	The nominal question was presented to all participants and each had an opportunity to clarify their understanding of it.
3. Brain Storming	10	Participants brainstormed all possible ideas and recorded all ideas on sticky notes. This stage was completed silently by each participant.
4. Sharing of ideas	10	Each participant was then invited to share their ideas to the rest of the group by the facilitator who recorded each on the white board.
5. Clarification and Clustering of ideas	10	Each statement was read out by the facilitator and participants were invited to question/interrogate any of the statements. If the group felt that statements recurred then redundant statements were removed.
6. Prioritization	5	Each of the participants were asked to prioritize the remaining statements in silence and then the facilitator records each statement on the white board.
7. Voting	5	The facilitator then secured the agreement of each participant with regards to the relative rank of importance to each of the remaining statements.
8. Ranking and Agreement	5	The facilitator then ensured that each of the participants agreed with the final ranking of each of the statements including the ranking of the top three statements.

The approximate duration in minutes each step took and the key activities that were completed in each of the steps are also detailed. Throughout all stages of the process one facilitator engages with the participants and the final data are derived by the participants themselves with no need for subsequent transcription.

further and all participants agreed that the responses were ranked in order of importance.

RESULTS

As can be seen from **Table 2** below a comparison of the top three themes revealed a partial overlap with some of the themes being revealed by each of the three groups. Consideration of the complete range of themes that were revealed within each of the groups also revealed overlap (see **Tables 3–5** below).

DISCUSSION

The aim of the current study was to examine the range of student motivations that facilitate their engagement with the quality assurance processes of their respective programme of study. To achieve this a qualitative approach using NGT was carried out. As is shown on **Table 2** the ranking of the top three themes across each of the three focus groups revealed some overlap with regards to the motivations for engagement. The main drivers for engagement as revealed here can be grouped together as (a) giving oneself a voice, (b) improving learning and then finally (c) professional development. The importance of each of these three themes are each discussed in turn.

Considering the engaged student's, it is perhaps unsurprising that they ranked the opportunity to represent their opinions as the most important factor driving their engagement. Such expression is, after all, the reason for such engagement in the first place. The motivational aspect of this tends to be associated around the development of a clear student identity (McKenna, 2004). For example, in earlier work we found that the psychology of student group formation is such that individuals tend to engage in various social encounters but are unaware they are using these exchanges to reinforce their professional identity (Senior et al., 2012; Senior and Howard, 2014). It may be the case that the act of engagement in various governance committees consolidates their identity at the nexus of academic literacy and professional identity. The finding that the engaged students ranked the opportunity to develop a professional identity higher than the non-engaged students further supports the importance of identity formation in effective learning (See e.g., Senior and Howard, 2014). Additionally, undergraduate students whose professional identities were associated with high academic responsibility are also more likely to express plans to continue their education beyond undergraduate study (Burke and Reitzes, 1981).

The themes that were revealed from the staff focus groups also informed an understanding of the students' desire to develop a representative voice throughout their time at university. Here, the student data were elaborated upon by the staff perspectives. The teaching staff also considered the development of a student voice to be an important driver of engagement. However, they also considered anger as the prime emotion driving such engagement. There has indeed been some work highlighting the need for teachers to be more attuned to their student's emotional state, especially since a positive staff-student relationship leads to an increase in student satisfaction and has a beneficial effect on the retention and performance of students (Thomas, 2002; Rhodes and Nevill, 2004). But there remains a surprising paucity of literature on the effects that negative emotions may have on the student experience. What could be driving the feeling of anger in the modern day student population? (see also Hargreaves, 2000).

As described above there is no doubt that the HE environment has changed considerably over the last 10 years and the modern-day university now places a consumerist ideology at its core (Bok, 2009; Brooks et al., 2016). Within such an ideology, where students are regarded as the key consumer and effective learning the key product, it is legitimate to assume that the measurement of student satisfaction would be straightforward; however this is far from the case (Senior et al., 2017). Yet despite the rapid rise of academic consumerism there remains an issue with regards to the expectations of the students (Riesman, 1980; James, 2002) and in some cases there is a significant disconnection between institutional aspirations and the experiences of the student body (Tomlinson, 2017). In some of these instances students are frustrated with their learning experience as it failed to meet their expectations of a programme of effective study (Nixon et al., 2016). Here the student voice is one of frustration and it is likely that student facing staff (such as the Teaching Fellows who participated in the third focus group) would regularly experience such ire (Finch et al., 2015). It needs to be borne in mind that the nature of the current protocol was such that while student anger was indeed perceived to be a possible intrinsic motivator for student engagement further work needs to confirm the factors that lay behind such anger.

The academic benefits of participation in quality enhancement meetings were rated as the second top ranked theme by the engaged students. While the non-engaged students did not consider the opportunity to develop a better educational experience as important they did rank the ability to develop professional skills in general and leadership skills specifically in the top three themes. The engaged students ranked professional development as number three in the ranks. This spread of

TABLE 2 | The top three ranked themes which resulted from the engaged and non-engaged student focus groups as well as the student-facing staff focus group.

	Engaged	Non-engaged	Staff
1	Giving oneself a voice	Professional development through CV enhancement, being proactive	Perceived benefits of engaging
2	Gaining a better educational experience	Giving oneself a voice	Awareness of opportunity for engagement
3	Professional development	Leadership and skill development	Feelings of anger, a need for change

TABLE 3 | The emergent themes and votes for the engaged students.

Votes	Theme
18	Giving oneself a voice
15	Gaining a better educational experience
15	Professional development
10	Gaining an understanding of how the university works
9	Having an active rather than passive attitude, the desire to create change
0	A good way for people to meet on the course

TABLE 4 | The emergent themes and votes for the non-engaged students.

Votes	Theme
23	Professional development through CV enhancement, being proactive
15	Giving oneself a voice
8	Leadership and skill development
6	Increasing the value for money spent on university
5	Increasing the enjoyment of the course
5	Getting the most of the course
5	Gaining confidence in oneself
4	Helping others
4	The opportunity to network with others
4	Dissatisfaction with the course
0	Enjoying the course
0	Gaining insight from the lecturers perspective
0	The motivation to use time productively
0	Better academic grades

ranks and the identification of specific skills by the non-engaged students does show how highly the need to develop a professional skillset is considered by the wider student cohort.

It tends to be common institutional practice to encourage students to engage with the quality management processes by highlighting the benefit to their professional skillset and the current data do show that this is an effective strategy to some extent. The perceived importance of this skillset is also clearly indicated by the top ranked theme from the staff focus group (see **Table 5**). The data also show the lack of importance that the non-engaged students place on the development of the overall learning experience compared to the professional skill-set. The non-engaged students not only considered a professional skill-set as the most important reason for engaging, but these students also considered the opportunity to develop leadership skills as the third ranked reason for engagement. This particular student group considers the elements of the professional and transferable skillset to be separate entities and judge each of these separate entities as important on its own merits. In light of the fact that the non-engaged students considered the acquisition of such skills to be so important it may be that institutions could see immense dividends returned by clearly framing student engagement as a means to easily acquire such skills.

TABLE 5 | The emergent themes and votes for the student facing staff.

Votes	Theme
32	Perceived benefits of engaging
23	Awareness of opportunity for quality enhancement, encouragement from the staff
19	Feelings of anger, a need for change
17	CV enhancement
17	The perception of staff receptiveness to feedback
9	The belief that one can make a difference
8	Enthusiasm for the course
6	Developing a sense of professionalism
6	Conscientiousness
5	Time
0	Ranking on league tables
0	Social influence (peers)
0	Best value for money
0	Vocational course
0	Sense of responsibility to self and others
0	Printing credits as an incentive
0	Evidence of feedback making a difference

On considering the rest of the ranked themes that were revealed in the data from the non-engaged students it is clear that the development of a professional skillset is one of the things that they consider to be a positive aspect of engaging with the quality management of their programmes. Indeed, aspects such as the opportunity to develop confidence in oneself, the ability to help others as well as the opportunity to network with others students on the programme are all diagnostic of the need to develop a wide professional and transferable skill set. The depth of detail revealed by the non-engaged students compared to the dearth of detail revealed by the engaged students again highlights the perceived need by the non-engaged students to develop this skillset in their wider learning (Kavanagh and Drennan, 2008). That the students in these groups considered the importance of the development of the professional skill differently is worthy of consideration especially as the development of such a skill-set is starting to be used by institutional managers to encourage students to engage in this manner (Crebert et al., 2004). Highlighting the importance of leadership development as well as the more generic professional skill-set may therefore be beneficial for encouraging engagement in this way.

It is worth noting that both the student groups considered the positive aspects of being actively involved in various management structures and how such involvement would support their ability to enact change e.g., “giving oneself a voice” (Engaged students 18 votes vs. Non engaged 15 votes). In the staff focus group the importance of this skill did emerge and was reported as “social influence (peers)” but received no votes in the final ranking stage. As the non-engaged students also considered the ‘the opportunity to network with others’ as a possible motivational factor (albeit with four votes) this does show that the wider student body may be motivated by their peers to affect change but do not engage as a means of meeting other students

socially. Previous research has suggested the importance of peer relationships in academic performance (Smith and Peterson, 2007) and social ties in an academic context have been shown to positively influence academic performance, generally through motivation as well as the exchange of knowledge and ideas (Smith and Peterson, 2007; Senior and Howard, 2014). It may be the case that the engaged students feel more empowered by their peers to affect a change compared to their non-engaged counterparts.

Worthy of note is the theme of “conscientiousness” that was raised and voted highly by the staff group which shows that staff perceived it to be a more important factor than both the student groups. While previous work does show a strong relationship between a conscientious personality and learning performance the current findings suggest that engaging within quality assurance processes may not (Colquitt and Simmering, 1998). Within the engagers and staff groups, it could be seen that a fair amount of importance was given to the concept of one’s own positive attitude as a motivation for engagement. However, it was perceived as significantly less important by the non-engaged group, which perhaps reflects their views on personal responsibility toward motivating oneself to be more engaged.

As can be seen across the various tables above, the majority of themes that secured a rank overlapped across the groups. By carrying out such a triangulatory analysis that involved the three different levels of focus groups it was possible to develop a better understanding of what motivates students to engage with the quality enhancement mechanisms of their specific programme of study. The application of NGT allowed for a detailed analysis of the various expectations to be developed in timely fashion without the need for the interpretation of extensive transcripts. Moreover, as the analysis of the various themes were carried out in a democratic and discursive fashion the members of each of the focus groups could develop ownership of each of the themes which in turn ensured that each of the focus group members were sure of their relevance. The presence of the staff perspective enabled a comprehensive overview of the full range of factors facilitating engagement to be developed.

Despite the unique nature of the current research, the findings should be borne in mind alongside some limitations. Take for example the emerging literature highlighting the role of culture and student engagement (e.g., Zhao et al., 2005). Bearing in mind the fact that the student participants in the current research identified as belonging to two main different cultural groups i.e., white British and east Asian the numbers of participants were too low to enable a cultural comparison to be carried out. Replication of the current paradigm with a larger and more diverse group of participants would therefore be useful. A further limitation to note is that the current research made no inferences to distance

learners who may be engaging with their studies online (Chen et al., 2010). The steady increase in online delivery across the global HE sector ensures that more work needs to be carried out examining the means by which this unique student cohort can be engaged.

Future work should also be carried out to ensure a cross-institutional comparison between the expectations of a student cohort in both an institute with a profile of high engagement compared to a profile of low engagement. Work that examines how the motivational aspects of student engagement can be used to drive subsequent student representation should clearly be carried out. While, student engagement in quality processes is clearly a complex and multifaceted issue, use of NGT proved to be an efficient and effective means of unpicking elements of this complexity. The findings presented above provide a firm foundation and serve to inform a fuller understanding of the processes by which students can start to become more engaged in their learning and the quality processes that surround it. This is an important first step toward engaging students fully as partners in their learning.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Research Activity and the New Pedagogy: Why Carrying Out Research Is Essential for Effective Learning

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The modern-day university is a thoroughly complex affair that comprises of numerous interlocking research activities that inform the delivery of an equally complex portfolio of learning programs (Kerr, 1963; Krücken et al., 2007). This contemporary model of a university is a far cry from university education envisioned by the noted educational philosopher Cardinal John Henry Newman¹. In his seminal paper on the nature and purposes of a University, Newman was clear that a university should be a place where students would acquire a liberal education that would enable them to graduate and to "... see things as they are, to go right to the point, to disentangle a skein of thought to detect what is sophistical and to discard what is irrelevant." (Newman and Svaglic, 1982, p. 6). Although, Newman's philosophy is at the heart of universities across the globe, the day-to-day reality of delivering his core principles within the context of a modern-day university is such that a casual observer might not see how a graduate should be able to develop the skills that Newman originally espoused. However, here we argue that by engaging students at the very heart of the research activity that is regularly carried out in a contemporary university it is indeed possible for Newman's original vision to be realized.

That said, it is worth considering Newman's philosophy in the context of the period when there were very few universities, mostly of ancient origins, and were dedicated to the education of elite "gentlemen." The curriculum was a loosely structured experience of academic teaching that centered on political debate, religious knowledge, and physical pursuits (de Ridder-Symoens, 1996). From the 1850s influenced by Newman and others, in the UK a small number of civic universities was created following the examples in the UK of Durham, Manchester, and London where students were prepared for their role in the world with science, engineering, and politics appearing on the curriculum. The relevance to the world of work was more clearly aligned with Newman's original ideals with preparation for employment being delivered via critical thinking rather than professional knowledge.

Following the Second World War, universities widened their recruitment pool and grew as a more egalitarian world was sought. There was a wider remit and a sense of state funded paternalism where students were the grateful recipients of whatever learning experience the university's academics considered appropriate. Later there was a movement toward collectivist ideals of the 1960s where universities were seen by activists and some academics as being democratic communities of learning where students and staff had an equal role. In some ways, these ideas were the basis of widening participation in the 80s and 90s culminating for example in

¹ See John Henry Newman's seminal essay "The Idea of a University" (1852) for his liberal ideal of a university.

the UK with ambitious aims for university attendance of 50% (Smithers, 2001). It was at this time when the emergence of the specialist teaching university started to emerge where the onus was on the completion of effective learning by students and not so much on the creation of knowledge through research.

The gradual evolution of the global HE sector into a two-part system can now be seen with the emergence of groups such as the Ivy League system in the US, the Russell Group in the UK and the Group of Eight in Australia. These groups consist of universities that claim to be leading in research excellence in a particular area (see e.g., Williams et al., 2007). Reputationally it makes perfect sense to be considered as a research active university than a teaching active university (Wuchty et al., 2007). Most of the professoriate consider their professional identity to be more aligned toward their research activity than to teaching (Harris, 2005). There is also a greater opportunity to secure more institutional funding. Indeed, financial support in the form of private endowments for institutes such as Harvard and Yale Universities in the US are substantial².

That said, even these research intensive universities are sensitive to the vagaries of market forces that would shape the delivery of their core product—i.e., excellence in a researchinformed learning experience. Thus in light of ever-growing market complexity it remains to be seen whether or not the provision of research informed teaching and indeed research as an activity is still the *raison de etre* in the modern university. It may come as a surprise to many that the inclusion of research activities within the portfolio of a university was not the main driver for their creation. Newman was clear in his disdain for research in his early writings and initially saw research activity as being completely distinct from an effective university education. Indeed, he was clear in the role that research activity had in the development of a University e.g., *“Intellectual training was the primary duty of a university. Research is not training, but rather it is philosophical or scientific discovery or “advancement”... if its object were scientific and philosophical discovery, I do not see why a University should have students”* (Newman and Svaglic, 1982, p. 1).

The separation of research and teaching activities is clearly not in the market interests of a modern-day university. Here we argue that a university should not only facilitate the various research activities of the professoriate, but that the role of the student should be placed firmly at the center of such activities.

Notwithstanding Newman's early concerns on the separation of research and teaching, there is a significant benefit to be had with the research *activity* itself (Hathaway et al., 2002). Scholars who are engaged in the activity of scientific discovery are in general at the forefront of scientific thinking to ensure that they can address a specific research question (Jones and Moreland, 2003). These individuals tend to be flexible minded and open to feedback and by its very nature they are used to the experience

of failure which quite paradoxically drives innovation and an enterprising mind-set (Cope, 2011). Clearly, the modern-day undergraduate would have much to benefit by spending time with such individuals. Yet this is not a one-sided relationship with the students developing a unique transferable skill set by being embedded within a research culture. The researchers themselves would benefit from the exposure to the constant inquiry that arose by carrying out their activities alongside students which would ingrain a collaborative research culture into the notion of the scholarly community (Shulman, 1993).

In our earlier work we have also found that students expected to be part of the research culture of the university and report the experience of working side-by-side with a member of the professoriate as one of key experiences of a university education (Towl and Senior, 2010). Here, they regarded research activity as being a fundamental aspect of the university experience. Moreover, the expectation to be trained in contemporary research techniques and the development of a sense of community development was the key extrinsic motivator for participation. The importance of taking part in research activity was first highlighted by in the 1998 report commissioned by the Carnegie Foundation for the Advancement of Teaching in the United States of America. For universities to deliver a truly authentic learning universities would need *“...to be able to give their students a dimension of experience and capability they cannot get in any other setting...”* (Boyer, 1996, p. 27). Boyer showed that learning would be best facilitated by a culture based on discovery that was guided by mentoring rather than solely on the traditional didactic transmission of information. Unfortunately the presence of such research based partnerships between the professoriate and student is not the current orthodoxy—a situation that led to noted Nobel Laureates decrying the separation of active research experience from the student cohort (Hubel, 2009). Placing research activity at the very heart of student culture could be a relatively straightforward way to ensure that the modern day undergraduate student benefits from focused mentoring.

In considering the above, there is clearly a need for institutional managers to facilitate research activity as well as encourage students to participate fully with such activities. However, there is a secondary benefit that students can acquire via participation in research activity that is now discussed. This will inform a complete understanding of the role that research activity plays as an effective learning process within higher education and further place Newman's core ideals of enabling students to detect sophistry in any argument firmly at the center of all contemporary university activity.

Research activity requires a unique set of professional skills that ultimately benefit the student in the post-graduation workplace. These transferable skills, such as project management and team skills, are vital for effective employment and make an excellent contribution to the professional skillset that undergraduate students expect to develop within HE (Senior et al., 2014). And yet there is only sporadic effort at best to ensure that all students have the opportunity to experience research activity.

²Harvard University has an endowment fund which by 2016 was worth \$35 Billion: http://www.hmc.harvard.edu/docs/Final_Annual_Report_2016.pdf which places it ahead in wealth of countries such as Gibraltar (\$1.8 Billion) the Seychelles (2.5 Billion) and even Nicaragua (33.5 Billion) Source: The CIA Factbook: <https://www.cia.gov/library/publications/the-world-factbook/>.

Effective research activity is rarely carried out in isolation so much so that it has now become the norm for the best quality research to be carried out in teams (Tissington and Senior, 2013). The tacit skill set that is developed is something that is eminently transferable into the world of work. However, it is rare for students to be provided with a framework to operate to when working in groups and standard pedagogic practice to develop team skills such as group assignments are seen as learning by doing and not reflective. Participation in research activity is one way in which the development of reflective team skills can be embedded within the curriculum³.

These “Non-Technical Skills” are regarded as being crucial for professional teams across professions and in extreme environments such as aviation and operating theaters is regarded as crucial (Salas et al., 2013). However as they might be referred to in universities as being “non-academic skills” there is a risk that they are perceived as being of less value by the students. However, by incorporating research activity into the curriculum students will benefit from by developing both technical and non-technical skills. The advantage of such an approach is that the development of team skills is broadly similar regardless of the activity that the student undergoes and that the students are not aware that developing this important skillset (Senior and Howard, 2014). The critical element to ensure effective learning is that students are actively encouraged to participate in research activity throughout the course of their learning.

Research activity provides a valid opportunity for the learning of team skills and by providing learning about the evidence

base for teams (e.g., West, 2012), students will discover ways of working to avoid pitfalls of teamworking frequently experienced in the workplace. Our recommendation is for students to have development sessions to foster team skills before and during these research projects. But we specify that this training would be based on firm evidence so (inter alia) students could learn classic findings such as groupthink (Janis, 1971) as well as recent evidence about conflict (De Dreu and Weingart, 2003), the prerequisites for “real teams” (Lyubovnikova et al., 2015) and how to avoid social loafing (van Dick et al., 2009). In this way, students would see the value of the application of research to their practice as well as learning concepts of teamworking which would then be applied in team based research projects.

These are important transferable skills that students expect to acquire with a university education. However, this is not the sole benefit for engaging with research activity. As is described above those students who engage with research activity also experience a greater degree of affiliation with their professoriate and engagement with their studies (Towl and Senior, 2010). These are the core skills that will ultimately ensure that the student will be able to detect sophistry and focus on what is relevant to ensuring success at university and in their careers—whatever these may be.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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The Influence of Field Teaching Practice on Pre-service Teachers' Professional Identity: A Mixed Methods Study

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The current study used mixed methods to research pre-service teachers' professional identity. Ninety-eight pre-service teachers were investigated and twelve teachers were interviewed in China. The results were as follows: (1) The results of quantitative data showed that compared with before the field teaching practice, pre-service teachers' professional identity increased after the field teaching practice—specifically, intrinsic value identity increased, and extrinsic value identity did not significantly change; (2) The results of qualitative data validated and elaborated the results of quantitative data in more detail with regard to changes in professional identity. Specifically, compared with before the field teaching practice, intrinsic value identity including work content, work pattern, etc., increased and extrinsic value identity including work environment, income, and social status, etc., did not significantly change after experiencing teaching practice; (3) The results of qualitative data also showed that mentor support at field school promoted the development of pre-service teachers' professional identity. Moreover, the development of pre-service teachers' professional identity during field teaching practice further promoted their professional commitment; that is, it promoted their emotional evaluation and belief in the teaching profession. The study discussed these results and proposed solutions and suggestions for future studies.

Keywords: field teaching practice, internship, pre-service teacher, professional identity, mentor support, professional development

INTRODUCTION

Teachers' Professional Identity

Teachers' professional identity is an important research field. It is a core element of teachers' professional lives, and also a "resource that people use to explain, justify, and make sense of themselves in relation to others, and to the world at large" (MacLure, 1993, p. 311). Teachers' professional identity has a widespread effect on a teachers' teaching, professional development, and staying in the teaching profession, etc., and influences individual teaching effects by affecting their concrete behaviors in the process of teaching (Korthagen, 2004). Teachers' short- and long-term decisions about curriculum design, pedagogy, assessment, and student learning are limited by their understanding of their teacher identity (Mockler, 2011). Sammons et al. (2007) conducted a study with a large-scale, longitudinal research in England. The results found a relationship between

aspects of teachers' professional identity and pupils' attainments in English and mathematics. Zhang et al. (2016) conducted a study with pre-service teachers in the stage of teacher education. The results showed pre-service teachers' professional identity influenced program performance by affecting their task value belief and extrinsic learning motivation. Moore and Hofman (1988) found that teachers with lower professional identity easily perceived lower work satisfaction and higher work stress, and teachers with higher professional identity were more likely to overcome the dissatisfaction with harsh working conditions. Moore and Hofman (1988) and Gaziel (1995) found professional identity related to intentions to leave the teaching profession. Furthermore, the influence of professional identity on the development of teaching practice received more attention in the research. Bullough and Gitlin (2001) also emphasized that the crucial role of professional identity in the stage of the teaching practice should be paid attention to.

However, scholars have different definitions for teachers' professional identity. Some researchers defined teachers' professional identity from the perspective of self or self-concept. For example, Kelchtermans (2000) argued that the teaching profession is highly self-involved and that teachers' professional identity is a concept of the teacher as a teacher. Volkmann and Anderson (1998) deemed that the teaching profession requires a complex and dynamic equilibrium between personal self-image and teacher roles. Akkerman and Meijer (2011) proposed that the formation of teachers' professional identity is a process of narrating and relating multiple I-positions and it is formed in the course of self-participation and self-engagement and in the course of trying to maintain continuity and consistency. Actually, the self is formed in the process of complex and meaningful social interaction; without environmental factors or professional backgrounds, there is no self or professional identity.

In view of the close relationship between identity and profession, Tickle (2000) proposed that professional identity is embodied through professional characteristics. Many researchers defined teachers' professional identity based on Tickle's perspective. For example, Nixon (1996) believed that teachers' professional identity is something that characterizes an occupational group with specific working conditions. Gaziel (1995) argued that teachers' professional identity is similar to a list of items that represents aspects of the profession. Young and Graham (1998) defined teachers' professional identity as the characteristics of an ideal teacher. Schepens et al. (2009) tested the relationship between professional identity and educational situation through professional characteristics. Based on professional knowledge and skills teacher obtained, Beijaard et al. (2000) divided teachers' professional identity into three aspects—subject matter, didactic, and pedagogical expertise.

Indeed, professional identity is regarded as an attitude from a psychological point of view. Attitude is an evaluative statement about things, persons, and events; the evaluative statement, approved or rejected, reflects a person's emotional object (Robbins and Judge, 2007). Accordingly, professional identity is based on cognitive and emotional elements. However, as an attitude, these elements are not discrete but a combination of cognition and emotion; the two elements are inseparable

and are displayed in judgments of value. Therefore, the present study defines professional identity as an attitude; professional identity involves teachers making a judgment or assessment of the importance and value of the teaching profession's different characteristics. Meanwhile, many scholars considered teachers' profession is multifaceted; for example, Moore and Hofman (1988) believed that teachers' professional identity includes centrality, valence, consonance, and self-presentation. Kelchtermans (2009) deemed that teachers' professional identity consists of self-image, self-esteem, job motivation, task perception, and future perspectives. Hong (2010) considered that teachers' professional identity is composed of value, self-efficacy, commitment, emotions, knowledge and beliefs, micropolitics, and so on. As stated above, the value of the teaching profession is a core element of professional identity; meanwhile, professional identity also includes other elements that vary with different teacher groups and professional development stages.

Compared with in-service teachers, pre-service teachers lack real experiences of the teaching profession, and their cognition and evaluation of the teaching profession are more based on teachers as students. For this reason, some scholars believe that pre-service teachers have not yet formed an essential professional identity but just formed a student identity (Beauchamp and Thomas, 2006; Flores and Day, 2006; Levin and He, 2008). Hong (2010) found that pre-service teachers' attitudes to their profession were vague, while in-service teachers' attitudes to their profession were specific and realistic, including in the areas of classroom control, knowledge teaching, and relationships with parents, colleagues, and managers. Therefore, under the influence of the career development stage, the structure of pre-service teachers' professional identity is relatively simple; it is likely to mainly focus on the value of the teaching profession.

Zhang (2016) proposed a pre-service teachers' professional identity model composed of intrinsic value identity and extrinsic value identity. Intrinsic value identity is mainly related to individuals' subjective feelings regarding the inherent feature of the teaching profession, such as work contents and work characteristics. Extrinsic value identity mainly focuses on cognitions about the external feature of the teaching profession, such as work environment, social status, and income. The present study will investigate and analyze pre-service teachers' professional identity from these two dimensions.

The Development of Pre-service Teachers' Professional Identity during Field Teaching Practice

In view of the characteristics of pre-service teachers' professional identity, some scholars proposed that pre-service teachers would experience an intricate transition of professional identity in the stage of teacher education; that is, their professional identity would constantly experience negotiation, construction, and acceptance. However, fundamental change was less likely to occur (Korthagen, 2004). The transition of identity was a difficult and slow process, and even if pre-service teachers entered the teacher education stage, their belief, and cognition were still stubborn, and they tended to use the knowledge and information teacher

education provided to confirm rather than confront and adjust their original beliefs and cognition. In general, when pre-service teachers engaged in teaching and internship, they did not have sufficient knowledge about students and the classroom, and they brought unrealistic views and optimistic attitudes to the classroom and treated classroom practice from an oversimplified viewpoint (Kagan, 1992).

However, this did not mean that pre-service teachers' professional identity could not change during the whole teacher education stage. Under the influence of individual internal and external factors, and subjective and objective factors, pre-service teachers' professional identity could not change in structure, but the dimensions of professional identity possibly changed on some level. Some studies found that pre-service teachers tended to overestimate their professional commitment and professional efficacy before the internship (Volkmann and Anderson, 1998; Kelchtermans and Ballet, 2002). The main reason for this was that pre-service teachers often underestimated the complexity of the teaching profession before they entered into the internship. The aim of the internship was to pull them back to reality from theoretical learning, which led to a decrease in professional commitment and professional efficacy. Hong (2010) found that the scores of students who experienced internship were lower than those of students who did not, on the emotion dimension of professional identity, which was possibly related to emotional exhaustion of students during the internship. Certainly, the changes in pre-service teachers' professional identity before and after the internship were related to different definitions of professional identity and also related to some factors in the teacher education stage. For example, Johnson and Ridley (2004) found that providing support for pre-service teachers, including providing guidance in the initial teaching jobs for novice teacher, integrating school culture, communicating class plan with expert teacher, etc., decreased the difficulty of transition from student to teacher. A study on novice teachers showed that the support and positive feedback from supervisor, assistants, and parents affected the success and well-being of novice teachers (Avalos and Aylwin, 2007; Oplatka and Eizenberg, 2007).

Moreover, there were many studies on teachers' professional identity, but the main method used was qualitative research, such as teachers' reinvention (e.g., Mitchell and Weber, 1999), creative narratives, discourses of teaching lives (e.g., Sfard and Prusak, 2005; Alsup, 2006); the metaphors of a teacher's role (e.g., Hunt, 2006; Leavy et al., 2007); and structured or semi-structured interviews, observations, written reflections, and self-recording (e.g., Palmér, 2015; Yuan and Lee, 2015; Izadinia, 2016). Limited quantitative research was mainly a cross-sectional study. For example, Hong (2010) conducted a cross-sectional and quantitative study with four groups, including pre-service teachers experiencing internship, pre-service teachers not experiencing internship, dropout teachers, and non-dropout teachers. Mahmoudi-Gahrouei et al. (2016) conducted a cross-sectional and quantitative study with three groups, including prospective teachers, new teachers, and experienced teachers. Therefore, longitudinal research on the changes in pre-service teachers' professional identity before and after an internship is needed. Moreover, based on the quantitative study, the study

further explores and elaborates on the changes, effects, and roles of pre-service teachers' professional identity through a qualitative study.

Summary

The development of teachers' professional identity is a long-term process. This process starts from individual choices of teacher education (Walkington, 2005). Pre-service teachers experience the transition of professional identity in the process of situation transition from teacher education to internship, and further change of identity occurs in the whole process of teachers' careers (Beauchamp and Thomas, 2009). Therefore, whether and how teaching practice promotes pre-service teachers' professional identity is an important research topic (Beijaard et al., 2004; Korthagen, 2004).

In conclusion, as a course bridging theory and practice, field teaching practice is an important part of teacher education programs, and it plays a significant role in the formation and development of teachers' professional identity. Therefore, a research mixing quantitative and qualitative approaches to investigate the changes of pre-service teachers' professional identity during an internship and analysis of the reasons and factors behind the development is needed.

MATERIALS AND METHODS

This study employed a mixed-methods design that used a combination of qualitative and quantitative approaches. According to Creswell's (2003) classification, the current study can be identified as a "the concurrent triangulation approach." The mixed approach offsets the inherent weaknesses within one method with the strengths of the other (Creswell, 2009). Triangulation refers to "the combination of methodologies in the study of the same phenomenon" (Denzin, 1978), and this approach allows the researcher to improve the accuracy of conclusions by relying on data from more than one method (Rossman and Wilson, 1985). In this study, the quantitative survey and qualitative interview are concurrent, but greater weight is given to the qualitative approach. In this study, quantitative research including two time points was a longitudinal study, which was used to gain an overview of the development of pre-service teachers' professional identity during their internship. Then, qualitative research was conducted to illustrate and elaborate the development in more detail, and to explore the factors influencing pre-service teachers' professional identity and professional development in the future.

Participants

Participants for the quantitative study were randomly sampled from different departments of a university in China. The curriculum and theoretical learning of teacher education mainly focused on Grades 1–3. Internship is conducted in Grade 4 in China. According to the regulation of the college, teaching practice is one of the requirements to obtain teacher certification. The contents of teaching practice mainly involve classroom

teaching, class management, and other jobs. The internship continues for 16 weeks and includes 320 class hours. After finishing the internship, pre-service teachers obtain 10 credits according to standard requirements. Therefore, the first survey was conducted before the internship (Time 1), and the second survey at the end of the internship (Time 2).

Because most pre-service teachers were at the end of their internship and were looking for a job at the time of the second survey, some participants were lost because of lack of data in Time 2. Participants were 98 pre-service teachers who remained from the previous sample of 140 pre-service teachers (Table 1). There were 98 valid participants in the two tests. A comparison of the 42 lost participants to the remaining 98 participants showed that there were no group differences in gender [$\chi^2(1) = 0.83$, $p = 0.36$], student origin [$\chi^2(2) = 1.49$, $p = 0.47$], and teacher professional identity [$t(1,138) = -0.79$, $p = 0.43$]. Of the 98 participants, 82% were girls, 77% were science, 32% came from city, 35% came from town, and 33% came from the country.

Using the typical-case-sampling method, 12 (four males, eight females, average age = 21.78 years old) out of the 98 participants were selected for participation in the interview in the qualitative study. To ensure the representativeness of the sampling, the study considered participants' gender, major, place of college admission, type of field school, type and subject of teaching, and so on. Their majors were different, with two students majoring in chemistry, two in literature, two in English, three in physics, two in educational technology, and one in special education. They conducted their field teaching practice at different middle schools located in different regions, such as Beijing, Hebei Province, Inner Mongolia, and Xinjiang Autonomous Regions. These middle schools varied in type from provincial or regional key schools to regular middle schools and schools for children with disabilities. The courses they taught varied from Chinese, math, English, chemistry, and physics to special education, according to their majors. The study was approved by the Ethics Committee of the Faculty of Psychology, Beijing Normal University, and all the work was carried out within the guidelines set by the committee. All subjects gave written informed consent in accordance with the Declaration of Helsinki.

Morse (1994) considered six participants as the smallest qualified number in phenomenological studies, and Kuzel (1992) argued that six to eight participants were acceptable in studies of homogeneous participants. The present study chose twelve participants for the research, and the sample size met the criterion mentioned. Additionally, according to the definition of "theoretical saturation" by Glaser and Strauss (1967) (theoretical saturation refers to a data size in which the researchers can no

longer form a new category with additional data). Based on the sorting and coding of the interview data, we found that our domains and categories had reached theoretical saturation after the seventh participant's data were analyzed. The data from the eighth to the twelfth participant could not form a new category code. This finding supported that twelve participants was an appropriate sampling number for this study.

Data Collection and Analysis

Quantitative Data: Survey Questionnaire

The quantitative study used a survey questionnaire to investigate the changes of pre-service teachers' professional identity. The participants were required to complete a questionnaire repeatedly before and after the internship.

To measure pre-service teachers' professional identity, a validated scale was used in prior research with mainland Chinese samples (Zhang, 2016). The scale consisted of 10 items, for which students responded on a 6-point Likert self-report scale ranging from 1 (strongly disagree) to 6 (strongly agree). Two dimensions were contained in the scale: intrinsic value identity, which mainly focused on individual subjective value judgment of the inherent features of the teaching profession (seven items, e.g., "Teaching job is valuable" "Teaching job is attractive"); and extrinsic value identity, which mainly related to cognition of external features of professional identity (three items, e.g., "Teacher's social status is high" "I think the work environment and condition for teacher are great"). The internal consistency reliabilities of the whole scale and the dimensions range from 0.79 to 0.87. The scale also has good validity. The results of confirmatory factor analysis showed that the two-factor model fit the data adequately: $\chi^2 = 120.49$, $df = 26$, RMSEA = 0.069, CFI = 0.98, TLI = 0.96, GFI = 0.97, NFI = 0.97. In this study, the reliability of the scale was acceptable. Cronbach's alpha coefficient for the whole scale and the two dimensions in Time 1 and Time 2 ranged from 0.74 to 0.87.

Qualitative Data: Semi-structured Interview

The interviews were semi-structured and were administered by the chief researcher with assistance from other researchers. Participants were selected based on the representativeness of the sample and then contacted by the researcher. After the participants were invited to the lab, they were first asked to read and sign an informed consent form that described the purpose, safety, and privacy protection policy of the research and the recording notification. Each participant was interviewed once, the time of interview lasted 30 min, the interview was conducted one on one and recorded, on completion, the participants were thanked and given a gift.

TABLE 1 | Participants' demographic information.

Test	N	Gender		Source of students			Major	
		Male	Female	City	Town	Country	Arts	Science
The first test	140	30	110	51	42	47	43	97
The second test	98	18	80	31	34	33	22	76

The interviews involved structured questions and follow-up questions. Each participant was asked to answer the same questions, and specific questions or follow-up questions were added according to the initial answers. The interview protocol had three parts. First, the current study collected participants' demographic information, including gender, age, internship time, place, school, subject, etc. Second, based on the definition of teachers' professional identity for participants, the formal interview had two questions: (1) Compared with their professional identities before the internship, did participants' professional identities change after the internship? What did these changes include? (2) Describe the causes of the changes, list the important people or events related to these causes, and answer additional further questions if necessary. Third, an open-ended interview was designed, and participants were asked to discuss the influence of these changes in professional identity on their future career development.

Audio recordings of the interviews were transcribed by the research team and then were checked carefully by non-team members to ensure accuracy. For data analysis, we adopted the consensual qualitative research (CQR) method (Miles and Huberman, 1994). The CQR method consists of domain coding, core idea coding, cross-case analysis, stability check, and audits. The key of the CQR method is a thorough team discussion of the transcribed data to reach an agreement on the conceptualization of the data. Our specific procedure was as follows: first, the interview data were grouped into several domains reflecting the main topics. Second, core ideas were extracted from each domain based on the interview contents and then examined in the context of each interview to ensure they indeed represented and covered related points of view. Third, categories and sub-categories were identified. Team members collected all of the core ideas from each domain for a cross-case analysis, found the common topics, clustered these topics to form categories and sub-categories, and then formed conclusions. In the CQR method, coding group members conducted the main analysis independently. All members needed to reach an agreement through consultations during the coding process. Finally, the coding results were submitted to external auditors. The external auditor re-examined the analysis and provided feedback to the coding group to refine the coding.

RESULTS

The Changes in Professional Identity: Quantitative Findings

To investigate the changes in pre-service teachers' professional identity before and after the internship, a paired-samples *t*-test was conducted. The results showed that there was significant difference in overall professional identity ($t(97) = -2.26$, 95% CI $[-0.27, -0.02]$, $p = 0.03$), intrinsic value identity ($t(97) = -4.12$, 95% CI $[-0.38, -0.13]$, $p = 0.00$), and extrinsic value identity ($t(97) = -0.31$, 95% CI $[-0.22, 0.16]$, $p = 0.76$). **Table 2** showed mean, standard deviation, minimum and maximum, on each sub-dimension and overall construct. The results indicated that the overall professional identity increased, intrinsic value identity

increased, and extrinsic value identity kept steady. Specifically, pre-service teachers with higher professional identity tended to think teaching is more valuable, more attractive, more interesting, and think communication with students is more meaningful. Meanwhile, extrinsic value identity, such as work environment and condition, social status, did not significant change. These results also implied that the inner tension of the two dimensions of teachers' professional identity increased after the internship.

In summary, compared with the professional identity before the internship, the overall professional identity and intrinsic value identity increased, and extrinsic value identity kept steady after the internship. Why did intrinsic value identity and the overall professional identity increased after internship? Which factors influenced pre-service teachers' professional identity during the field teaching practice? Did field teaching practice influence pre-service teachers' professional development? To answer the above questions, a qualitative study was conducted.

The Changes, Factors, and Roles of Identity: Qualitative Findings

The data analysis indicated that three domains—changes in identity, factors of identity and, roles of identity—could explain the changes in pre-service teachers' professional identity before and after the internship and the influence of the internship on pre-service teachers' professional identity and professional development. **Table 3** displayed domains, categories and sub-categories, representativeness of each category, and examples of the core ideas. According to Miles and Huberman (1994), each domain and category was identified by the frequency of usage. In the present study, we considered domain or category to be “general” if it was used in all 12 cases, “typical” if it was used in 8–11 cases, “variant” if used in 4–7 cases, and “insufficient of representativeness” if used in fewer than four cases.

Changes in Identity

The first domain, the changes in identity, showed the changes of pre-service teachers' professional identity before and after the internship. Specifically, there were two categories in this domain as follows: intrinsic value identity and extrinsic value identity. There were five sub-categories in the two categories. Intrinsic value identity consisted of work contents and work characteristics, and extrinsic value identity consisted of work environment, income, and social status. The five sub-categories are representative: work content was general; work characteristic, income, and social status were typical, and work environment was variant.

TABLE 2 | Descriptive statistics of sub-dimensions and overall construct ($n = 98$).

Variable	Time	Min	Max	Mean	SD
Overall professional identity	Time 1	1.93	6.00	4.26	0.78
	Time 2	2.64	6.00	4.40	0.70
Intrinsic value identity	Time 1	2.57	6.00	4.58	0.74
	Time 2	2.86	6.00	4.84	0.69
Extrinsic value identity	Time 1	1.00	6.00	3.93	1.00
	Time 2	1.33	6.00	3.96	1.00

TABLE 3 | The results of the qualitative research: representativeness and examples of domain, category, and sub-category.

Domain, category, and sub-category	Number of times (<i>N</i> = 12)	Level of representativeness	Examples of core idea
Identity changes			
<i>Intrinsic value identity</i>			
Work contents	12	General	Before practice: I did not know much about teaching, and I thought that teachers only teach and manage class. After practice: I found that teachers also need to do the work assigned by the school and at the same time still pay attention to communication with students.
Work characteristic	11	Typical	Before practice: Teaching is boring, especially when teachers have to devote their whole life to only a few textbooks. After practice: Teaching can be creative, not just a simple repetition.
<i>Extrinsic value identity</i>			
Work environment	4	Variant	Before practice: The work environment is good, and social interactions are simple and pure and not complicated. After practice: The view is the same as before the practice.
Income	9	Typical	Before practice: A teacher's income is lower than a company employee's and is at the same level as a civil servant's. After practice: A teacher's income is not as high as I thought.
Social status	11	Typical	Before practice: The social status of teachers is high, and teaching is a great profession. After practice: a teacher's social status is so-so and is not as glorious as I imagined.
Identity factors			
Mentors at field school	12	General	Mentors have the most influence, and they are conscientious, attentive, and give me lots of guidance.
Students at field school	6	Variant	The most impressive aspect for me is my students; I am so touched by their concern for me.
Identity roles			
Emotions	8	Typical	I want to be a teacher, and I think it is meaningful. Teaching is a low paying and laborious job, but my thoughts on becoming a teacher have not changed.
Beliefs in teaching career	12	General	After I learned more about the contents, the environment and the conditions of a teacher's job, my belief in teaching became stronger, and I had no hesitation.

N = 12. General = all 12 cases represented, Typical = 8–11 cases represented, Variant = 4–7 cases represented.

All 12 participants had a cognitive change in work content before and after their internships. The original sentences of some participants are cited here, as follows: “As for work content, I had only a very basic idea about it before the internship. I thought that the teachers only taught and managed the class. Through the internship, I learned that teachers also have to work on tasks that the school assigns to them.” Some participants “took part in teaching research under the guidance of the mentor in the internship, which enabled them to experience what it feels like to be a research-oriented teacher,” and understood more about the work contents of a teaching job, which “impressed me very much.” In sum, the understanding and identity of the teaching profession rose from vague to explicit.

Eleven participants spoke about a re-acquaintance with the characteristics of the teaching profession. Before the internship, they generally felt that “teaching is boring and sort of routine,” “in 3 years, the job becomes a mechanical repetition,” and “especially when it comes to teaching a course, the whole teaching life has to be spent dealing with only a few textbooks.” Through the internship, they discovered that “teaching can be creative and not just a simple repetition” or that there is “truly a lot to learn”;

some participants even greatly improved their understanding of the professional requirements and attainment through the internship. They realized that “the more you learn, the more you can give to students; moreover, the broader the field you study, the higher you stand, and the deeper knowledge you have, and these can benefit the students.”

Of the 12 participants, 9 talked about income and the welfare of teachers. Before the internship, most participants thought, “a teacher's income is at an average level in society, which is close to that of civil servants” and that “the welfare of a teacher is not as good as a company employee.” After the internship, participants' understanding of the situation did not change much. Some participants even noted that “their understanding was more realistic than before,” that “as a profession, teaching is not so good and stable as I had imagined,” or that “a teacher's hard work is not reasonably proportional to their financial reward.”

Eleven participants mentioned the social status of teachers. Before the internship, the participants thought that “teachers have a high social status and are respected by the society,” “the social status of teachers is high; teaching is a great profession.” However, after the internship, they thought that “a teacher's social status is common, and teaching is just a

common job; the teaching profession in fact is not as glorious as I thought."

Only four participants mentioned their understanding of teachers' work environment. They thought that "the work environment is good, and the social circle is unique – simple and pure, not complicated." After the internship, these views remained the same.

The Factors of Identity

In the second domain under the effect domain—the factors of identity—one general category (mentor at the field school) and one variant category (students at the field school) were extracted.

As for the impact of mentor support on professional identity, all participants emphasized the important roles mentors and other teachers played in the field school. The original interview discourses are cited here as follows: Some participants argued that "responsible teaching attitude and comprehensive guidance from the mentor" were major factors to make him/her focus more on the teaching profession. Some participants were deeply moved by the mentors. They realized that "the most positive effect was from my mentor. He designed the course based on his ideas and creativity, activated the students and created a learning atmosphere in the classroom to make students more motivated to learn." "Before, I focused more on arranging the teaching content but with the guidance of my mentor, I realized it was more important to communicate with the students in class and to make students more interested in learning." One participant who completed his internship at a key middle school in Beijing talked about the deep thinking and high professional identity brought to him by the teachers at the field school: "the strongest effect from my mentor was his professionalism, sense of responsibility and attitude. The teaching profession depends on teachers' conscience; you need to do your job from the heart, perform your full duty, not just one day or two, but forever." Vice versa, two out of the twelve participants thought that "job burnout, lack of responsibilities and de-motivation of teachers at the field school" were the major factors impacted on his/her teaching initiatives. This finding confirmed the opposite side of the importance of a mentor.

Additionally, the current study also analyzed the importance of students at field school. Six out of the 12 participants spoke about how the students in their classes had deeply influenced them. Some participants said, "I communicated with the bad students in my class and found they communicated sincerely, and they were the ones I have the most contact with now." A participant who completed the internship in a middle school in Hebei province felt that "the most impressive experience for me was the students; I remember once after P.E. class, I wanted a chair to sit on, but there was only one dirty chair in the classroom. A student took off his shirt to wipe it clean for me. I was so touched by that." Many things like this happened during the internship. These things made participants realize the students' care and understanding, which was the most important factor for participants to appreciate the teaching profession.

The Roles of Identity

The third domain, the roles of identity, showed the influence of internships on pre-service teachers' future professional development. Specifically, there were two categories in this domain: emotional evaluation and belief in the teaching profession.

Of the 12 participants, 8 evaluated their emotions toward the teaching profession at the end of their internship. The emotions of the majority of participants changed from "good" or "neither like nor dislike" to "thinking highly of teachers," "it is worthwhile to be a teacher," and "we should respect and cherish the profession and do the job assuredly." Some participants said that "I'd like to be a teacher; as a profession, it is meaningful," "Teaching is a low paying and laborious job; sometimes there are complaints, but they are just for the sake of complaining. They do not affect my feelings for the job," and "Compared with other professions, I prefer teaching."

During the interviews, all 12 participants stated their beliefs in the teaching profession at the end of their internship. Most participants noted that the internship strengthened their beliefs in having a teaching profession. Some participants said that "the internship was a turning point for me; it made up my mind to continue trying to be an excellent teacher." Other participants described their changes before and after the internship: "At the beginning, my family thought I was suited for a teaching job, and I did not reject that idea. After the internship, when I started to understand the ramifications, environment, and condition of a teaching job, my thinking on teaching in school became stronger and has not changed since then." Other participants said that "my confidence was strengthened, and I learned a lot." The internship showed that their beliefs in having a teaching career were strengthened.

DISCUSSION

The present study used a mixed qualitative and quantitative approach. The quantitative research investigated the changes of pre-service teachers' professional identity before and after the internship. The qualitative research illustrated and elaborated the changes of professional identity in more detail; further analyzed the factors of professional identity and their roles in pre-service teachers' professional development in the future; and revealed the relationships among pre-service teachers' professional identity, mentor support, and professional commitment.

Forming a Positive Yet Tense Professional Identity after Experiencing the Internship

The results of quantitative data showed that compared with professional identity before the internship, pre-service teachers' professional identity increased after the internship; specifically, intrinsic value identity increased significantly, and extrinsic value identity kept steady, which was consistent with the results of qualitative data. The results of qualitative research indicated that pre-service teachers had a new understanding of the contents and characteristics of teaching work. These new

features, communication with students, creativity of teaching, etc., had become attractive to pre-service teachers. These factors contributed to changing pre-service teachers' stereotype of the teaching profession before experiencing the internship. Conversely, the harsh reality of the profession, such as income level, social status, and work environment, did not quite match the "greatness," "high status," and "middle-class" images pre-service teachers held before their internship, which even led to some pre-service teachers' negative cognition of the teaching profession; however, the changes almost kept steady before and after the internship.

There were both similarities and differences in results between the present study and the study of Hong (2010). The changes of professional identity and the two dimensions in the study meant that pre-service teachers' attitudes became more realistic after experiencing the internship, which was consistent with the results of Hong (2010). Hong (2010) analyzed the differences in the emotion dimension of professional identity between pre-service teachers experiencing the internship and those not experiencing the internship. The results indicated that pre-service teachers who had not experienced the internship were obviously too optimistic and underestimated the effect of educational situation on emotion; pre-service teachers who had experienced the internship had less idealized concepts.

However, inconsistent with the results of Hong (2010), the results of her cross-sectional study showed that there were no significant differences in the value dimension of professional identity between pre-service teachers who had not experienced student teaching and pre-service teachers who had experienced student teaching. This inconsistency may be related to different approaches; the present study used longitudinal design and excluded generational differences effectively. It was conducted to detect real changes in pre-service teachers' professional identity before and after the internship. Furthermore, the inconsistent results also related to different samples, different measuring tools, and different internship modes.

As stated in the review, researchers tended to view professional value as a whole to measure previous studies on professional identity; however, the current study investigated pre-service teachers' professional identity from intrinsic value identity and extrinsic value identity. Intrinsic value identity is a value judgment of a profession's work attributes (e.g., work content, work pattern), whereas extrinsic value identity is a value judgment of a profession's social attributes (e.g., work environment, income, and social status). The study showed that the two dimensions had different variation trend before and after the internship, which contributed to deepen understandings of pre-service teachers' professional identity and changes of different dimensions.

In the current study, the cognition and evaluation of work contents and features reflected the intrinsic value of the teaching profession, whereas the cognition and evaluation of income, social status, and work environment reflected the extrinsic value of the teaching profession. Intrinsic value identity was strengthened whereas extrinsic value identity was kept steady relatively, even somewhat weakened in a certain sub-category throughout the internship. This result indicated that the interior

of professional identity had a conflict change. The overall professional identity was positive and increasing, but it was likely to go through more inner tension after experiencing internship. Festinger (1957) proposed the approach-avoidance conflict characteristics of volitional behavior according to cognitive dissonance theory. This inner tension of professional identity could bring more uncertainty to the pre-service teachers' career choices and professional commitment in the future. Pre-service teachers might improve their extrinsic value identity to help them integrate into the teaching profession completely or they might reduce their intrinsic value identity and then leave the teaching profession.

Additionally, the results also meant that it is important to enhance the design and plan of the internship. During field teaching practice, if pre-service teachers are provided multiple tasks and contents, they will have a chance to experience fully and deeply the kinds of characteristics of the teaching job that will have great significance for the development of professional identity, especially for cultivating and promoting their intrinsic value identity. Certainly, multiple and abundant tasks in the internship are closely related to the supports of the important others (e.g., mentors); otherwise, pre-service teachers will be frustrated, which will not be beneficial for the improvement of professional identity.

Mentor Support at Field School Effectively Facilitates Professional Identity

The results of qualitative data indicated that teaching guidance and work attitudes of the mentor at the field schools played a critical role in pre-service teachers' professional identity. Many participants realized that "the most positive effect was from the ideas and creativity of their mentors" and that "they were conscientious and did their job from their heart," which impressed with participants. Some participants cited the influence of students of school and experienced "being moved" and "accomplishment." The results indicated that the support of mentors at the field schools was important in the internship stage.

The results were supported by some studies. Izadinia (2016) conducted a study by interviewing seven pre-service teachers and mentors. The results showed that the mentoring relationship was an important influencing factor in pre-service teachers' professional identity. Specifically, when the mentoring relationship was more positive, the pre-service teachers felt more confident as teachers and their professional identities were higher, whereas, their professional identity and confidence both declined when the mentoring relationship was negative. Stufflebeam (2000) emphasized the importance of mentor support and proposed that these supports also influenced teaching efficacy, professional orientation, and professional commitment, which was proved by Schepens et al. (2009). The results showed that mentor support played an important role in pre-service teachers' professional efficacy, professional commitment, and professional orientation. The three variables were the components of professional identity. An empirical study indicated that the communication and feedback of the mentor at

the field school had an important effect on pre-service teachers' affective commitment; especially, mentors' communication and feedback were far more important for pre-service teachers than campus teaching (Christophersen et al., 2016). Furthermore, students at the field school were also considered to be one of the most motivating factors influencing teachers' professional identity and professional development (Proweller and Mitchener, 2004). The interactions of new teachers with students deeply influenced their teaching perspective, self-confidence, and work satisfaction (Bullough, 2001).

In conclusion, this result revealed that the supports of the mentor were important. These supports would not only directly influence pre-service teachers' professional identity but also could have a profound effect on their future professional commitment. The sources of supports are not limited to the mentors but also include the entire teacher community, such as school leaders, teaching assistants, students, and parents of students (Avalos and Aylwin, 2007). Williams (2010) emphasized that there were abundant social practices and social relationships in field teaching practice, which was important not only to form professional identities but also to make a successful career transition. Providing supports for pre-service teachers, including providing guidance in the initial teaching jobs for novice teachers, adapting school culture, communicating the class plan to expert teachers, etc., decreased the difficulty of transition from student to teacher (Johnson and Ridley, 2004). These supportive strategies should be adopted by every school.

Professional Commitment of Pre-service Teachers Strengthened by Internship

The results of the qualitative data indicated that pre-service teachers' emotional evaluation was more positive and that they had a firmer belief in their teaching career after the internship. According to previous definitions of professional commitment in studies (e.g., Meyer et al., 1993; Van Huizen, 2000), professional commitment refers to the extent of one's individual emotional connection with one's profession and the extent of one's unwillingness to change professions. This study's findings showed that pre-service teachers' professional commitment was strengthened.

Professional commitment has a direct and important effect on individual professional decision in the future. Rots et al. (2007) found that commitment to teaching, especially the initial commitment to teaching pre-service teachers obtained after completing learning and training during teacher education, was closely related to whether one chose to be a teacher in the future. The initial commitment to teaching was an important predictor of teacher leaving his job in the earlier stage of professional development (Rots et al., 2010). Professional commitment directly influenced an individual's career decision-making, and decision to stay in or leave a job, meanwhile, also was influenced by many factors, such as teachers' supports (e.g., supports of educator, supports of mentor) and professional efficacy. Professional commitment would play an important role between these factors and career decision-making. For example, results from primary and middle school teachers in

Netherlands indicated that affective commitment mediated the relationships between classroom self-efficacy and responsibility to remain in teaching, between change in level of motivation and responsibility to remain, between relationship satisfaction and responsibility to remain in a structural model (Canrinus et al., 2012).

Based on previous studies, the qualitative study further revealed the potential relationships among pre-service teachers' professional commitment, professional identity, and mentor support. That is, mentor supports predicted pre-service teachers' professional identity and commitment, and professional identity mediated the relationship between mentor support and professional commitment. Certainly, the influencing mechanism was based on the case interview, and the result will need to be tested by a quantitative study in the future. Meanwhile, the results provided evidence for distinguishing between professional identity and professional commitment. Professional identity referred to the fact that individuals made judgments or evaluations on different characteristics of profession, while professional commitment mainly focused on professional affection, including aspiration of remaining in the current job and the degree of enjoyment of the job (Blau, 1985). The two concepts focused on different psychological components, were different in the emergence and formation period, and embodied different developmental stage of professional attitude. Accordingly, from the perspective of professional attitude, the results in the current study also implied the development and transition of pre-service teachers' professional attitude after the internship, which provided inspiration for exploring studies about professional attitude transition in the future.

Conclusion and Implications for Teacher Education

The current study used mixed methods to explore the changes in pre-service teachers' professional identity, and used qualitative study to explore the factors of professional identity, and the roles of professional identity in professional development and commitment during the internship. The results indicated that compared with professional identity before the internship, pre-service teachers' professional identity increased after the internship; specifically, intrinsic value identity increased while extrinsic value identity remained steady. Mentor supports in field school were important factors. Regarding the roles of professional identity, pre-service teachers' professional commitment, including affective evaluation of teaching profession and teaching belief both increased.

The results of the present study have several important implications for promoting teacher education programs, and especially for improving the effectiveness of field teaching practice. First, teacher-training institutions should further expand the contents of field practice to provide pre-service teachers with more opportunities to participate in various kinds of practical work and expand pre-service teachers' understanding of the teaching profession. Second, the school should arrange proficient mentors for pre-service teachers, excellent teachers' supports should contribute to promote pre-service teachers'

professional identity and commitment, and the sources of the supports should not be limited to teacher groups. The ways of support should be diversified. Third, as an essential part of teacher education, internship should be expanded throughout all years in college. This is particularly important in teacher education in China. The internship is assigned in the last year of teacher education and continues for 3 months. Therefore, the short time and lateness for participating in an internship limit pre-service teacher's understanding of the teaching profession. Additionally, the extrinsic values of the teaching profession need to be further improved. These extrinsic factors have no significant roles in pre-service teachers' professional identity during the internship, but the inner tension of professional identity cannot be neglected. The government and educational administration should formulate relevant educational policies and further improve the extrinsic values of the teaching profession.

Limitations and Future Directions

There are several limitations regarding this study that must be noted. The first limitation is the loss of the sample in the longitudinal study. Given the limited sample conditions, the present study extended sampling range and differences in demographic variables as far as possible to improve the representativeness of the sample. Meanwhile, from the point of sampling bias, the loss of participants in the longitudinal research was random. However, the number of participants ($n = 98$) was still low for a quantitative study, which could have led to unsteady results.

More care should be taken to avoid losing the sample in the future. Second, the number and representativeness of the sample

in the qualitative research need to be improved. Hill et al. (2005) argued that researchers should randomly select participants from a homogeneous total group. The participants should have rich knowledge of the research topics and recent relevant experience. In other words, the sampling should be based on a set standard. The current study met Hill's criterion, and the number of participants also met the smallest number some researchers have deemed acceptable (Kuzel, 1992; Morse, 1994). Additionally, the present study used mixed methods to investigate the changes in pre-service teachers' professional identity. However, the relationships among professional identity, mentor support, and professional commitment during the internship still need to be tested using quantitative data in the future.

AUTHOR CONTRIBUTIONS

HZ designed the study, analyzed the data, wrote and revised the article. XZ designed the study, collected and analyzed the data, interpreted the data, wrote the article. All authors approved of the publication of the article and ensured that the questions related to the accuracy or integrity of any part of the work were appropriately investigated and resolved.

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Placement Work Experience May Mitigate Lower Achievement Levels of Black and Asian vs. White Students at University

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Ethnic minority groups have been shown to obtain poorer final year degree outcomes than their majority group counterparts in countries including the United States, the United Kingdom and The Netherlands. Obtaining a lower degree classification may limit future employment prospects of graduates as well as opportunities for higher level study. To further investigate this achievement gap, we analyzed performance levels across three academic years of study of 3,051 Black, Asian and White students from a United Kingdom University. Analyses of covariance investigated effects of ethnicity and work placement experience (internships) on first, second and final year marks, whilst statistically controlling for a number of factors thought to influence achievement, including prior academic performance. Results demonstrated superior achievement of White students consistently across all years of study. Placement experience reduced, but did not eliminate, the size of the achievement gap exhibited by final year students. Sex, parental education and socioeconomic status had no significant main effects. Female students showed a more complex pattern of results than males, with Black females not showing the same final year uplift in marks as their Asian and White counterparts. Implications and possible explanations are discussed.

Keywords: attainment gap, placement, internship, University, ethnicity, performance, achievement, BME

INTRODUCTION

Ethnic minority groups have been reported to have final year degree outcomes that are inferior to their majority group counterparts in The Netherlands (Van Den Berg and Hofman, 2005; Severiens and Wolff, 2008), the United States (e.g., Betts and Morell, 1999) and the United Kingdom (HEFCE, 2015). Whilst overall proportions of University students receiving 'good' (first or upper second classification) degrees in the United Kingdom have increased over the past decade, the gap between the proportions of White British students achieving at this level in comparison with United Kingdom-domiciled students from Black and Minority Ethnic (BME) groups remains (75.6% vs. 60.4%: Equality Challenge Unit, 2015). This is particularly disturbing in the context that the implications of obtaining a lower degree classification are potentially enduring. An ever increasing number of graduate employers require applicants to hold at least a upper second (2.1) classified degree (77%: Association Graduate Recruiters, 2015), and at many institutions holding a degree with a lower second (2.2) classification can also prevent graduates from undertaking higher level University study. Addressing the attainment gap at an institutional level is therefore an ethical imperative.

Prior attainment, although a key factor in predicting degree outcomes, does not fully account for the differences between ethnic groups (Leslie, 2005; Broecke and Nicholls, 2007; Richardson, 2008, 2015; Fletcher and Tienda, 2010; HEFCE, 2015). Broecke and Nicholls (2007) conducted a large scale study which investigated 65,000 United Kingdom qualifiers and found that BME students obtained lower degree results than their white counterparts, even when controlling for prior attainment, age, gender, and discipline. In the same study, students obtaining entry to university via 'academic' (e.g., A-level, International Baccalaureate) rather than 'vocational' (e.g., Business and Technology Council: BTEC) qualifications tended to achieve higher marks. However, Broecke and Nicholls (2007) did not control for parental education experience, a factor which Connor et al. (2004) suggested significantly differs between ethnic groups. Similarly, in the United States, Fletcher and Tienda (2010) found that controlling for prior attainment reduced, but did not eliminate, gaps between White students and their Hispanic and Black counterparts. They instead considered high school 'quality' as an explanatory factor. Previous research has investigated various potential causes of the gap in attainment between BME and White students, often controlling for prior performance. However, whilst a number of factors contributing to the poorer attainment of BME students at University level have been identified, none have been able to fully account for the observed gaps between White and BME students.

In England, ethnic minority groups are now – on average – more likely to go to university than their white counterparts (Crawford and Greaves, 2015). However, in the majority of institutions, non-white students remain a minority. Sadly, those institutions with higher proportions of BME students appear to have *greater* differentials in attainment, with the exception of Russell Group¹ Universities where a benefit of increased representation is observed (Fielding et al., 2008). Many of the universities that BME students go to are modern institutions; the Russell Group Universities have over 12% more white students than the Million+² group of Universities (Equality Challenge Unit, 2015). Controversially, Boliver (2016) argues that admissions policies at some Russell Group Universities may even be biased against ethnic minority applicants, further compounding the situation. Although the United Kingdom based University and Colleges Admissions Service (UCAS), which handles and analyses almost all admissions to United Kingdom Universities, dispute this interpretation they have recently started to publish such equality data for each individual University to consider. Most previous research on the BME attainment gap has been conducted in institutions where BME students are a minority, or used large datasets which have combined data from a number of institutions with very different characteristics. Whilst qualitative research (see, e.g., Read et al., 2003) can help to elucidate the experiences of BME students in this context, it is impossible to quantify to

what extent these experiences as 'a minority' actually impact on academic achievement. In a synthesis of the literature, Singh (2009, p. 29) suggests that *"a recurring theme in many studies is the lack of support and isolation that many BME students feel."*

The majority of the studies looking at the BME attainment differences in Higher Education either focus on the attainment gap for qualifying students, or upon student retention and attrition rates in earlier years of study (e.g., Connor et al., 2004; Broecke and Nicholls, 2007; Fielding et al., 2008; Richardson, 2008; Meeuwisse et al., 2010b). Little research has investigated whether the gap occurs earlier on in academic study (i.e., post-entry but pre-graduation) or more specifically whether the gap changes throughout the period of study. Previous research (e.g., Thiele et al., 2016) has suggested that many entry level differences may be narrowed by the final year of study, but little is known about how these effects influence performance across the different study years whilst at University. Critically, this information may provide clues to help our understanding of the causes of the gaps, as well as how best to reduce them. Previous research has investigated a variety of possible differences between different ethnic groups in conceptions of learning (Richardson, 2010), entry qualifications (e.g., Richardson, 2008), intentions to persist (Eimers and Pike, 1997), and sense of belonging, integration and prejudice (Nora and Cabrera, 1996; Read et al., 2003; Severiens and Wolff, 2008; Meeuwisse et al., 2010a). To date, no single factor has been able to fully account for the gap.

Several researchers have reported that work experience undertaken whilst on a placement year or internship during students' degree programmes has a positive effect on final year marks when they return to university (e.g., Gomez et al., 2004; Mandilaras, 2004; Rawlings et al., 2005; Reddy and Moores, 2006; Mendez, 2008; Surridge, 2009; Green, 2011; Mansfield, 2011; Crawford and Wang, 2016), although see also Duignan (2002). Jones et al. (2015) reported on the beneficial effects of a work placement on final year performance across two United Kingdom Universities, despite accounting for the self-selection effects of opting to complete a placement. Reddy and Moores (2012) showed the benefit held at Aston University regardless of ethnicity, sex and socioeconomic background, but also noted that these factors influence whether or not students actually choose to take an optional placement year. Blasko et al. (2002) suggest that work experience during a degree programme has a larger positive effect on employment for lower socio-economic status groups – the work experience helps to bridge the divide that was already present. Moores and Reddy (2012) also showed the career benefit of placement experience for psychology students. Despite the clear impact of a placement year on final year attainment and employment success, and the known differential uptake of this experience across ethnicities, placement experience has not been previously considered as a potential moderating variable for the BME achievement gap.

Thus, the present study explored data from a single institution, in which White students are a minority, to examine whether a BME attainment gap still occurs in a highly ethnically diverse student environment, how any BME attainment gap

¹The Russell Group is a United Kingdom group which claims to represent 24 leading research intensive Universities. The Universities in the group are generally considered highly prestigious and highly selective in their intake.

²A group of Universities which describes itself as "The Association for Modern Universities in the United Kingdom."

is manifested over the different years of academic study and whether placement experience narrows the gap. In addition, we split students into higher and lower entry tariff groups in order to investigate whether students with higher vs. lower prior academic achievement were affected differentially by any gap. A number of other variables known to influence attainment were also included in the analyses in order to examine the any potential interplay between factors and to provide statistical control for differences in our sample unrelated to students' ethnic backgrounds. Richardson (2008), for example, reported a more pronounced BME attainment gap in women than in men and Thiele et al. (2016) reported some persisting effects of socio-economic differences on achievement. End of year (stage average) marks were used to ascertain the size of the gap in each year of study. Our hypotheses were that: (i) white and BME students would have different levels of achievement, despite statistically controlling for prior attainment and other factors known to influence achievement, (ii) the size of the BME achievement gap would increase across the years of study, (iii) placement experience would reduce the size of the BME achievement gap and (iv) the BME achievement gap would be larger amongst students with lower prior attainment. In addition, we expected to see better performance of females (vs. males) and a reduction in the influence of prior attainment across the years of study.

MATERIALS AND METHODS

Sample Data

Aston University is an ethnically diverse institution with a high population of Asian students in comparison to other United Kingdom Higher Education Institutions (35% vs. around 8% nationally) and – unusually – an overall white minority (36% vs. around 80% nationally: Equality Challenge Unit, 2015). Aston University is not affiliated to the Russell Group, or the Million+ group. As a former technical college originally created by the employers of Birmingham in 1895, it gained its University status in 1966. Aston University prides itself on its placement year provision and consequential high rates of graduate employability, with many of its students taking a placement year as part of their degree. Undergraduate student performance (end of year or 'stage average mark') and demographic data were obtained via Aston University's electronic records system for graduates from academic years 2010–11 to 2014–15. The initial sample comprised 5,740 records with information on: degree classification, first year average mark, second year average mark, final year average mark, sex, ethnicity, award year, whether or not the student took a placement, socio-economic status, parental educational background, UCAS entry tariff, type of school attended prior to university and home or overseas fee status.

In order to match students from various backgrounds as closely as possible the following exclusions were made: (i) Students with overseas tuition fee status: this group might be expected to have a different language and acclimatization background from Home students; (ii) Students from independent

schools: this group (<10%) shows quite a different pattern in terms of ethnicity and performance and previous analyses have suggested that these students do not typically perform as well as other students with similar entry qualifications (e.g., HEFCE, 2003; Thiele et al., 2016); (iii) Students entering with qualifications other than A-levels: students with BTEC qualifications in particular tend to underperform relative to their peers with similar UCAS tariffs (e.g., Broecke and Nicholls, 2007); (iv) Students with missing or refused data on parental educational background: we wanted to include this as a dichotomous (yes/ no) variable for simplicity so omitted those without data; and (v) Students who reported being from 'mixed' or 'other' backgrounds, or refusing information: these groups were relatively small in number in our sample so were omitted in order to provide a more reliable analysis. The included sample ($n = 3,051$) had the following characteristics: 56% female, 43% White/50% Asian/7% Black, 46% had taken a placement and 44% were first generation at University.

Measures

Stage average mark was the dependent variable in all analyses and was expressed as a percentage with 100% being the maximum mark achievable. Although Universities often use a variety of methods to determine a student's degree classification, students can be assured of a first class degree with a mark of 70% and above, an upper second class degree with a mark of 60% and above and a lower second class degree with a mark of 50% and above. Students with between 40 and 50% are awarded a third class degree and below 40% a degree is not normally awarded.

Sex was coded as male or female. Ethnicity data were recorded as declared by the students themselves using the 18 categories used for United Kingdom census data, but later grouped into the superordinate categories of "Asian or Asian British," "Black/African/Caribbean/Black British," "White," "Mixed/Multiple ethnic groups" and "Other." Whether or not a student had taken a placement was coded as "yes" or "no". Socioeconomic status contained (arguably) ordinal data based on occupation and was coded from one to eight based on the National Statistics Socio-economic classification (NS-SEC) analytic classes (1 = Higher managerial, administrative and professional occupations and 8 = Never worked and long-term unemployed).

UCAS entry tariffs ranged from 40 to 480 with a mean of 309. UCAS tariffs are scores given to a variety of qualifications based on the 'size of' (effort required) and the 'achievement in' (performance level) those qualifications. UCAS entry tariffs were used as a measure of prior academic achievement. The calculation of these tariffs has recently changed, but for the data included in our analyses, an A level with a grade A would have been awarded a UCAS tariff of 120 points, an A level with a grade B 100 points and a grade C 80 points. As levels attracted half the number of points as their A level equivalents. In addition to the total UCAS tariff scores used in the analysis as a continuous covariate, we also created a 'UCAS excellence' variable to split students into UCAS higher (320 points or above: roughly corresponding to ABB A levels or above) vs. lower (lower than 320 points)

performing students. In 2014, the United Kingdom government requested that restrictions usually applied to student recruitment to Universities be lifted for students with ‘very high’ grades prior to entry – this included students with ABB A level grades and above. Fifty-two percentage of our sample were defined as ‘high UCAS excellence.’

Analyses

The data were coded and statistically analyzed using IBM SPSS version 23. Once coded, ANCOVAs were used to analyze the data. Stage average mark was the dependent variable. The main independent variables of interest were sex, ethnicity, placement status, parental education, year of study and UCAS excellence. Socioeconomic status and UCAS entry tariff were used as covariates in the ANCOVA as a statistical control for their influence. The first ANCOVA analyzed only final year student data. The second ANCOVA used year of study (First, Second or Final) as an additional independent variable.

RESULTS

Exploration of the Final Year Attainment Gap

Figure 1 shows the final stage average marks split by *ethnicity*, *placement* and *UCAS excellence*. White students and those that did placements achieved higher marks. White students ($M = 65.26$, $SE = 0.24$) achieved higher marks than both Asian ($M = 63.7$, $SE = 0.21$) and Black ($M = 62.81$, $SE = 0.65$) students. Students who had taken a placement ($M = 64.24$, $SE = 0.31$) performed better than those who had not ($M = 63.82$, $SE = 0.32$). The BME achievement gap was smaller amongst students who had taken a placement. Variables analyzed in a between subjects ANCOVA investigating effects on final stage average marks were: *sex* (male/female), *ethnicity* (White/Asian/Black), previous *parental education* in HE (yes/no), *UCAS excellence* (high/low), *UCAS entry tariff* (covariate), *socioeconomic status* (covariate) and whether or not the student had taken a *placement* (yes/no).

Main Effects

Significant main effects of *ethnicity* [$F(2,2999) = 21.51$, $p < 0.001$, $\eta_p^2 = 0.014$] and *placement* [$F(1,2999) = 26.97$, $p < 0.001$, $\eta_p^2 = 0.009$] were found as described above. *UCAS excellence* did not have a significant main effect [$F(2,2999) = 2.84$], but *UCAS entry tariff* was a significant covariate [$F(1,2999) = 54.89$, $p < 0.001$, $\eta_p^2 = 0.018$]; there was a positive correlation between UCAS entry tariff and achievement. *Socioeconomic status* was not a significant covariate and neither *parental education* nor *sex* had significant main effects ($F_s < 1$).

Interaction Effects

The *placement* \times *ethnicity* interaction was significant [$F(2,2999) = 3.48$, $p < 0.05$, $\eta_p^2 = 0.002$]; the BME achievement gap was reduced amongst students who had taken a placement. *Placement* \times *UCAS excellence* was also significant [$F(1,2999) = 6.84$, $p < 0.01$, $\eta_p^2 = 0.002$]; the positive

effect of a placement on achievement was larger in students with low UCAS excellence. The interactions between *sex* \times *ethnicity* [$F(2,2999) = 2.85$, $p = 0.058$, $\eta_p^2 = 0.002$] and *placement* \times *sex* \times *UCAS excellence* \times *parental education* [$F(1,2999) = 2.57$, $p = 0.052$, $\eta_p^2 = 0.001$] narrowly missed significance. All other effects were not significant.

In summary, the widely reported BME achievement gap was replicated in this sample, with White students achieving higher marks than both Black and Asian students. Although effects were relatively small, it is noteworthy that whereas UCAS entry tariff explained 1.8% of the variance in the data, ethnicity explained 1.4%. However, the BME achievement gap was smaller in students who had taken a placement, with Black and Asian students benefitting from this experience more than White students. Placement experience was associated with higher final stage average marks, in particular amongst students who had entered University with lower UCAS excellence.

Exploration of the Attainment Gap across the Years of Study

Figure 2 shows the mean stage average marks by *study year* and *ethnicity*. A general increase in performance over the years of study can be seen for all ethnic groups investigated, as well as higher overall achievement by White students. White students ($M = 63.82$, $SE = 0.23$) performed better than Asian ($M = 62.20$, $SE = 0.19$) and Black ($M = 62.13$, $SE = 0.62$) students. Final year performance ($M = 64.06$, $SE = 0.26$) was higher than second year ($M = 62.43$, $SE = 0.26$) performance and second year was higher than first year ($M = 61.66$, $SE = 0.28$) performance. **Figures 3A–F** shows how students who have taken a placement improve their marks more in the final year than those who have not. In addition, the difference between high and low UCAS excellence students is markedly reduced (and sometimes reversed) in final year students who have taken a placement. The overall increase in performance over the years of study is not experienced equally by sexes and ethnic groups.

In order to explore the BME achievement gap by academic *study year*, first, second and final year performance were examined using a mixed measures ANCOVA. As before, other variables included in the analysis were *sex*, *ethnicity*, *parental education*, *UCAS excellence*, *UCAS entry tariff* (covariate), *socioeconomic status* (covariate) and *placement*.

Main Effects

Significant main effects of *study year* [$F(2,5386) = 5.85$, $p < 0.01$, $\eta_p^2 = 0.002$], *UCAS entry tariff* [$F(1,2693) = 82.62$, $p < 0.001$, $\eta_p^2 = 0.030$], *ethnicity* [$F(2,2693) = 15.00$, $p < 0.001$, $\eta_p^2 = 0.011$], and *UCAS excellence* [$F(1,2693) = 7.67$, $p < 0.01$, $\eta_p^2 = 0.003$] were found. Main effects of *socioeconomic status*, *placement*, *sex* and *parental education* were not significant ($F_s < 1$).

Interaction Effects

Crucially for our hypotheses, there was no significant *study year* \times *ethnicity* interaction [$F(4,5386) = 1.45$]; the BME achievement gap was not increasing by study year, but neither was it decreasing. The *study year* \times *placement* interaction

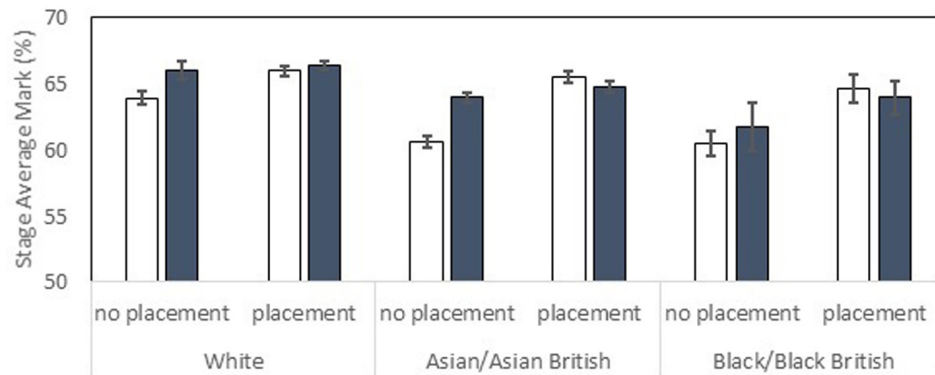


FIGURE 1 | Stage average mark percentage for the final year shown by ethnicity, placement status and UCAS excellence. High UCAS excellence students are shown with shaded bars. Low UCAS excellence students are shown with unshaded bars. Standard error bars shown.

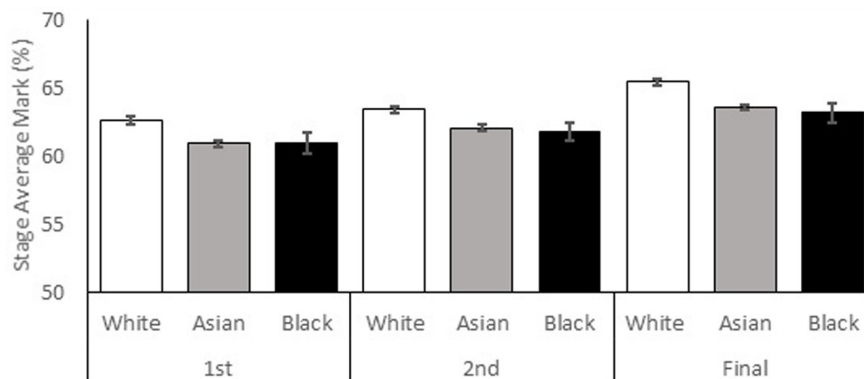


FIGURE 2 | Stage average mark percentage shown by ethnicity and year of study. Standard error bars shown.

was significant [$F(2,5386) = 44.59, p < 0.001, \eta_p^2 = 0.016$]; there was a steep increase in performance from the second academic year to the final year in those who undertook a placement between these two academic years, and a decrease in performance for the same period for those who did not take a placement. *Study year* \times *UCAS excellence* was also significant [$F(2,5386) = 3.05, p < 0.05, \eta_p^2 = 0.001$]; there was a bigger difference between high and low UCAS excellence in the first academic year compared to other years, suggesting a reduction of influence of prior performance over time. There was a significant *ethnicity* \times *placement* \times *UCAS excellence* interaction [$F(2,2693) = 3.61, p < 0.05, \eta_p^2 = 0.003$]. This mirrored the pattern already reported above; placement experience was associated with better performance overall for BME students and lower UCAS excellence students. *Study year* \times *sex* \times *UCAS excellence* narrowly missed significance [$F(4,5386) = 2.80, p = 0.061, \eta_p^2 = 0.001$], but *study year* \times *sex* \times *UCAS excellence* \times *parental education* [$F(2,5386) = 3.54, p < 0.05, \eta_p^2 = 0.001$] and *study year* \times *sex* \times *parental education* \times *ethnicity* \times *placement* [$F(4,5386) = 2.62, p < 0.05, \eta_p^2 = 0.002$] interactions were significant. These interactions are explored further below. Other interactions were not significant.

In order to understand better the four and five way interactions reported above, further mixed measures ANCOVA analyses were conducted on male and female students separately. For male students (**Figures 3A,C,E**) there were significant effects of *ethnicity* [$F(2,1185) = 4.58, p < 0.05, \eta_p^2 = 0.008$], *UCAS entry tariff* [$F(1,1185) = 29.34, p < 0.001, \eta_p^2 = 0.024$] and *UCAS excellence* [$F(1,1185) = 4.23, p < 0.05, \eta_p^2 = 0.004$]. The main effects of *placement* [$F < 1$] and *study year* [$F(2,2370) = 2.26$] were not significant, but there was a significant *placement* \times *study year* interaction [$F(2,1185) = 14.03, p < 0.001, \eta_p^2 = 0.012$]. Male students who did not take a placement prior to their final year showed little improvement in marks in their final year, whereas those who had done placements showed an average mark improvement of over 3%. There was also a *study year* \times *UCAS excellence* interaction [$F(2,1185) = 3.29, p < 0.05, \eta_p^2 = 0.003$]. As already described above, the gap between high and low UCAS excellence male students was largest in year 1 and smallest in the final year, although high UCAS excellence students consistently achieved the highest marks. Other main effects and interactions were not significant.

For female students (**Figures 3B,D,F**) there were significant effects of *ethnicity* [$F(2,1506) = 13.70, p < 0.001, \eta_p^2 = 0.018$] and

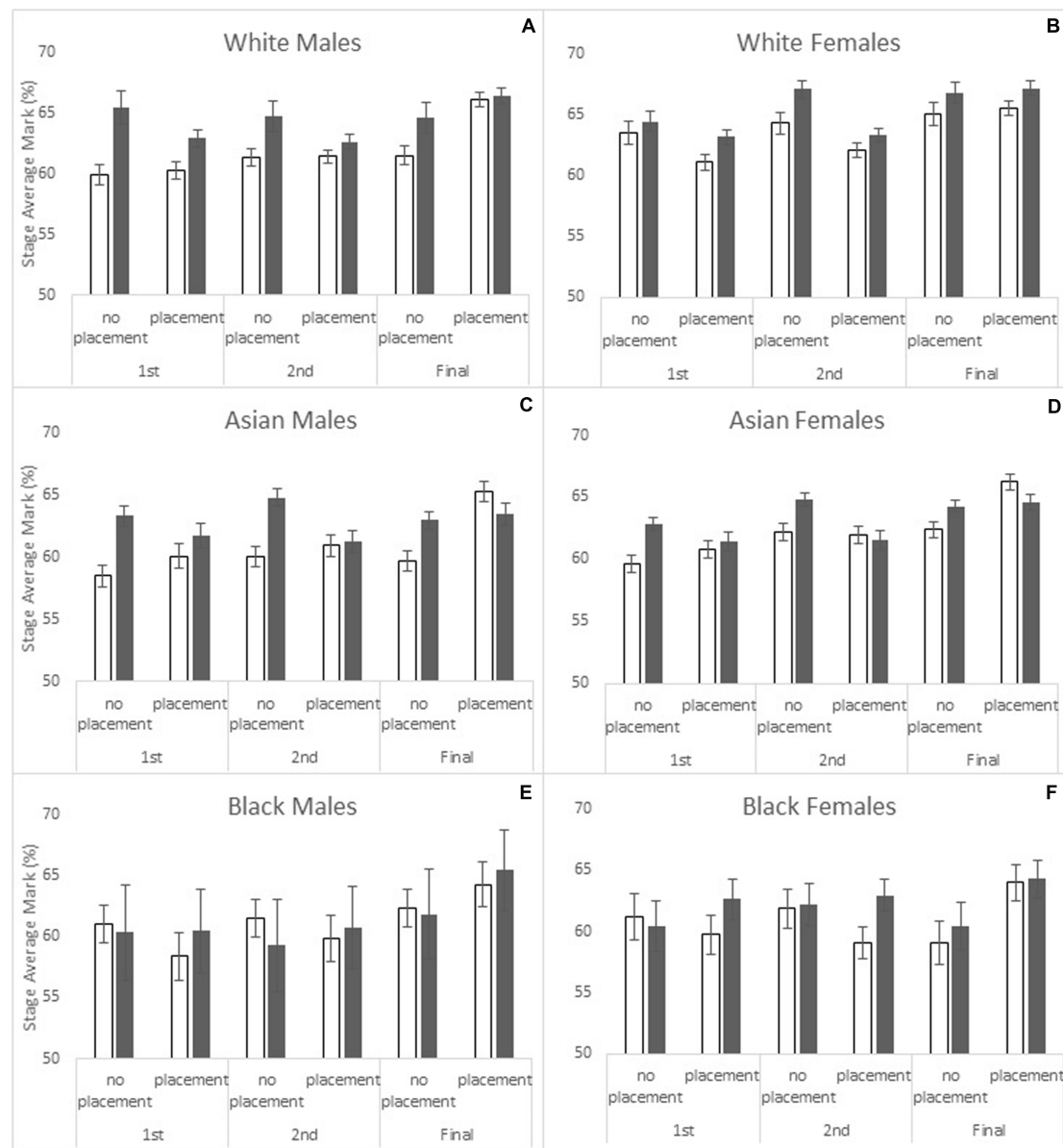


FIGURE 3 | Stage average mark percentage shown by placement, UCAS excellence, and year of study for the different ethnicity and gender groups (A–F). High UCAS excellence bars are shaded, low UCAS excellence unshaded. Standard error bars shown.

UCAS entry tariff [$F(1,1506) = 56.38, p < 0.001, \eta_p^2 = 0.036$], but UCAS excellence narrowly missed significance [$F(1,1506) = 3.58, p = 0.061$]. In contrast to the males, females had a significant main effect of study year [$F(2,3012) = 3.66, p < 0.05, \eta_p^2 = 0.002$], showing consistent improvement from first to final year of study, and of parental education [$F(1,1506) = 3.99, p < 0.05, \eta_p^2 = 0.003$], with lower performance amongst first generation female students. As with the males, the main effects of placement [$F < 1$] and socioeconomic status [$F(1,1506) = 1.15$] were not significant.

In terms of interaction effects for the female students, there was a significant study year \times placement interaction

[$F(2,3012) = 45.73, p < 0.001, \eta_p^2 = 0.029$] which showed that females who had taken placements performed at a slightly lower level than those who had not in both the first and second years of study, but higher in the final year (following the placement). In contrast to the males, the study year \times UCAS excellence interaction was not significant [$F < 1$]. However, the study year \times ethnicity interaction was significant [$F(4,1506) = 3.80, p < 0.01, \eta_p^2 = 0.005$] and showed that Black females were not experiencing the uplift in marks in the final year experienced by both White and Asian females. The ethnicity \times placement interaction narrowly missed significance [$F(2,1506) = 2.90, p = 0.055, \eta_p^2 = 0.004$] but the ethnicity

\times placement \times UCAS excellence interaction was significant [$F(2,1506) = 3.19, p < 0.05, \eta_p^2 = 0.004$]. This suggested that – across all study years – White high UCAS excellence females achieved higher marks than low UCAS excellence females, regardless of placement status. For Asian females, the benefit of being in the high UCAS excellence group was only exhibited amongst students who did not do placements, whereas for Black females being in the high UCAS excellence group was a benefit only amongst those who did do placements. A *study year* \times *ethnicity* \times *UCAS excellence* interaction [$F(4,1506) = 2.52, p < 0.05, \eta_p^2 = 0.003$] showed that Asian females with low UCAS excellence caught up with their high UCAS excellence counterparts by the final year, whereas in White females the gap remained constant (in Black females the size of the gap was not significant). A *study year* \times *UCAS excellence* \times *placement* interaction [$F(2,1506) = 3.43, p < 0.05, \eta_p^2 = 0.002$] showed that in female students who had done placements, high and low UCAS excellence students performed at a similar level by the final year, whereas in those who had not done placements a differential in performance was still present. A *study year* \times *ethnicity* \times *placement* \times *parental education* interaction [$F(4,1506) = 3.67, p < 0.01, \eta_p^2 = 0.005$] showed that the final year decline in performance in Black females was principally associated with those who had not done a placement and whose parents had not had a university level education. Other effects and interactions were not significant.

In summary, the situation for females was far more complex than for that of males, with multiple factors – including parental education, placement experience, UCAS excellence and ethnicity – influencing student attainment.

DISCUSSION

Consistent with our first hypothesis, even at a highly multi-cultural university where white students are a minority – and with a number of critical variables statistically controlled – White students still out-performed their Asian and Black counterparts in terms of final year marks. This worrying result replicates findings reported across the sector and reflects previous literature (e.g., Broecke and Nicholls, 2007; Fielding et al., 2008; Richardson, 2008) on the BME attainment gap in Higher Education. Arguably, some reassurance could come from the finding that, contrary to our second hypothesis, the BME achievement gap did not increase by year of study – at least not overall – suggesting that the university experience was not exacerbating the gap over time. However, nor was the gap decreasing, despite a general trend toward higher marks across the student population in the final year and evidence that the influence of other critical factors such as prior performance did decrease in some groups over the years of study (see also Thiele et al., 2016). Moreover, it could be considered of even greater concern that the BME achievement gap is already present in the first year of University study, despite the employment of statistical controls for entry qualifications. Furthermore, for Black females, the gap did grow, as this group did not improve their performance in

the final year to the same extent as their White and Asian counterparts.

In support of our third hypothesis, the BME achievement gap was markedly smaller in students who had taken a placement year. Placement experience was also associated with a reduced gap in the final year between those with higher vs. lower entry tariffs – a finding particularly true for males. Students who took placements improved their marks more in the final year than those who did not. Previous research has shown the beneficial effects of placement experience on final year performance (e.g., Reddy and Moores, 2006, 2012; Jones et al., 2015), but the current study extends this work to suggest that placement experience is associated with reduced achievement gaps – for both BME students and for students entering University with different levels of prior achievement. Placement experience may therefore offer a mechanism to help bridge the BME achievement gap, although it does not eliminate it.

Contrary to our final hypothesis, the size of the BME achievement gap did not differ between students of higher and those of lower prior attainment. Prior attainment is therefore not likely to be able to account for the different sizes of BME attainment gaps reported across different types of institutions (Fielding et al., 2008).

In addition, after controlling for entry tariff and other variables, we did not find a significant difference in the performance of males vs. females. Previous literature has demonstrated superior attainment in female students (e.g., Broecke and Nicholls, 2007; Thiele et al., 2016). However, in contrast to the males, female achievement was higher if their parents had been to University; Mehta et al. (2011) discuss a range of reasons why first generation students find study more difficult. Also, in contrast to males, females showed an overall main effect of year of study, with an uplift in their grades in their final year. However, as already discussed, Black females who entered University with low UCAS excellence and who did not do a placement did not show this uplift. Cotton et al. (2016) suggested that male (and overseas BME) students may be more likely to overestimate their likely degree outcomes, possibly leading to an under-commitment of study time. Female students were reported to be generally more anxious about their studies and placed greater emphasis than males on the academic (vs. social) aspects of University life, although some reporting bias may have been evident. Richardson (2008) found that the BME attainment gap was more pronounced in women than men, but our data did not show this pattern overall.

A study by the National Union of Students (2011) “Race for Equality” proposed a number of possible reasons for the BME attainment difference including previous educational experience, teaching and learning factors within the institution, institutional environment and ‘broader’ (psychological) issues. Cotton et al. (2016) also considered differences in learning approaches (see also Ridley, 2007; Richardson, 2010), integration into University life (see also Eimers and Pike, 1997; Severiens and Wolff, 2008; Meeuwisse et al., 2010a; Stuart et al., 2011) and having an accurate understanding of achievement levels. Cotton et al. (2013) also found that BME (and male) students were more likely to have part time jobs during term time

(see, e.g., Moreau and Leathwood, 2006 for a discussion of the risk of term time working exacerbating inequalities). Meeuwisse et al. (2010b) provide evidence that BME students who withdraw from higher education more often report doing so because of a perceived lack of quality of education rather than a lack of ability (see also Eimers and Pike, 1997). Thus, perceptions of quality may also have a greater impact on the motivation of BME students. A SOAS Students' Union (2016) report, based on qualitative data, takes a somewhat more critical 'non-deficit' stance, suggesting exclusion and discrimination in the teaching and learning environment contributes to the gap. Indeed, a recent HEFCE (2016) report suggests that BME graduates are more likely to wish they had made different Higher Education choices. Richardson (2015) provides a useful summary of 'what we know and what we don't know' about the under-attainment of BME students in United Kingdom higher education and suggests that ethnicity is a proxy for other factors yet to be identified, which are confounded with ethnicity.

LIMITATIONS AND CONCLUSION

Since students in this study were not randomly allocated to take a placement (or not), any causal inferences regarding placements reducing the BME achievement gap cannot be made. A fully randomized study would not be possible. Jones et al. (2015) discussed the self-selection issue in terms of students' choice whether or not to take a placement year and found that, although some self-selection is present, the impact of placement experience is still positive. A number of demographic factors – including ethnicity – are known to be associated with the likelihood of a student taking an optional placement at Aston University. Of concern, therefore, is that the reduced likelihood of BME students taking placements also means that, if placement experience can act to reduce achievement gaps, the students that may benefit most from this experience are also those least likely to use the opportunity. Encouraging BME students to participate in optional placement experience may therefore be one way of helping to reduce the BME achievement gap.

The observational nature of our study does not allow us to infer what the cause of the BME achievement gap at Aston University might be. However, what has been shown is that the gap still exists even after statistically controlling for a number of demographic and situational variables. It is also present across 3 years of study. Although our findings may be somewhat less generalisable to other institutions due to the particular diverse nature of the student population at Aston University, conversely they can be taken as a strong indication that the BME achievement gap is not likely to be *fully* accounted for by the experience that BME students are often a minority in United Kingdom universities. However, this is not necessarily to say that being a minority would not present issues that might further contribute to any gap. Furthermore, although the student population at Aston University may be ethnically diverse, the staff profile is markedly less so – only 5% of Aston University's academic staff are BME. The lack of BME staff would limit exposure to role models of the same ethnicity which may have

some impact on motivation and success (e.g., Connor et al., 2004).

In this study, we only investigated the influence of three broad categories of ethnicity – White, Black and Asian – on performance. Thus, as well as omitting students from the other broad categories, we also ignored potentially significant and important differences within those broad categories. Although this strategy allowed us to ensure a relatively large sample size in each category, it will undoubtedly have also meant that important differences were ignored. Nevertheless, even considering these three broad categories, we observed different patterns of performance and different influences on performance, suggesting that the BME achievement gap is likely to be modulated by a number of factors acting differently on different groups. There were variables which would have been useful to include in the model, but for which no data were available, including term-time working, parental income and English as an Additional Language. Students with BTEC qualifications, and students from independent schools were excluded from analyses, yet these students could have contributed to the gap, despite the low numbers in each group. A further limitation was that we deliberately included socioeconomic status and UCAS entry tariff as covariates in the model in order to provide a statistical control for these factors, but ethnicity is not statistically independent from socioeconomic status or entry tariff. Indeed, in our sample, Asian students were more likely than Black students to be categorized as high UCAS excellence and there was a significant association between socioeconomic status and ethnicity.

The sizes of the effects reported in the study appear relatively small. In terms of final year average grades, the effect of ethnicity accounted for just 1.4% of the total variance. However, to provide some context, the effect of prior attainment was just 1.8% of the total variance. The mean difference between White, Asian and Black average marks was between 2 and 3 marks. Although this may not seem large, a whole degree classification spans only 10 marks and with mean values of BME groups falling toward the lower end of the 2.1 degree classification range, this magnitude of difference will very easily create differences in final degree outcomes for large numbers of students. These findings therefore have serious and long term implications. Many graduate-level jobs and post-graduate courses (and related bursaries) have a 2.1 classification degree or above as a minimum entry requirement. This means that BME graduates are less likely to be able to benefit from these opportunities, impacting on both their career and further educational opportunities (e.g., Naylor et al., 2007). Although Aston University has an excellent reputation in achieving good graduate outcomes for its students, universities also have a moral and civic responsibility to provide equality of opportunity and outcomes for students from all backgrounds.

Our findings therefore reinforce the existence of the BME achievement gap in final year performance in a United Kingdom University and – for the first time – show that a gap exists even in a University with a predominantly non-white student demographic. We also show that the achievement gap is also present from the first year of study and remains reasonably constant for most groups. However, placement experience is associated with a smaller – but still present – BME achievement

gap in the final year. Future research should attempt to evaluate the impact of work placements on the BME achievement gap in other institutions and try to further disentangle potential self-selection effects of participating in a placement from the benefits offered from the placement itself. However, placements are important for both career and degree outcomes, particularly for students with certain demographic characteristics and prior performance profiles and BME students should be encouraged to gain such experience. Higher Education Institutions need to invest in resources to motivate hard- to-reach groups and in particular students who enter university with weaker prior achievement. Although Aston University will do exactly that, completely eliminating the BME achievement gap will clearly involve going beyond anything which we already do.

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ETHICS STATEMENT

The data for this study were part of a larger dataset collected by the University for various functions including equal opportunities monitoring and enhancing the student experience. No new or additional data were collected and all data were anonymized. The analyses conducted were part of a project which monitors fair access and success. Students consent to their data being used for these purposes upon accepting their offer to study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Social Cognition and Executive Functions As Key Factors for Effective Pedagogy in Higher Education

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Higher education (HE) faces the challenge of responding to an increasing diversity. In this context, more attention is being paid to teachers and teaching skills positively related to students learning. Beyond the knowledges identified as key components of an effective teacher, teachers also need to be capable of unraveling what their students think and believe, and how they accommodate the new information. More importantly, teachers need to be able to adapt their own teaching to their audience's needs. In learners, social cognition (SC) has been related to a better receptivity to the different teacher-student interactions. Since these interactions are bidirectional, SC could also help to explain teachers' receptiveness to the information available in feedback situations. However, little is known about how SC is related to teacher development, and therefore teaching effectiveness, in HE. In addition, executive functions (EFs), closely related to SC, could play a key role in the ability to self-regulate their own teaching to better answering their students emerging needs. Although there is wide evidence regarding the association of EFs to performance in high demanding settings, as far as we know, there are no studies exploring the relationship between teachers' EFs and teaching effectiveness in HE. Establishing a positive association between teaching effectiveness and these socio-cognitive functions could be a promising first step in designing professional development programs that promote HE academics' ability to understand and care about students thoughts and emotions, to eventually adapt their teaching to their students needs for a better learning.

Keywords: social cognition, executive function, teaching effectiveness, higher education, theory of mind, empathy

Higher education (HE) deals with students increasingly diverse in a wide range of variables such as age, gender, race, ethnicity, academic and socioeconomic backgrounds, among others (Smith, 1989; Gurin et al., 2002; Brown, 2004). As a consequence, offering high quality learning opportunities so all the students reach the expected achievements emerges as a great challenge for Universities these days. Since teachers are the ones engaged in a closer and more frequent interaction with students, it seems reasonable to think that whatever strategy Universities implement to deal with this challenge, teachers should be a nuclear part of it Lazerson et al. (2000) and Barrington (2004).

In a context where students are no longer the only ones responsible for their learning, more attention is being paid to teachers and teaching characteristics that are positively related to students learning (Fry et al., 2003; Klassen and Tze, 2014). Some authors suggest that these fundamental characteristics do not differ significantly across different levels of Education (Hutchings and Shulman, 1999; Lazerson et al., 2000). In this sense, Pedagogical Content knowledge, emerging from both Subject matter and Pedagogical knowledge, has been identified as a key component of an effective teacher (Shulman, 1986). Particularly in experienced HE teachers, Pedagogical content knowledge has been assumed, since their pedagogical experience is already framed in their own disciplines (Lazerson et al., 2000). However, it has been suggested that effective teachers also need to be capable of unraveling how their students understand and accommodate the new information, so they can adapt their own teaching to their audience's particular needs (Darling-Hammond, 1998).

The former proposal for teacher effectiveness (Darling-Hammond, 1998), describes the teaching-learning process as an interaction that in order to be successful needs the information to flow not only from the teacher to the student, but also in the opposite direction (Battro et al., 2013; Mcconville, 2013; Watanabe, 2013). The importance of this bi-directionality could be even greater in a context of growing diversity, where teaching designed for one particular student profile may not be effective in engaging the motivation of all learners and offering them optimal learning opportunities (Guri-Rosenblit et al., 2007). Nonetheless, the importance of this bidirectional interaction for a better student achievement does not seem to have fully permeated the actual practices of HE teachers (Chang et al., 1981; Tettegah and Anderson, 2007), where teaching effectiveness is mostly still assessed through traditional measures that seem non-related to student learning (Uttl et al., 2017), and teacher cognitive and socio-emotional competencies are largely overlooked.

Although most of the scientific evidence supporting the importance of this bidirectional interaction for teaching effectiveness comes from school settings (Lucariello et al., 2016), there are some experiences that highlight the importance of this interaction also in HE. In a qualitative study from the Harvard Graduate School of Education (Rodriguez and Solis, 2013) 23 master teachers were asked about “*What are you focusing your mind on throughout the process of teaching?*” (Rodriguez and Solis, 2013, p. 161). Participants in the study varied from Pre-K teachers to graduate-level professors, and were selected because they had previously been recognized for their teaching effectiveness. The authors conclude that teachers' responses reveal that the awareness of the learner-teacher interaction is fundamental for a successful learning. In this sense, they identify three main awareness dimensions in teachers' responses critical for a successful learning:

- (1) *Connection*: described as the close relationship with the student, the need of creating a true understanding of the other, the importance of sharing feelings.

- (2) *Collaboration*: reveals the former interaction as an active process for both, the teacher and the student, who work together toward a common goal.
- (3) *Mutual effects*: is the awareness of some sort of Banduras' Reciprocal Determinism (Bandura, 1978, 1989). Teachers realize when they adapt their teaching to respond to students feedback, students respond changing their approach to learning.

Similarly, Bain (2004), after his analysis on the practices and characteristics of the “What the Best College Teachers,” highlights that *the best teachers* share a relationship of trust with their students and value the interaction with them. Although systematized information about non-effective teachers is lacking, this qualitative evidence suggests that master teachers seem to have developed a high level of theory of mind (ToM) and Empathy. Both ToM and Empathy are core components of what is known as social cognition (SC), that is, the set of cognitive processes that enable us to interact effectively and safely with other people (Adolphs, 2009).

Theory of mind, defined as the ability to infer our own and others' mental states that can be used to predict the behavior of others (Premack and Woodruff, 1978), has already been presented as a critical ability that allows teachers to engage in a successful interaction with their students (Strauss and Ziv, 2012; Mcconville, 2013; Rodriguez, 2013). Research on the relationship between teachers' ToM and teaching effectiveness has traditionally been approached by studying teachers' beliefs about learning (Strauss and Shilony, 1994; Strauss et al., 1998). These studies focus on teachers identification of key concepts for students learning and provide rich information about the learning theories that teachers implicitly or explicitly share. However, they are not informative about teachers' ToM, that is, they tell little about teachers' ability to read their students thoughts, needs or intentions when interacting with them. Despite a growing consensus about its importance, as far as we know, no studies have been published so far aiming to identify the cognitive processes that allow teachers to understand their students' thoughts, intentions and needs. More specifically, no studies have been published that assess teachers ToM and explore the relationship that could exist between teachers' ToM and their performance or their students learning.

Together with ToM, Empathy is the other main SC component. It is known as the ability to not only recognize or identify others' feelings, but also to experience these emotions by adopting their perspective and responding with sensitivity and concern to their suffering or needs (Batson, 2009). In the educational context, it has been emphasized the importance of knowing how to communicate that we have indeed understood the other's feelings and our will to help (Feshbach and Feshbach, 2009). Some authors have suggested that empathic teachers model and facilitate their students learning and empathic development (Chang, 2003; Cooper, 2004). It has also been argued that empathic teachers promote their students positive attachment to them and to schools (Carkhuff and Berenson, 1967). To date most studies on empathy in educational contexts have approached empathy from the

Rogers therapeutic perspective (Feshbach and Feshbach, 2009). This perspective posits that empathy in educational contexts works as in therapeutic settings, that is, the more communicative and understanding the teacher is with their students, the greater the bond between students and teachers becomes, at the same time promoting students bond with school (Rogers, 1969). In this sense, the meta-analysis performed by Cornelius-White (2007) including studies from 1942 to 2004, confirms the positive relationship between “positive personal characteristics of the teacher,” such as empathy, and positive students behavior. In addition, this relationship seems to be independent from the teacher previous pedagogical experience. Nevertheless, this comprehensive meta-analysis also reveals some limitations of the current knowledge and establishes challenges for future research such as: (a) the need for more objective measures of empathy, moving away from self-reported measures (Stueber, 2017), (b) the need to further explore the relationship between teachers empathy and teachers performance, and (c) the need for this relationship to be studied specifically in HE, where it has received much less attention.

As opposed to teachers’ SC, learners’ SC has been widely related to performance and academic achievement. A recent review points out that SC in children is not only positively related to specific academic skills such as reading and writing but also predicts the development of metacognitive skills throughout childhood (Wellman, 2016). Although this review makes no mention about how teachers’ SC could impact teaching-learning interaction, it highlights two arguments that are central for this *perspective* article: (a) children with greater SC are more receptive to information available in feedback instances; and (b) SC processes are trainable.

Regarding the first argument, little discussion exists today on the interactive nature of teaching-learning processes. Thus, when recognizing the importance of the learning mind and brain, researchers should not forget about the other mind and brain involved in the interaction: *the teaching brain* (Rodríguez, 2013). In this sense, Wellman argument invites us to think that teachers with greater SC should make the most of the interactive instances with their students, and would be more receptive to their students needs, thoughts, etc. The second argument presented by Wellman points to the importance of studying the relationship between teachers’ SC and their performance or effectiveness. If this relationship proves to be positive, emphasizing the development of SC abilities could contribute to the birth of a new way to train HE teachers. In the light of some promising evidence of adults’ SC being amenable to intervention (Horan et al., 2008; Santiesteban et al., 2012; Bishop-Fitzpatrick et al., 2013) and a few attempts aiming to intervene in teachers development of social skills (Barton-Arwood et al., 2005; Talvio et al., 2016; Jennings et al., 2017), helping teachers to further develop their SC could become an evidence-based strategy to enhance teachers cognitive development and therefore effectiveness in HE, but more evidence linking these interventions to a positive impact in students learning is needed.

In addition to all the above, being aware of what their students are understanding and learning should be a very useful tool for teachers to timely self-regulate their own teaching. Moreover,

effective teachers also need to monitor, assess and reflect on their own teaching performance, as well as having the flexibility to implement the necessary changes to improve it Darling-Hammond (1998). Therefore, effective teachers first need to integrate the information coming from their students with the information from their own behavior and, then, make the necessary adjustments to offer an inclusive learning experience. In cognitive terms, an effective teaching would demand a good executive functioning. Although different conceptualizations of executive functioning have been proposed depending on the specific processes being emphasized, there is a general consensus in defining executive functions (EFs) as a set of processes in charge of planning, monitoring and regulating behavior in relation to an established goal (Stuss and Alexander, 2000; Alvarez and Emory, 2006; Flores and Ostrosky, 2012; Lezak et al., 2014). EFs have been extensively linked to academic success (Meltzer, 2007; Best et al., 2011; Samuels et al., 2016), as well as to professional performance in some highly demanding contexts (Stavrakaki et al., 2012; Vestberg et al., 2012). As far as we know, there are no studies exploring the relationship between EFs and effective teaching, but a very recent study on teachers’ temperament found that the *conscientiousness* personality trait is positively related to some external measures of teaching effectiveness in school *first-year* teachers (Bastian et al., 2017). A *Conscientiousness personality* is related to an organized and planful, achievement-oriented worker (Barrick and Mount, 1991), suggesting a high similarity with the set of cognitive functions identified as EF. Therefore, although prior evidence suggests that EF might be an important factor behind teacher effectiveness, we have not found studies exploring this relationship in HE.

Literature from cognitive and social neuroscience shows a close relationship between EFs and SC in both children (Sabbagh et al., 2006) and adults (Saxe et al., 2006). The nature of this relationship has not been yet clarified, and while some studies suggest that EFs underlie SC, particularly ToM (Baez et al., 2014), others argue this relationship is based on the overlap of some neuroanatomic circuits (Saxe et al., 2006). In any case, a review on the relationship between EFs and SC in patients with acquired neurological pathology defends CS and FE as distinct cognitive functions (Abouafia-Brakha et al., 2011), although a positive relationship between them has been consistently reported. These authors also emphasize the need to further explore this relationship in different contexts and populations since there is no agreement about which processes are shared by both functions.

At present the influence of SC in learning has received considerable attention, mainly from the study of these abilities in learners. In comparison, the study of teachers’ SC and how these abilities are related to teachers development and teaching effectiveness has been widely ignored. Although this relationship has been theoretically defended in previous work, empirical approaches focusing in HE are scarce and show some important methodological flaws. In addition, the consistent association found between EFs and SC makes critical to include teachers’ EFs when exploring the association between teachers’ SC and effective teaching in HE. On one hand, it would help to clarify whether

teachers' EFs is to some extent related to teacher effectiveness in HE. And on the other hand, it would be necessary to explore if teachers' EFs have a mediating role on the relationship between teachers SC and their teaching effectiveness.

In this context, research on teachers' EF and SC in relation to teachers effectiveness in HE seems auspicious, but further empirical efforts need to be made. In a situation of growing diversity, HE teachers are in need of an upgraded toolkit of teaching strategies and skills to offer appropriate learning opportunities to all their students. Although establishing a positive association between teachers' SC and EFs and their teaching effectiveness is not enough to infer a causal relationship, it could be a helpful first step. If this relationship can be established, specific programs could be implemented in HE in order to assess the impact they could have in teachers development and teaching effectiveness. Eventually, professional development programs offered by Universities in order to

improve their academics teaching skills, could highly benefit from implementing changes based on this expected evidence.

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Both authors listed RC and GN have made substantial, direct and intellectual contribution to the work, and approved it for publication.

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An Investigation of First-Year Students' and Lecturers' Expectations of University Education

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Transition from school to university can cause concern for many students. One issue is the gap between students' prior expectations and the realities of university life, which can cause significant distress, poor academic performance and increased drop-out rates if not managed effectively. Research has shown several similarities in the expectations of staff and students in regards to which factors determine academic success, but there is also evidence of dissonance. For example, staff consider independent study and critical evaluation as key factors, whereas students view feedback on drafts of work and support from staff as being most important. The aim of the current study was to determine what expectations students hold when starting university education, and what expectations university lecturers have of students entering university. Lecturers ($n = 20$) and first year students ($n = 77$) completed a series of questionnaires concerning their expectations of learning in HE (staff and students) and their approach to teaching (staff). Results revealed that students have largely realistic expectations of university. For example, the majority expected to be in charge of their own study. Some unrealistic expectations were also evident, e.g., most expected that teaching would be the same at university as it had been at school. The expectation that lecturers would provide detailed notes varied as a function of student age. Lecturers reported modifying their expectations of students and adapting their teaching approach according to year of study. Information-transmission/teacher-focused style was more common when teaching 1st year students; a more concept-changing/student-focused approach tended to be used when teaching 2nd year students (and above). Lecturer's expectations of student engagement did not differ according to year. Less experienced lecturers reported more negative expectations of student engagement than did experienced lecturers. In line with previous work, we observed overlap in expectations of staff and students, but some clear differences too.

Keywords: student expectations, lecturer expectation, UK higher education, University education, teaching styles, teaching experience

INTRODUCTION

Transition from school/college to university can be extremely challenging, both for the student and academic staff involved in teaching the new cohort. This transition has been identified as a major cause of anxiety amongst first-year university students (Lowe and Cook, 2003). Failure to successfully manage such transition may result in significant distress, poor academic performance,

and increased drop-out rates (Yorke and Longden, 2004). It is notable that the transition to university may be particularly difficult for mature students with families, for students who are the first generation to go to university, and for students who come from ethnic minorities that are underrepresented in a student population (Briggs et al., 2012). Since the arrival of the Teaching Excellence Framework (TEF) this has become particularly relevant for the UK Higher Education (HE) sector. TEF recognizes institutions which do the most to encourage students from a range of backgrounds, and provide support to facilitate their retention and progression.

According to Smith and Wertlieb (2005), a key factor in the ease of transition from school or college to university is student expectations, or, more specifically, the gap between students' prior expectations of HE and the reality of university life. There is a growing body of evidence showing that many students arrive at university with unrealistic expectations (Lowe and Cook, 2003; Smith and Hopkins, 2005; Crisp et al., 2009; Murtagh, 2010; Kandinko and Mawer, 2013). For instance, incoming students often overestimate the amount of contact time with staff that will be offered at university (Smith and Hopkins, 2005); they also have unrealistic beliefs about class sizes, staff availability, and workload that are inconsistent with reality (Lowe and Cook, 2003). With this in mind, students often arrive ill-prepared for studying at university, where teaching regularly takes place in large class sizes, where students are taught by staff who are involved in a variety of other roles in addition to teaching, and where the emphasis is on independent learning. As noted by Murtagh (2010), the transition from the highly controlled, teacher-driven learning environment of schools or colleges to university, where the student is responsible for their own learning, is perhaps the biggest challenge for the student. Furthermore, such mismatch between a student's expectations and reality has the potential to color their experiences during first year. This is important, because first year experiences play a significant role in shaping students' attitudes and performance in subsequent years (Tinto, 1993). Additionally, the initial weeks of first year are also the time at which students are most likely to drop out from their course (Smith and Hopkins, 2005).

To manage the transition of students into university successfully, universities need to be proactive in working to minimize any potential discrepancies between what students expect of university (and by proxy, of their lecturers) and what, in turn, is expected of them. This issue is likely to become increasingly important given the proposed changes to tuition fees and the increasingly consumerist ethos within the HE sector, particularly against a backdrop of continued expansion of student numbers at UK universities.

Student Expectations of Studying at University

A common expectation of students is that a university education will enhance their academic and vocational prospects, but also provide opportunities to become independent and to enjoy themselves (Lowe and Cook, 2003; Kandinko and Mawer, 2013). Employability has become a key issue in the UK HE

sector, particularly since the increase in student fees at British universities (Kandinko and Mawer, 2013). The career-focused approach to education can be beneficial. For example, Tinto (1987) reported that students who were more certain about their long-term career goals were more likely, and faster, to successfully transition to university than students who studied without clear career trajectories. However, this focus on employability can potentially lead to a shallow approach to learning, with students concentrating on merely passing assessments to get through the course rather than developing a deep approach to learning and trying to understand the course material.

Aside from expectations concerning improved employment prospects and increased personal independence, students generally come to university with few expectations and with little notion of how to be successful; they often view it as a continuation of secondary school. For example, Lowe and Cook (2003) reported that nearly a third of their cohort of first year students expected that lecturers would use similar teaching styles to those they had experienced at school. Thus, students found themselves unprepared for the more relaxed and informal style of teaching they encounter at university. With regards to expectations about the style of teaching that students may encounter at university, there was an interesting distinction reported by Lowe and Cook (2003). A "significant" number of their cohort reported receiving much more detailed material in, or for, class than they had expected, whereas an equally large number of students found that the lecture material was not as detailed as they had expected (Lowe and Cook, 2003). These variations are likely to make it harder for universities to manage students' expectations during the transition period into HE.

Another issue of note concerns students' expectations of how they will be taught at university. For example, Kandinko and Mawer (2013) reported that students exhibited a preference for small tutorial-style classes, as opposed to larger lecture-type classes. This is because the former offers greater opportunities for face-to-face interactions with teaching staff. However, the rapid expansion of the HE sector has seen a movement toward greater reliance on large lecture-style classes to deliver course material rather than small group teaching (Crosling et al., 2009), especially during 1st year. Incoming students often overestimate the amount of contact time that they will be offered at university (Smith and Hopkins, 2005) and can have expectations about the role of teaching staff that are inconsistent with the reality of studying at university. For example, although HE staff tend to consider the responsibility for learning to be primarily the students' responsibility (Crabtree et al., 2007), some students tend to consider that lecturers have the greater responsibility for students' learning (Killen, 1994). On the other hand, Crisp et al. (2009) demonstrated that students' expectations can be consistent with those of staff, as their cohort recognized that their success at university would be primarily be their own responsibility. Despite the evidence of congruent staff/student expectations it remains the case that there are often discrepancies between the students' expectations of the role of staff and the reality of university life. For example, Lowe and Cook (2003) reported that 41% of their cohort had expected staff, i.e., lecturers, to be more sympathetic and reassuring, and 35% had thought that

lecturers would be more helpful and friendly. This is important because, expectations of positive staff-student interaction and mutual understanding seem to be vitally important for students' successful transition into university (Clark and Ramsay, 1990; Grosset, 1991; Johnson and Watson, 2004; Keup and Barefoot, 2005), as is lecturers' involvement in facilitating academic and social integration. Negative perception of academic staff has been shown to adversely impact students' chances of success (McInnis et al., 1995; Maxwell, 1996; Lizzio et al., 2002).

The most significant difference, or gap, between what students think university is like or what they expect from university, relates to their preparedness academically, i.e., their expectations of potential academic difficulties they may encounter. Although some studies have reported that students were rather confident about their abilities to cope with academic requirements (Cook and Leckey, 1999), others have reported that students expect to struggle with the demands of learning in HE. For example, Lowe and Cook (2003) reported that two-thirds of their sample expected to experience problems in coping with the academic demand. Interestingly, upon follow-up, it turned out that only 50% of students actually experienced academic struggles. Thirty-nine percent of students shared that they had struggled to keep up with the workload and over a third reported that they experienced difficulties in developing an independent learning/study style, i.e., being responsible for their own learning. These issues are likely related to students' expectations prior to arriving at university. For example, Lowe and Cook (2003) reported that, on entering university, 57% of their cohort did not know how much studying, including attending classes and independent reading, would be required per week. Indeed, students often underestimate the number of hours of independent study that would be required for their course (Crisp et al., 2009) and were unprepared for this aspect of university life (Murtagh, 2010). Murtagh (2010) also highlighted that students arrive at university without a clear understanding of how they are going to be assessed, supporting Lowe and Cook's (2003) observation of nearly 20% of their sample not knowing about assessments on their course. There is evidence that students may harbor unrealistic expectations about assessments, for example, supposing that lecturers will provide detailed feedback on drafts of their work and that staff will be able to return assessed work within a week (Crisp et al., 2009).

Students expect to, and often do, experience financial difficulties during their degree. For example, Lowe and Cook (2003) reported that 45% of the cohort they studied experienced financial hardship. With this in mind, students often expect to combine paid work with their studies. Crisp et al. (2009) observed that 70% of their cohort expected to be doing some form of paid work alongside their degree. Longden (2006) showed that over 40% of their sample of first-year students were working alongside their studies, with 10% of the sample working more than 20 h per week. The need for students to undertake paid work has been implicated in rates of non-attendance at lectures, which is a growing problem in HE (Cleary-Holdforth, 2007; Field, 2012). This is interesting because students recognize that attendance at lectures and other teaching sessions is important for their academic performance (Crisp et al., 2009). Given that missing lectures and teaching sessions can disadvantage students,

universities have responded by providing additional resources, such as offering notes and/or recorded lectures, which can be accessed online. These are popular with students, but the concern remains that they might exacerbate the problem of non-attendance (Grabe, 2005; Chang, 2007; Karnad, 2013).

An issue that needs to be considered is that where students have few or inaccurate perceptions of university education prior to undertaking undergraduate study this may contribute to a disengagement from the educational and social aspects of university life. Such disengagement can have detrimental effects on students' academic performance, their personal and social development, and may also affect student retention (Lowe and Cook, 2003). A need for better preparation, aided by appropriate communication between teachers and students and between secondary and tertiary educational institutions, is obvious. Universities too need to offer appropriate academic, attitudinal, and social preparation courses for incoming students. This should be a process, rather than an event and, in addition to academic preparation, linked to peer-mentoring and staff-student interaction opportunities (Lowe and Cook, 2003).

Lecturers' Expectations of University Students

There is a paucity of research assessing what lecturers expect of students when they first enter university and very few studies have investigated the perceptions of both students and lecturers regarding factors that influence academic success (Killen, 1994; Fraser and Killen, 2003). Fraser and Killen (2003) showed that, overall, there was considerable agreement between the responses of first-year students and lecturers about which factors impact on academic success. However, students and lecturers significantly differed on the importance placed on "regular attendance at lectures." Students did not expect having to attend all lectures, or considered irregular lecture attendance to affect their academic success. Lecturers expected students to regularly attend lectures and linked attendance with success (Killen, 1994; Fraser and Killen, 2003). In the context of essay writing, McEwan (2015) reported several interesting differences between the expectations of staff and students. For example, 64% of their sample of HE tutors considered that the lecturer is the target audience for an essay, whereas only 38% of their student sample thought this was the case. Also, 71% of staff thought that students should critique their sources, whereas only 25% of the students thought this was necessary.

With regards to expectations that would contribute to students' academic failure, there was significant disagreement between lecturers and first-year students. Students attributed external causes to less successful academic performance, specifically part-time work. Lecturers, on the other hand, thought that it was "inadequate and/or poor exam preparation" that led to students' academic failure, i.e., more internal characteristics (Fraser and Killen, 2003). Additionally, there was a tendency for blame-attribution: students tended to blame lecturers for academic failure yet lecturers held the students themselves responsible for not achieving to the best of their abilities (Killen,

1994; Fraser and Killen, 2003). According to Mischel (1973) lecturers expect students to be independent learners by the time they enroll at university, but this assumes that incoming students already understand the need to be efficient in balancing their desire for achievement with a strong sense of purpose and enjoyment from academic activities. Fraser and Killen (2003) reported that lecturers also expect students to be self-disciplined and self-motivated.

Recent changes in student fees have led to an increasingly consumerist ethos amongst the student population which has influenced students' expectations (Kandinko and Mawer, 2013). The question remains as to whether staff expectations of students has also been influenced by these changes. The match, or mismatch, between student and staff expectations is important, as it can have implications for students' academic performance, but also their social and emotional wellbeing (Williamson et al., 2011). With this in mind, it is important to gain information about the current match or mismatch between students' and staff expectations.

The aim of the current study was to determine the expectations of incoming first year students and the academic staff who teach them and to establish the relative match—or mismatch in the expectations of these two groups. Students were presented with a questionnaire, based on Lowe and Cook (2003), that assessed their expectations of the academic and social aspects of starting at university. Lecturers were presented with the Approaches to Teaching Inventory (ATI; Trigwell and Prosser, 2004), which assesses whether lecturers adopt more of an *Information-Transmission-Teacher focused (ITTF)* approach; or more of a *Conceptual-Change-Student focused (CCSF)* teaching style and with statements reflecting positive and negative student engagement.

METHODS

Participants

Data were available for 77 students enrolled in either the Single Honours Psychology Programme or a Joint Honours Degree Programme with Psychology being one of the two subjects studied. Additionally, data were collected from 20 staff members who are currently lecturing on the Psychology Programme at Aston University, Birmingham, UK. All participants were recruited over a period of ~2 months, between October and November 2014. The experimental protocol was explained to participants and written informed consent was obtained, in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Centre for Learning Innovation & Professional Practice (CLIPP) at Aston University, Birmingham, UK prior to data collection.

Student Sample

The mean age of the student participants ($n = 77$) was 19.1 years ($SD = 3.0$ years), with a range of 21 years: minimum age: 18 years; maximum age: 39 years. The sample consisted of 15 men (19.5%) and 62 women (80.5%)—this male:female ratio is characteristic of the undergraduate psychology programme at Aston University. Seventy-three participants (94.8%) were studying on the Single

Honours Psychology Programme, the remaining participants (5.2%) were studying on the Joint Honours Degree Programme. The average entry tariff for this cohort was 380 UCAS points (Guardian University Guide, 2015), which is consistent with the average of 386 over 5 years (2012–2017) and 87% of the cohort progressed into second year, which is consistent with the average progression rate 86% over 5 years (2012–2017). However, only 4% of the cohort actually withdrew or were withdrawn from the programme, which is slightly lower than the average withdrawal rate of 6% over 5 years (2012–2017). The majority of participants (73; 95.8%) were in their first-ever degree programme; the remaining participants (5.2%) had previously entered a degree programme without completing it.

Staff Sample

Data for lecturers ($n = 20$) showed that 10 lecturers' responses (50%) for the questionnaire were concerning first-year students, six lecturers' responses (30%) were concerning second-year students and four lecturers' responses (20%) were concerning third/final-year students. On average, lecturers had been teaching 14.5 years ($SD = 9.1$). The sample included novice and experienced lecturers with a teaching-experience range of 39 years (minimum years teaching: <1 year; maximum years teaching: 40 years). The course for which the questionnaire was completed was taught—on average—for 4.2 years ($SD = 4.4$ years; range: 19 years; minimum years teaching on this module: <1 year; maximum years teaching on this module: 20 years).

Measures

Students completed a questionnaire that was created specifically for this study but which was based on the survey used by (Lowe and Cook, 2003). The questionnaire assesses students' expectations of the academic and social aspects when starting at university, and is comprised of three sections: (a) *Reasons for Attending University* (15 items); (b) *Academic Aptitude* (15 items); (c) *Teaching Expectation* (15 items). Students were required to rate their agreement with each statement on the questionnaire on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Lecturers completed the ATI (Trigwell and Prosser, 2004), a 16-item self-report questionnaire which consists of two main scales: (a) reflecting an information-transmission/teacher-focused (ITTF) approach; (b) reflecting a conceptual-change/student-focused (CCSF) approach. Each scale is further subdivided into "Intention" and "Strategy" subscales. The "Intention" subscale is associated with what is meant to be achieved; the "Strategie" subscale is linked to how this would be achieved (teacher-focused; student-focused; teacher-student interaction). "Intentions," thus, range from "transmission of subject content to students" to "helping students change their conceptions of the content." Lecturers were required to rate their agreement with each of the statements on the questionnaire on a 5-point Likert scale, ranging from 1 (only rarely) to 5 (almost always). Higher scores indicate higher levels of endorsement of the assessed teaching style. Lecturers were also presented with statements reflecting positive student engagement (eight items, e.g., *They'll be interested in learning new material*) and negative

student engagement (eight items, e.g., *They won't be interested in what I teach*). They were asked to indicate which of these statements they would expect from the students they teach.

Data Analysis

Analysis of Student Questionnaire

Total scores for the student questionnaire were calculated and subsequently, emerging clusters were generated. Statements reflecting students' expectations were then analyzed using One Sample *t*-tests.

Using cluster analysis, we examined which of the statements (clusters) would help to identify "similar students," i.e., which statements would be a best and/or worst predictor of student expectations. Initial cluster centers were identified, using Agglomerative clustering, a hierarchical method to define the number of discrete clusters.

The K-Means Cluster Analysis, a non-hierarchical procedure, was subsequently applied to classify cases into groups that are relatively homogeneous within themselves and heterogeneous between each other. Then, cases were assigned to clusters based on the distance from cluster centers, using an iteration factor of 5. Finally, locations of cluster centers were re-assessed based on the mean values of cases in each cluster.

In exploratory analysis we also assessed if age of student would have an effect on questionnaire scores. Thus, students were separated into two groups, those under the age of 20 ($n = 69$) and those aged 20 and above ($n = 8$). Non-parametric Mann-Whitney *U*-tests were conducted to assess the differences between these two groups.

Analysis of Staff Questionnaire

Total scores were calculated for the ITTF and the CCSF subscales of the ATI; scores were also generated for the "Intention" and "Strategy" subscales. To assess the relationship between teaching experience and teaching approaches, Pearson correlations were conducted between scores on the ITTF, ITTF-intention, ITTF-strategy, CCSF, CCSF-intention, and CCSF-strategy scales and years of teaching experiences (both, on the module selected to be the focus of the ATI and overall years of teaching experience). To account for correlations with sub-scales of the ITTF and CCSF, Bonferroni-corrected *p*-values ($0.05/3 = 0.016$) were used to assess significance.

Statements reflecting the positive or negative engagement of students were analyzed using One Sample *t*-tests. The testing variable reflected that at least half of the positive engagement items and half of the negative engagement items were endorsed by lecturers.

Paired sample *t*-tests also assessed if there was a significant difference between the expectations of positive or negative student engagement items. Exploratory analyses were also conducted to assess changes if the test variable reflected that all positive but no negative engagement items would be endorsed by lecturers.

One-Way ANOVAs were then used to assess group differences (more years of teaching experience vs. fewer years of teaching experience) on the endorsement of positive and negative student engagement.

RESULTS

Student Expectations Questionnaire—Summary of Endorsed Statements

Total scores for the student questionnaire were calculated, then emerging clusters were generated. Subscale-identified clusters are presented in Table 1. How students endorsed individual items of identified clusters is summarized in Tables 2–4.

With regards to *reasons for attending university*, the majority of students (~60–87%) expected university to provide further information to help them make decisions about their future careers, or to start those careers. However, about 30% also acknowledged attending university to postpone career decisions. Although social factors (e.g., enjoying themselves before starting to work) formed part of university expectations for ~46% of students, peer pressure did not seem to affect university attendance, although parental expectation may have had some influence, for ~45% of students (see Table 2).

Regarding *anticipated academic struggles*, nearly 60% of students expected to struggle with their workload, nearly 50% thought the pace of teaching and subsequently learning would be too fast. However, nearly 45% of students felt confident that they understood the concept of academic teaching and learning, and despite potentially struggling with the workload, were confident in their abilities for independent and self-directed studying and learning. With regards to *other struggles*, nearly 45% of students expected to endure financial struggles, and between 40 and 50% students expected to experience emotional problems (e.g., missing family and friends) and particularly, examination anxiety (see Table 3).

Less than 50% of students expected teaching to be different to what they experienced during A-levels, or at college, as seen in their responses to the statement on "lectures will be more informal than at school/college." About 20% of students expected that lecturers would give extensive notes, however, between 75–90% of students expected having to be in charge of their own study habits (including note-taking, regular lecture attendance, group work, etc., see Table 4).

Student Expectations Questionnaire—Cluster Analysis

The numbers of clusters were predetermined to be 3—this was based on an initial Agglomerative Clustering method (squared Euclidean Distance). Initial cluster centers were then evaluated based on this sampling. The minimum distance between an assigned case and a cluster was observed to be 0; the maximum distance was 10. Final cluster centers were then generated as the mean for each variable within each final cluster. Final cluster centers reflect the characteristics of the *typical* case for each cluster. When assessing the cluster membership for students it emerged that only one student was assigned to cluster 2, 36 students were assigned to cluster 1 and 37 students were assigned to cluster 3. Three students remained unassigned.

Re-calculating the cluster analysis, forcing a decision between two-cluster assignments, resulted in 30 students being assigned

TABLE 1 | Themes (clusters) assessed in the student questionnaire.

Reasons for attending university	Academic aptitude	Teaching expectation
Ambition	Academic aptitude struggles	Expectation of Teaching being facilitating (student-focused)
Lack of other opportunities	Other struggles (Financial, Emotional, Support)	Expectation of Teaching being information transmitting (teacher-focused)
Social factors		Expectation of Learning being similar to college (high-school)
Perceived status and expectations		

TABLE 2 | Summary of endorsement of items presented for *Reasons to Attend University* (in percentages); *reverse score items.

Reasons for attending university ambition, drive, motivation	Strongly disagree (%)	Disagree (%)	Neither agree/disagree (%)	Agree (%)	Strongly agree (%)
I came to university because I wanted ...					
to get a clearer idea about career decisions	13.1	4.0	7.0	58.4	29.9
to maximize my options before making career decisions	2.6	1.3	7.9	50.7	37.7
wanted to go to university (always)	1.3	1.3	11.7	50.7	35.1
and needed a university degree to get the job I want	1.3	0	28.6	26.0	44.2
Lack of other opportunities					
I came to university because ...					
it is better than being unemployed	0	3.9	11.7	29.9	54.6
it seems like the normal thing to do	2.6	6.5	36.4	46.8	7.9
*I wanted to get away from home	19.5	31.2	26.0	18.2	5.0
*I wanted to postpone decisions about my career	14.3	39.0	18.2	23.4	5.0
Social factors					
I came to university because					
*I wanted to enjoy myself before starting work	3.9	13.0	36.4	32.5	14.3
all my friends are going to university	16.9	32.5	28.6	19.5	3.0
I wanted to find a partner	36.4	41.6	14.3	6.5	1.0
Perceived status and expectations					
I came to university because					
I liked the idea of going to university	1.3	2.6	2.6	64.9	28.6
this is what my parents expected of me	5.2	18.2	31.2	27.3	18.2
*I wanted to post-pone the need to start work	0	20.8	35.1	35.1	9.1

to cluster 1 and 44 students being assigned to cluster 2, leaving the same three students unassigned. Results of the forced cluster analysis (presented in **Table 5**) indicate that, overall, the clusters are not too different from each other: Students in Cluster 1 endorsed *Academic Struggles*, *Expect Dictative (Information-Transmission) Teaching*, and *Other Struggles* less than students in Cluster 2, but students in Cluster 1 endorse *Lack Of Other Opportunities* more than students in Cluster 2.

The findings from the ANOVA (here used in terms of a dispersion analysis of clustering results) allow assessment of the differences between F-ratios and, therefore, the role of different mean variables in the forming of the clusters. Findings from the ANOVA illustrate that *Academic Struggles*, *Expect Dictative (Information-Transmission) Teaching*, i.e., lecturer-focused teaching, *Lack of Other Opportunities*, and *Other Struggles* exerted the greatest influence in forming the clusters. Medium influence was exerted by *Expect Facilitative (Concept-Changing) Teaching*, i.e., student-focused teaching, *Perceived Status and Social/Parental Expectations* and other *Social Factors*.

The least influence was exerted by *Academic Ambition* and *Expect Similarity to College/High-School Teaching*. The order of influences, and the associated *F*-values and significances, are summarized in **Table 6**.

Student Expectations Questionnaire—Exploratory Analysis of Age Differences

To assess if age of student would have an effect on the scoring of the questionnaire we compared scores of those students who were under the age of 20 ($n = 69$) and those who were aged 20 and above ($n = 8$), using a Mann–Whitney *U*-test. This revealed a significant difference between groups, only with regards to the expectation of dictative, i.e., information transmission/teacher-focused teaching, $Z = -1.9$, $p = 0.05$. Here, those aged 18–19 years scored higher, meaning they “agreed” or “strongly agreed” to items like “lecturers give extensive written notes” and/or “lecturers will dictate their notes” than students who are aged 20 years or older (**Table 7**).

TABLE 3 | Summary of endorsement of items presented for *Anticipated Obstacles* (in percentages); *reverse-score items.

Anticipated obstacles	Strongly disagree (%)	Disagree (%)	Neither agree/disagree (%)	Agree (%)	Strongly agree (%)
academic aptitude struggles					
I worry that					
*I will struggle with the workload	0	11.7	28.6	49.4	10.4
I struggle with the concept of academic teaching/learning	3.9	41.6	33.8	16.9	3.9
*the pace of teaching will be too fast	0	22.1	28.6	40.3	9.1
I lack the right study skills	7.9	28.6	36.4	22.1	5.2
I struggle with self-directed study	7.9	40.3	23.4	27.3	1.3
I will struggle with self-directed learning	10.4	37.7	20.8	28.6	2.6
I have chosen the wrong course	45.2	40.3	10.4	3.9	0
I may have made the wrong decision to go to university	46.8	35.1	15.6	2.6	0
Other Struggles					
I worry that					
*I will have financial difficulties	5.2	36.4	13	33.8	11.7
*I will suffer from examination anxiety	3.9	18.2	20.8	42.9	14.3
*there will be a lack of personal support from lecturers	5.2	40.3	23.4	29.9	1.3
I will be missing my family	27.3	16.9	11.7	39	5.2
I lack confidence	11.7	22.1	26	31.2	9.1
my family does not support me	66.2	29.9	2.6	1.3	0
I find it difficult to cope with being away from home	44.2	23.4	18.2	10.4	3.9

Approaches to Teaching Inventory (Lecturers)

Overall, lecturers scored significantly higher on the CCSF scale (mean = 29.0; $SD = 6.0$; Range = 22; Min:Max = 15:37) than the ITTF of the ATI, (mean = 23.2; $SD = 6.7$; Range = 26; Min:Max = 10:36) scale, $t_{(19)} = 2.4$, $p = 0.03$. This means they adopt a concept-changing, student-focused approach over an information-transmitting, teacher-focused approach. Follow-up analysis on the intention subscales and strategy subscales of the CCSF and the ITTF scales supported the overall findings: significantly higher scores were revealed for the CCSF-strategy subscale (mean = 13.8, $SD = 3.9$; Range = 14; Min:Max = 6:20) relative to the ITTF-strategy subscale (mean = 10.8, $SD = 3.5$; Range = 12; Min:Max = 5:17), $t_{(19)} = 2.3$, $p = 0.03$; and trend-significant differences were shown for the intention subscales, $t_{(19)} = 1.9$, $p = 0.07$, with higher scores being reported for the CCSF-intention subscale (mean = 15.2, $SD = 3.4$; Range = 12; Min:Max = 7:19) relative to the ITTF-intention subscale (mean = 12.5, $SD = 4.0$; Range = 15; Min:Max = 5:20; **Figure 1**).

Approaches to Teaching Inventory—Correlations with Teaching Experience

When assessing the association between ATI scales and teaching experiences, a significant negative correlation was revealed between ITTF and years of teaching in general (see **Figure 2**), $r = -0.6$; $p = 0.006$, indicating that those who have been teaching fewer years endorsed approaches that are more teacher-focused and information-transmitting than their colleagues who have

been teaching longer. This was further supported by significant and near-significant negative correlations between the ITTF subscales: ITTF-intentions subscale: $r = -0.6$, $p = 0.009$, and ITTF-strategy subscale: $r = -0.5$, $r = 0.03$ (see **Figure 2**).

Furthermore, assessing the associations between the lecturers' scores on the ATI measures and which year students are taught in (first year, second year, final year) revealed several significant relationships (see **Figure 2**): Significant and near-significant negative correlations were observed between year in which students are taught and lecturers scores on the ITTF ($r = -0.6$, $p = 0.01$) and scores on the ITTF-intention and ITTF-strategy subscales ($r = -0.45$ $p = 0.05$; $r = -0.53$, $p = 0.02$). Near-significant positive correlations were observed between year in which students are taught and lecturers' scores on the CCSF ($r = +0.5$, $p = 0.04$) and scores on the CCSF-Strategy subscale ($r = +0.5$, $r = 0.02$).

Expectation of Student Engagement—Group Differences

Assessing differences in endorsements of positive and/or negative expectations of student engagement when comparing responses of lecturers who have been teaching longer (i.e., 12 years or more) and those who have been teaching 12 years or less, revealed a significant difference with regards to endorsement of negative expectations of student engagement: Lecturers with less teaching experience selected significantly more items (mean = 2.1; $SD = 2.0$) than lecturers with more teaching experience (mean = 0.5; $SD = 0.7$); $F_{(1, 18)} = 7.2$, $p = 0.02$. No significant differences were reported for endorsing positive expectations of student engagement.

TABLE 4 | Summary of endorsement of items presented for *Teaching Expectations* (in percentages); *reverse-score items.

Expectations of lecturers being facilitative	Strongly disagree (%)	Disagree (%)	Neither agree/disagree (%)	Agree (%)	Strongly agree (%)
My expectations about attending university are that					
lectures will be more informal than at school/college	7.9	22.1	20.8	41.6	7.9
I will have to take care of my own notes	0	1.3	1.3	57.1	40.3
*I will not be required to attend classes	23.4	45.5	18.2	10.4	2.6
I will have to do a lot of independent learning	2.6	0	0	33.8	63.6
there will be a lot of group-work	1.3	3.9	27.3	63.6	3.9
I will be able to partake in research	1.3	1.3	5.2	70.1	22.1
Expectations of lectures being dictative					
My expectations about attending university are that					
lecturers give extensive written notes	9.1	37.7	31.2	18.2	3.9
lecturers will dictate their notes	5.2	23.4	26	44.2	1.3
*I will have to attend all classes	0	7.9	16.9	48.1	27.3
there will be too many assessments	1.3	15.6	44.2	35.1	3.9
it will be difficult to balance study and work commitments	0	20.8	35.1	35.1	9.1
Expectations of lectures being easy; university not being different from high-school					
My expectations about attending university are that					
I will do fine if I just pay attention in class	7.9	40.3	23.4	23.4	5.2
*I will do fine even if I do not go to class	48.1	39	10.4	1.3	1.3
I will do fine as long as I do all required reading	2.6	16.9	20.8	48.1	11.7
there will not be many assessments	9.1	53.3	33.8	3.9	0

Assessment of differences in endorsements of positive and/or negative expectations of student engagement when comparing responses of lecturers who teach first year vs. those who teach second year and above, yielded no significant group differences.

DISCUSSION

This study aimed to assess what incoming students and lecturers expect of learning and teaching at university. It was observed that, overall students, had relatively realistic expectations of university. For example, they viewed enrolling at university as helpful for making future career decisions, and the majority of students (over 75%) expected to be in charge of their own study habits. Less than 50% of students expected that teaching would be different at university than at secondary school—a finding in line with previous research (e.g., Cook and Leckey, 1999; Lowe and Cook, 2003). Approximately 60% of students expected to be struggling with the anticipated workload and nearly 50% of students anticipated that the pace at which teaching and learning takes place would be too fast. Emotional and financial struggles were anticipated by over 40% of students. This study shows consistency with previous findings such as those by Cook and Leckey (1999) and Lowe and Cook (2003).

Student Expectations

Cluster analyses, following the initial identification of students' endorsements of expectations (see **Tables 2–4**) revealed two independent clusters of students, showing that those who formed Cluster 2 were less assured of their own, independent

TABLE 5 | Results from “forced” Cluster Analysis.

	Cluster	
	1	2
FINAL CLUSTER CENTERS		
Academic ambition	17.17	16.11
Lack of other opportunities	15.60	13.84
Social factors	6.67	7.50
Perceived status and expectations	11.90	11.11
Academic struggles	16.80	21.66
Other struggles	16.77	18.93
Expect facilitative	24.40	23.07
Expect dictative	12.83	15.45
Expect easy	12.77	12.93

Subscales and their themes are divided by shading of white to gray. Final cluster centers are computed as the mean for each variable within each final cluster.

learning. These students endorsed *Expect Dictative (Information-Transmission) Teaching* (i.e., information-transmitting, teacher focused approach to learning and teaching) as well as *Other Struggles* more often than the students who formed Cluster 1. Cluster 2 may have been comprised of students who enroll into university straight out of secondary school, anticipating little difference to the style of teaching they had encountered before (Lowe and Cook, 2003). These students would also expect to struggle more with the workload, the teaching pace and with studying more independently. Students in Cluster 2 also anticipated more struggles, both *Academic* and *Other*, such as emotional problems or financial hardship. Students forming

TABLE 6 | Summary of results from the dispersion analysis.

	<i>F</i>	<i>p</i> -value
Academic struggles	82.3	0.001
Expect dictative (information-transmission) teaching	25.7	0.001
Lack of other opportunities	22.2	0.001
Other struggles	14.3	0.001
Expect facilitative (concept-changing) teaching	5.3	0.02
Perceived status and social/parental expectations	4.9	0.03
Social factors	4.8	0.03
Academic ambition	4.1	0.05
Expect similarity to college/high-school teaching	0.1	0.7

Subscales and their themes are divided by shading of white to grey. Large *F*-values indicate greatest separation between clusters.

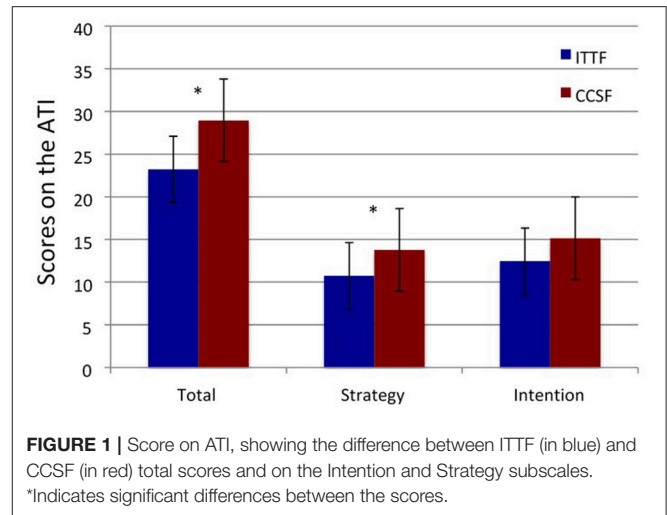
TABLE 7 | Summary of results for Group differences when comparing students aged 18–19 vs. 20 years and over.

	18–19 years old (<i>n</i> = 69)		20 years and over (<i>n</i> = 8)	
	Mean	SD	Mean	SD
Academic ambition	16.8	1.9	15.1	3.8
Lack of other opportunities	14.7	1.8	13.8	1.8
Social factors	7.1	1.6	7.8	1.8
Perceived status and social/parental expectations	11.4	1.6	10.9	2.0
Academic struggles	19.8	3.2	18.6	3.7
Other struggles	18.0	2.7	16.9	3.0
Expect facilitative (concept-changing) teaching	23.5	2.5	24.5	2.3
Expect dictative (information-transmission) teaching*	14.6	2.4	12.6	2.8
Expect similarity to college/high-school teaching	12.7	2.0	13.8	1.8

*Difference is significant, $p = 0.05$; n = number of participants; SD = Standard Deviation.

Cluster 1, on the other hand, endorsed *Lack of Other Possibilities* as a reason for attending university more than the students forming Cluster 2. These students may be the ones who opted for a university education due to the fact that alternatives, such as going into vocational training or decent-paying jobs, are more constrained nowadays; even entry-level jobs often requiring at least a baccalaureate education (Wells et al., 2013).

Exploratory analyses assessed if age impacted the scoring of the questionnaire. It revealed a difference between those who are 18 and 19 years and those who are 20 years and older. Younger students expected more *information-transmitting teacher-focused approaches* than did older students. For example younger students more likely to expect that lecturers would give extensive written notes. Similar observations were reported by Lowe and Cook (2003); although their student sample was divided, with one group of students expecting much more detailed notes than they received, but the other group reporting they were, in fact,



receiving more detailed lecture notes than they had anticipated. However, as Lowe and Cook (2003) studied students enrolled across different university courses the observed differences may have been related to the specific subject area those students were studying. The greater tendency of the younger students to expect this teaching approach may be because they have just left secondary school, whereas older students may have taken a Gap-Year, attended preparation courses for university, or joined university from the workforce. These experiences may have altered their expectations of what type of teaching to expect, or, more importantly, of their own abilities to study, learn and problem-solve independently.

The identified clusters, were also influenced by students' expectations of *Perceived Status* and *Parental Expectations*, but to a lesser extent. This might relate to the perceived impact of parents' own educational attainments on students' academic expectations. For example, Cohen (1987) showed that parental influences had an impact on educational aspirations, as well as educational attainments. It has been argued that parental aspirations and expectations might possibly exert even more of an influence than status attainment or peer pressure (Kandel, 1978).

Staff Expectations Approaches to Teaching Inventory

Overall, lecturers scored significantly higher on the concept-changing student-focused (CCSF) scale than the information-transmitting teacher-focused (ITTF) scale of the ATI (Trigwell and Prosser, 2004), indicating that lecturers more often adopt a student-focused approach in order to facilitate conceptual change in students with regard to the module they teach, rather than engaging in a more shallow, information-transmitting approach. The significant negative correlation observed between ITTF and its subscales and years of teaching showed that those with fewer years of teaching endorsed approaches that are more teacher-focused and information-transmitting. These findings also indicate that teachers tend to evaluate their teaching expectations in the context of their teaching experiences, as those with more teaching experiences endorsed such approaches less.

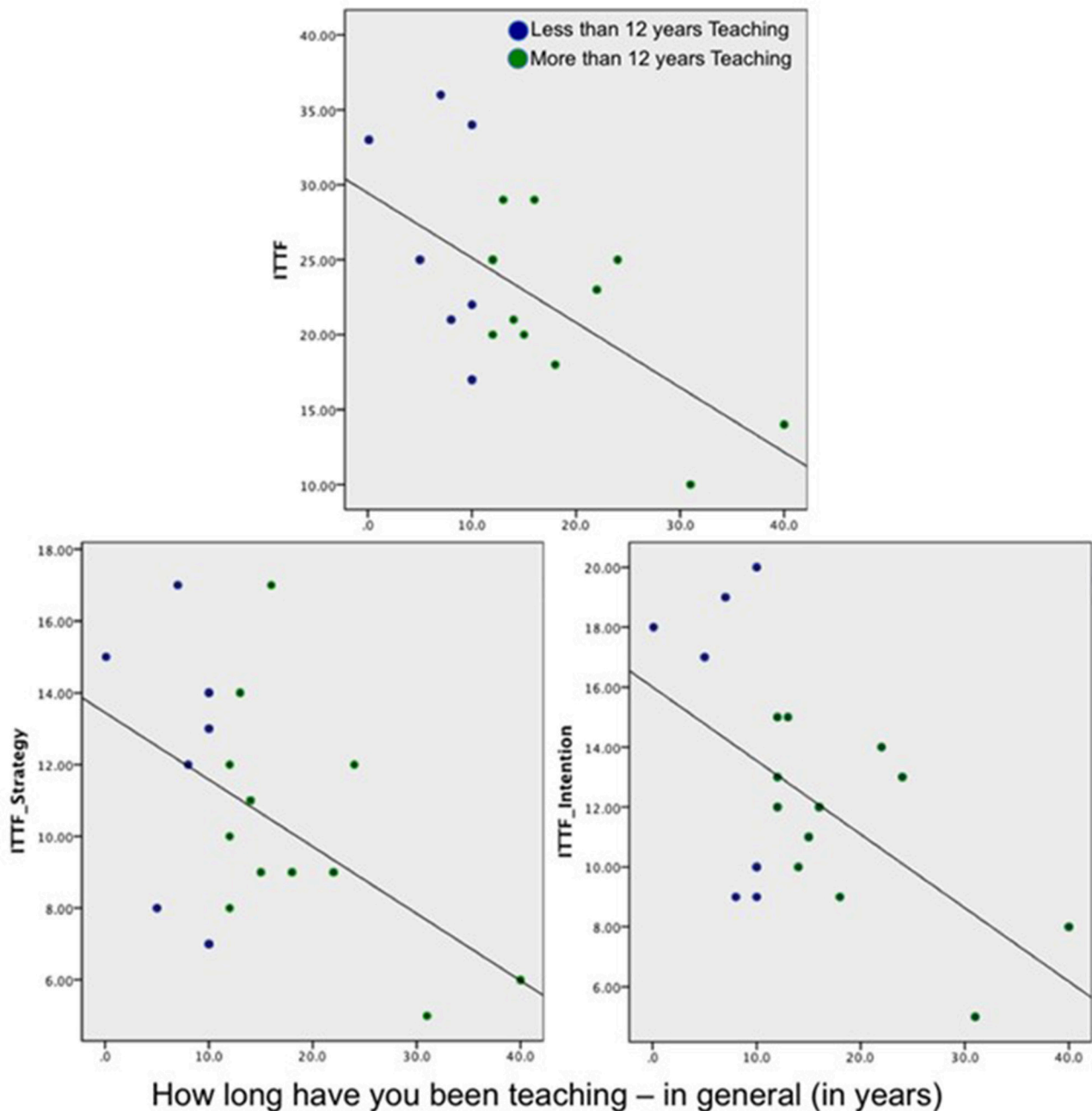


FIGURE 2 | Correlations between years of teaching experience and scores on the ITTF scales.

Significant and trend-significant negative correlations were observed between year in which students are taught and lecturers' scores on the ITTF and scores on the ITTF-intention and ITTF-strategy subscales. Trend-significant positive correlations were observed between year in which students are taught and lecturers' scores on the CCSF and scores on the CCSF-Strategy subscale. These findings indicate that there are associations between the approaches lecturers take (i.e., concept changing/student-focused vs. information-transmitting/teacher

focused) and which year students are studying in. The nature of these associations (negative/positive) indicates that, for students in the earlier years of study, lecturers tend to endorse more information-transmission (teacher-focused) approaches. On the other hand, increasing years at university and cumulative learning experiences, the scores on the ITTF and its subscales decrease, meaning that lecturers endorse these teaching approaches less often. The positive relationships between the CCSF and the years in which students are

studying supports these findings, as these associations show that lecturers tend to increase the student-focused, concept changing approaches in later years of study. This is in line with literature showing that lecturers adapt their approaches to teaching in responses to students' requests but also in response to students' learning and achievements (Trigwell and Prosser, 1993, 2004; Prosser and Trigwell, 1999). Such development is important to prepare students for post-graduate studies or for employment. It also shows that such development takes into account that students who come to university straight from A-levels, or college and who, as shown here, expect a teaching style more reflective of one they are used to, have an opportunity to gradually develop a more independent learning style.

Expectation of Student Engagement

We observed that lecturers who teach students in second-year and/or above would show a larger number of positive learning endorsements relative to lecturers who taught first year students. However, Fraser and Killen (2003) showed that lecturers actually expected students to be independent, self-motivated and self-efficient right from the beginning of their university degree, a finding which is in-part supported by our current observations. Lecturers endorsed positive student engagement related to lecture attendance and participation in lectures far more than negative engagements (e.g., disruptive behavior, leaving early). Positive engagement with the university culture and a lecture, rather than a classroom, environment was endorsed by students, who also recognized regular attendance at lectures would be expected of them when at university. This seems to contradict findings by Fraser and Killen (2003), who reported that students undervalued the importance of regular lecture attendance.

Application to Students' University Experience

A mis-match between students' and lecturers' academic expectations may result in communication break-down or to uncertainties about their respective roles. For example, students may feel that there is little that they can do to succeed and lecturers may not be aware of how they can improve the situation. In the long-term this could impair effective teaching and pedagogy and might lead to decreased student satisfaction, poor academic performance, and increased dropout rate (Fraser and Killen, 2003).

Current findings suggest a potential for common understanding, e.g., both students and lecturers endorsed regular lecture attendance and positive engagement during lectures as being expected when studying at university. This is in line with previous research (e.g., Crisp et al., 2009), but also contradictory to observed trends at university which have seen increasing rates of non-attendance at lectures (Cleary-Holdforth, 2007; Field, 2012) and a need for provisions such as online lecture repositories and increasing e-resources being requested by students. Yet, there are also quite significant differences, suggesting disparate views of what a successful academic career, or successful academic progression, means. Talbot (1990) reported that the most influential personality traits (in relation to

academic persistence and achievement) appeared to be intrinsic motivation and students' level of cognitive categorization. The importance of understanding whether or not there is a mis-match between the expectations that students hold of university teaching and learning, and the expectations that staff have of students is related to the fact that the majority of students who end up dropping out of university do so in year 1, and most likely at the end of term 1, or the beginning of term 2 (Ozga and Sukhnandal, 1998).

A HEFCE report (HEFCE, 2017) shows that retention rates in 2011–2012 were about 6.6%; higher drop-out rates (non-continuation rates) were observed for mature students (and those in age-brackets of 21–24 and 25 and over). It appears as if males are more likely to drop-out than females, hence it may be important to look at gender differences with regards to expectations. The low number of males recruited in this study does not, however, allow for a rigorous assessment of gender differences. There is a documented "gender gap" in attending university, in fact, data from acceptance and enrollment rates in 2015 showed that the entry rate for female students aged 18 grew twice as fast as that for males, meaning that females are 35% more likely to enter university than males (UCAS, 2016). Previously, different academic expectations between males and females have also been reported (Wells et al., 2013); this aspect should be further addressed in future.

Students are particularly vulnerable at the beginning of the course; hence they may require more support. Research has shown that the introduction of orientation courses has resulted in higher academic achievement and lower drop-out rates (Wilke and Kuckuck, 1989). The identification of students at-risk of failure, but also assessments of students' expectations and their satisfaction as well as offering tutoring services and study skills development programs have proven to be successful in maintaining, if not improving, retention rates (Cook and Leckey, 1999).

Therefore, considering the different perspectives would help in attempting to narrow the gap between discrepant expectations. Helping students understand the apparent changes between studying at secondary school and studying at university would allow for more realistic expectations from the beginning, including a reduction in anxiety and a potential for better academic success. From a lecturers' perspective, helping students to become more aware of, and to understand, effective, and progressive learning habits and learning environments (Fraser and Killen, 2003) would increase their academic potential and ensure more successful degree completions.

Specifically, younger students which in this study made up the majority of the sample, expected teaching to be much more information-transmitting, facilitating the more shallow learning approaches they are familiar with, or successfully applied, at college. Recent recognition of "*Life-long Learning*" aims to increase the number of mature students into higher education; however, differences with regards to student characteristics, e.g., students' prior experiences and circumstances, would need to be considered more closely. Nonetheless, the number of new undergraduates in the UK reached record levels in 2015, with UCAS reports revealing increasing number of students from

disadvantaged backgrounds, mature students as well as students from ethnic minorities and those who are first-generation of attending university entering higher education. To ensure their retention, progress and ultimately success is reliant upon closing the gap between the differing expectations hold amongst students and lecturers.

Limitations

Students voluntarily filled out the questionnaires, rather than it being a compulsory requirement for a course, for example. It has thus to be considered that the sample is likely biased toward more engaged and proactive students in the first place. No record of whether students would be considered to be of a traditional, compared to non-traditional, background with regards to university education was obtained, a fact that likely could have impacted results. Although we recorded if students were entering their first-ever degree course, or if they had previously entered a course, the numbers were too discrepant in order to compare them in any meaningful way. In future, university education background, i.e., traditional vs. non-traditional, should be recorded as there may be differences in expectations between these groups of students. It might be useful to more actively recruit those who had previously entered a degree course, and to compare their expectations of university teaching and learning against those who had never entered a degree programme before.

Overall, the sample size is modest, and given that the sample was obtained primarily from only one programme (BSc Psychology)—which traditionally has a very imbalanced male:female ratio—in future, studies should recruit across different university programmes to balance the number of male and female students who are being asked about their expectations of university. The imbalance in male:female ratio could confound findings, given the previously discussed gender differences with regards to academic expectations (Seifert et al., 2010; Wells et al., 2013). Recruitment of a more evenly balanced sample of male and females could be arranged by assessing degree courses that may be unevenly represented across genders (e.g., comparing Psychology and Engineering).

In this sample, the number of students who were aged 20 and above, and are thus regarded as mature students, was rather small

($n = 8$). Differences between this cohort and the younger student cohort should be viewed with caution. Future research, however, should attempt to increase the number of mature students in order to assess such differences in detail.

CONCLUSION

Higher education is an extremely important and life-changing time for most students; students invest not only financially, but also emotionally as well as time and effort. Therefore, ensuring that students make the most of their university experience, and leave university with the best degree possible requires clear communication of the expectations that both parties, students and lecturers, have of each other. What can be drawn from this study is that there *remains a need* to more clearly communicate these mutual expectations. From a lecturer's perspective, reiterating the *active* and *self-governing* role that students need to play in their university education might resolve in students being more aware of the fact that they would need to accept full responsibility for their own academic success and acknowledge that their lecturers are only one of many resources for achieving success. Students need to be made aware of the fact that they need to monitor their own progress toward completing their degree (Tinto, 1995). Furthermore, it needs to be acknowledged that students and lecturers have *joint responsibility* for student success: a first stage in accepting such responsibility would be to gain a better understanding of the complex processes that seem to influence students' academic success. Differences in student and lecturer perception and expectation make it difficult to appropriately assess learning and teaching. Future research should therefore attempt to further integrate students' expectations about the factors that may influence their success with their actual performance (Fraser and Killen, 2003).

AUTHOR CONTRIBUTIONS

SH: designed and conducted the study (data collection and analysis) and wrote the initial draft of the manuscript; NR: conducted a literature search and wrote the second draft of the manuscript. Both authors contributed to the final draft.

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