Students' Research Experiences as Pre-requisite for Research-Informed Teaching in Higher Education

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Abstract

The experiences of students play a crucial role in achieving life-long meaningful learning outcomes. This study was conceptualised to ascertain whether a statistically significant difference exists between students' academic level regarding their research experiences in the university. The study adopted the descriptive cross-sectional survey research design by collecting data from 400 Business Education students made up of 244 undergraduates and 156 postgraduates. Valid quantitative data were obtained from 367 Business Education students, constituting a 92% rate of responses from the students. The data were analysed quantitatively, using descriptive statistics (i.e. frequencies and percentages, and means and standard deviations), as well as, inferential statistics (i.e. Chi-square). A statistically significant difference was found between the experiences of research masters and PhD students. While undergraduate students had heard guest lecturers discussing their research work more than non-research masters' students, non-research master students, on the other hand, had experienced more research than the undergraduates. It was recommended that programmes need to be designed in such a way as to sequentially connect students' experiences based on learning activities that expose the students to practical research with those exposures and experiences forming part of the assessment process.

Introduction

In spite of the range of research-focused programmes developed by universities to generate knowledge within teaching and learning, many academic commentators argue that the role of research evidence and experiences on the part of the student remains limited, insignificant and blurred (Spronken-Smith, Mirosa, & Darrou, 2014). This could be attributed to the contradictory empirical evidences on the research-teaching nexus coupled with students' scanty research exposures and experiences during their learning process. Literature has suggested that for academics to effectively and successfully integrate research into their teaching, it requires sufficient experiences of students in research (van der Rijst, Visser-Wijnveen, Verloop, & Van Driel, 2013).

In order to render the integration of research into teaching more effectively, academics need to explicitly express research in their undergraduate teaching in a visible and approachable way for student learning to benefit from research integration, since student perceptions of teaching play an important role in fostering learning outcomes (Prosser & Trigwell 2014). Especially for fresh students, it can be difficult to recognise research integrated into teaching; therefore promoting student perceptions of the university as a research-rich learning environment is an essential part of the transition to higher education (Brew, 2010).

Within teaching and learning in higher education, it is argued that student perceptions of the learning environment and student characteristics do influence students' learning outcomes (Prosser & Trigwell, 2014). Findings from a study by Lizzio, Wilson, and Simons (2002) indicate that positive perceptions held by students, not only directly influence their academic achievement, but also improve the quality of their learning outcomes including research skills and other generic skills related to teaching and learning. The results further suggest that perceptions of the university learning environment by students may contribute to academic achievement irrespective of their prior academic performance. Other related studies (Brew, 2010; Prosser & Trigwell, 2014; Spronken-Smith, Mirosa & Darrou, 2014) have revealed that students' perceptions of research were related to their undergraduate research experiences as well as institutional factors. They also revealed the need for staff to be supported to enable them immerse students into the research culture.

A study on undergraduate student perceptions of research in teachin during the first undergraduate year and their relationship with their learnin outcomes, found that one of the critical factors in promoting student learni about research is their perception of the university as a research environme (Levy & Petrulis, 2012). Undergraduate students held that the resear culture within their universities had positive impacts on their learning, includi increased understanding of subjects, promoting their motivation for resear and contributing to teacher credibility. While there are doubtless benefits derive from learning within a research culture, it is not known how thi manifested or experienced in Ghanaian universities. There is an appar dearth of literature on studies relating to student experiences of researc Ghanaian universities thus providing the necessity for such a study in or to have a more clarity of students' experience of research in Ghana universities. Thus, the current study sought to establish whether a statistic significant difference existed among students' academic levels with regard to their research experience in Ghanaian universities. Specifically, the study was set to find out whether significant differences exist between the research experiences of students of varied academic levels, namely between MPhil and doctoral students; and between undergraduate students and non-research master students.

The following hypotheses were then tested:

H_0: There is no statistically significant difference among students' academic levels with regard to their research experience in the university.

H_1: There is a statistically significant difference among students' academic level with regard to their research experience in the university.

H_0: There is no statistically significant difference between **Masters (MPhil) and Doctoral (PhD) Students** with regard to **their research experience** in the university.

H_1: There is a statistically significant difference between **Masters (MPhil) and Doctoral (PhD) Students** with regard to their **research experience** in the university.

H_0: There is no statistically significant difference between **Undergraduate and Non-research Masters' Students** with regard to their research experience in the university.

H_1: There is a statistically significant difference between **Undergraduate and Non-research Masters' Students** with regard to their research experience in the university.

Literature Review

A number of studies have indicated that for faculty members to effectively and successfully integrate research into teaching, students' experiences are pre-requisite (Brew, 2010, Prosser & Trigwell, 2014, Spronken-Smith, Mirosa, & Darrou, 2014, Van der Rijst, Visser-Wijnveen, Verloop, & Van

Driel, 2013). To ensure an effective integration of research and teaching faculty members are encouraged to incorporate research into their teaching across all levels of study, particularly, at the undergraduate level. This will serve as a foundation for students' perceptions of the role of research in teaching and fostering increased student learning outcomes (Prosser & Trigwell, 2014).

Within the framework of higher education, students' expectations and impressions, coupled with their personal characteristics, are noted to affect their learning outcomes (Prosser & Trigwell, 2014). The results of an observational analysis by Lizzio, Wilson, and Simons (2002), validate the assertion that students' expectations of the role of research in teaching impact their learning outcomes, indicating that positive perceptions held by students increase the consistency of learning outcomes Lapoule and Lynch (2018) using the case study approach, explored the link between teaching and research in terms of the research experiences of academics based on an initial survey on 1,057 university academics. The study sought to explore the extent to which the pedagogical case study method could contribute to bridging the gap between teaching and research as experienced by their students. The results showed that pedagogical case studies contribute to classroom teaching and to scholarly research experiences of their students. It was further revealed that linking research and teaching helped academics engage in both teaching and research to clarify their conceptual approaches to teaching.

Gresty, Heffernan, Pan and Edwards-Jones (2015) investigated how to minimise the risk associated with research-informed teaching [regarding students' experience of research] in a UK University, using a single case study approach with multiple data points across three discipline areas, namely; Biological Sciences, Business Management and Environmental Building. Three disciplines helped to enlarge exposure of the study to different students and teachers and therefore potentially enriched the examination of the risks learning impact and mitigating strategies in a wider context. They reported benefits of research-informed teaching including enhanced students' experiences and engagement, as well as, producing graduates who are better prepared for employment in an uncertain world. The study identified two risk categories associated with the link including curriculum bias and how research engagement impacts on students' experience.

In a study examining teachers' experiences and views on the relationship between teaching and research, Tavakoli and Howard (2012 found that, regardless of the context in which the teachers worked or the amount of experience they had, the majority of them [teachers] were not engaged with research and were sceptical about the practicality and relevance of research to their professional practice.

Zamorski (2002) conducted an "unusual and experimental" research (p. 413) on Research-led Teaching (RLT) and learning in Higher Education. In the study, 12 final year undergraduate students were recruited as researchers to undertake a set of small-scale qualitative research tasks including attending research workshops, interviewing fellow students from the undergraduate programme, keeping notes on interview and transcripts, maintaining a journal, writing about their own thoughts and experiences regarding RLT and learning, and capturing images of research at the university along with the written commentary of the images. Data were also collected from 16 academics including the pro-vice chancellors for teaching and learning and for research, deans of schools, established lecturers and researchers, and newly appointed staff through interview. The study covered a greater range of issues than had been originally envisaged. However, only one part of the research was reported: academics and students' understanding and experience of RLT and learning. The finding of the first part of the study showed that lecturers and students understood RLT and learning as: teaching that is heavily informed by lecturers' or other people's research, teaching where students' engagement in research formed part of pedagogy, and teaching where lecturers involved in investigating and reflecting on their own practice.

In their study in New Zealand, Robertson and Bond (2001) paid attention to the meaning of research and teaching and their possible inter-relationships. Using a phenomenological approach, they interviewed nine academics on their own experience of the link between research and teaching. The researchers came up with five different experiences of the relationship between the two activities: the experience of teaching and research as symbiotic activities in a learning community between academics and students; the experience of teaching being a means of transmitting new research findings (*research-led teaching*); the experience that teachers demonstrate and facilitate inquiry-based learning (*research-based teaching*); the experience that research and teaching are mutually incompatible; and the experience of no or little connection between research and teaching at undergraduate level; the last two being less visible and in contradistinction of the first three ideals.

Research Method

The study investigated the research-teaching nexus in tertiary education establish how students experience research during the course of their studie The study adopted the descriptive cross-sectional research design. A tot of 1,071 students made up of all Business Education students from tw public universities in Ghana for the 2018/2019 academic year constitute the population. The multi-stage sampling technique, based on institution and programmes, was adopted in selecting a suitable sample for the study with a stratified random sampling of undergraduates and a census selectio of all the postgraduate students in Business Education due to their relativel small number. In all, a sample of 400 Business Education students, comprisin 244 undergraduates and 156 postgraduates, were selected to respond to questionnaire for the study. However, valid quantitative data were obtained from 367 respondents, indicating a 92 percent response rate. The data were analysed using descriptive statistics (i.e. frequencies and percentages and means and standard deviations) as well as inferential statistics (i.e. Chi-square) (Field, 2009).

Results

In terms of sex representation in the study respondents, more than half (n = 201, 54.8%) of the students who partook in the study were males. Female constituted 45.2% (n = 166).

Table 1: Level of Study of University Students

Level/Type	*Frequency*	*Valid Percent*
Undergraduate	211	57.5
Research masters	63	17.2
Non-research masters	65	17.7
PhD	28	7.6
Total	367	100.0

Source: Field Data (2020)

Regarding the levels of students in the study, from Table 1, more tha half (n = 211, 57.5%) the number of students who partook in the stud were undergraduate students. An almost equal number of research master students (n = 63, 17.2%) as non-research masters' students (n = 65, 17.7%) partook in the study. Obviously, fewer PhD students (n = 28, 7.6%) participated in the study which reflects the relatively fewer PhD students studying in Ghanaian universities. This picture also alludes to the fact that there are fewer Business Education programmes at the postgraduate level in the Ghanaian public universities. Since most of the Business Education programmes in the universities are at the undergraduate level, it is reasonable to involve more undergraduate students in the study in order to establish the true state of affairs of the research-teaching nexus in Business Education in Ghanaian public universities.

Differences in Students' Research Experiences According to their Academic Levels

In determining whether there exist differences in students' exposure to research, chi-square independent test was conducted. The results are presented in Table 2.

The results from Table 2 show that differences exist among the levels of students with respect to their exposure to research. Differences were found in all the research experiences exposed to the various students. For example, in terms of students hearing a member of staff discuss their research work in a module, textbooks or handout, a statistically significant difference was found among the levels ($\chi 2$ (3, 367) = 14.969, p = .002). Also, a significant difference was found in students' experience of attending a university research seminar ($\chi 2$ (3, 367) = 93.759, $p < .001$). Students' participation in a research project run by a member of staff significantly varied among them as well ($\chi 2$ (3, 367) = 18.136, $p < .001$). To identify where the significant differences lie between the various levels of the students, a 2*2 crosstabulation *post hoc* analysis was conducted.

The focus was on identifying differences between categories of non-research students and categories of research students; specifically, between undergraduates and non-research masters, and between research masters' students and PhD students. The results are presented in Tables 3 and 4, with Table 3 displaying mainly the results for the categories of research students.

In respect of students' exposure to hearing a member of staff discuss their research work in a module, textbooks or handout, 45(77.6%) of the research master students did not experience it whilst 13(22.4%) of the

Table 2: Students' Academic Levels and their Research Experiences in the University

Research Experience	*Yes/ No*	*LEVELS* Undergrad. n (%)	*Research Masters n (%)*	*Non-Research Masters n (%)*	*PhD n (%)*	χ^2
Hearing staff discuss their research work	Yes No	106 (59.2) 105 (55.9)	18 (10.1) 45 (23.9)	40 (22.3) 25 (13.3)	15 (8.4) 13 (6.9)	14.969
Hearing guest lecturer discuss research work	Yes No	50 (53.2) 161 (59.0)	29 (30.9) 34 (12.5)	7 (7.4) 58 (21.2)	8 (8.5) 20 (7.3)	21.838
Reading research report written by staff	Yes No	120 (55.6) 91 (60.3)	47 (21.8) 16 (10.6)	31 (14.4) 34 (22.5)	18 (8.3) 10 (6.6)	10.480
Examining art/ artefacts produced by staff	Yes No	21 (33.9) 190 (62.3)	18 (29.0) 45 (14.8)	13 (21.0) 52 (17.0)	10 (16.1) 18 (5.9)	20.871
Attending university research seminar	Yes No	28 (23.9) 183 (73.2)	46 (39.3) 17 (6.8)	27 (23.1) 38 (15.2)	16 (13.7) 12 (4.8)	93.759
Attending research conference	Yes No	14 (20.6) 197 (65.9)	30 (10.0) 33 (48.5)	8 (11.8) 57 (19.1)	13 (19.1) 15 (5.0)	83.704
Attending artistic performance or exhibition	Yes No	28 (36.4) 183 (63.1)	22 (28.6) 41 (14.1)	16 (20.8) 49 (16.9)	11 (14.3) 17 (5.9)	21.128
Participating in a research project run by a staff	Yes No	49 (41.9) 162 (64.8)	25 (21.4) 38 (15.2)	29 (24.8) 36 (14.4)	14 (12.0) 14 (5.6)	18.136
Serving as research assistant in data collection	Yes No	49 (51.0) 162 (59.8)	26 (27.1) 37 (13.7)	13 (13.5) 52 (19.2)	8 (8.3) 20 (7.4)	9.750
Contributing to research project in any way	Yes No	77 (43.3) 134 (70.9)	36 (20.2) 27 (14.3)	47 (26.4) 18 (9.5)	18 (10.1) 10 (5.3)	31.607
Contributing to research conference paper or poster	Yes No	35 (53.8) 176 (58.3)	17 (26.2) 46 (15.2)	6 (9.2) 59 (19.5)	7 (10.8) 21 (7.0)	8.128

Source: Field Data (2020)

Table 3: Crosstabulation *Post-hoc* Analysis Between Research Masters (M.Phil.) and Doctoral (PhD) Students on Hearing a Staff Discuss Research Work

Levels	*Responses*				χ^2	*df*	*p*
	Yes *Actual*	*Expected*	*No* *Actual*	*Expected*			
PhDs	15 (45.5%)	10.2	13 (22.4%)	17.8			
Research Masters	18 (54.5%)	22.8	45 (77.6%)	40.2	5.242	1	.022
Total	33 (100%)	33	58 (100%)	58			

Source: Field Data (2020)

PhD students did not experience it. Further, 18(54.5%) of the research masters students experienced it whilst 15(45.5%) of the PhD students also experienced it. A chi-square independent test showed a significant difference between research masters and PhD students' experience in hearing a member of staff discuss their research work ($\chi2$ (1, 276) = 5.242, p = .022, Φ = .022). A careful analysis of the expected count in each cell showed that the PhD students had more of such experience than the research masters students. Differences between the categories of non-research students, namely, undergraduates and non-research masters are presented in Table 4.

The 2*2 *post hoc* test between undergraduates and non-research masters in terms of their research experience from Table 4 showed that the undergraduate students had heard more guest lecturers discussing their research work than non-research masters' students ($\chi2$ (1, 276) = 5.068, p = .024, Φ = .024). However, in the various specific research experiences, the non-research masters had experienced more research than the undergraduates: Critically, examining art/artefacts such as an image, performance, device or design produced by a member of staff, $\chi2$ (1, 276) = 4.644, p = .031, Φ = .031; attending a university research seminar (not as part of a module), $\chi2$ (1, 276) = 24.886, p < .001, Φ = .000; attending an artistic performance or exhibition linked to one's subject area(s), $\chi2$ (1, 276) = 4.773, p = .029, Φ = .029; participating in a research project run by a lecturer, $\chi2$ (1, 276) = 11.217, p = .001, Φ = .001; and contributing to a research project in any way, $\chi 2\ (1, 276) = 25.761, p < .001,\ \Phi =$ .000. In each of the areas, the p value was less than .05 indicating significant difference in the experiences.

Table 4: Crosstabulation *Post-hoc* Analysis Between Undergraduate and Non-research Masters' Students

Research Experience	*Responses* *Yes/No*		*Levels Under-graduate*	*Non-Research Masters*	χ^2	*df*	*p*
Hearing guest lecturer discuss research work	Yes	Actual	50 (87.7)	7 (12.3)	5.068	1	.024
		Expected	43.6	13.4			
	No	Actual	161 (73.5)	58 (26.5)			
		Expected	167.4	51.6			
Examining art/ artefact produced by member of staff	Yes	Actual	21 (61.8)	13 (38.2)	4.644	1	.031
		Expected	26	8			
	No	Actual	190 (78.5)	52 (21.5)			
		Expected	185	57			
Attending university research seminar	Yes	Actual	28 (50.9)	27 (49.1)	24.886	1	.000
		Expected	42	13			
	No	Actual	183 (82.8)	38 (17.2)			
		Expected	169	52			
Attending an artistic performance or exhibition	Yes	Actual	28 (63.6)	16 (36.4)	4.773	1	.029
		Expected	33.6	10.4			
		No	Actual	183 (78.9)	49 (21.1)		
		Expected	177.4	54.6			
Participating in a research project run by a lecturer	Yes	Actual	49 (62.8)	36 (18.2)	11.217	1	.001
		Expected	59.6	46.6			
	No	Actual	162 (81.8)	29 (37.2)			
		Expected	151.4	18.4			
Contributing to a research project in any way	Yes	Actual	77 (62.1)	47 (37.9)	25.761	1	.000
		Expected	94.8	29.2			
	No	Actual	134 (88.2)	18 (11.8)			
		Expected	116.2	35.8			

Source: Field Data (2020)

Discussion

The study revealed a significant difference between research masters and PhD students in respect of their experience in hearing some member of staff discuss research work in module, textbook or handout, with the PhD students having more of such experience than the research masters' students. Undergraduate students had heard more guest lecturers discussing their research work than non-research masters' students. However, in the various research experiences, the non-research masters had experienced more research than the undergraduates, including participation in a research project run by a lecturer, and contributing to a research project in any way. This could be attributed to the tendency faculty members may have to expose master students who are considered as beginning researchers relatively less as compared to PhD students who are considered as advanced researchers who could analyse and synthesise research issues cited by their lecturers well more than master students.

While the undergraduate students had heard more guest lecturers discussing research work than non-research master students, the non-research masters had experienced more research than the undergraduates, including participation in a research project run by a lecturer, and contributing to a research project in anyway. Brew (2010) intimated that in terms of subject content, the linkages between research and teaching are more difficult to enact at the undergraduate level than at the masters' level, particularly, before the final year of the undergraduate course, because of the more hierarchical and cumulative construction of knowledge in the former. Thus, it is more difficult to incorporate the latest research findings in the undergraduate curriculum design. This seems to suggest that the level of treatment faculty will apply to students in their research exposures and experiences depends on the level of study of the students. Thus, lecturers are more likely to expose students to some research experiences the higher the students have climbed-up on the academic level. Aside from the levels, Lapoule and Lynch (2018) have indicated that variations are also apparent within the group of applied disciplines.

The literature clearly reveals that this research knowledge transfer is more problematic at the undergraduate level as compared to the postgraduate level (McLernon & Hughes, 2003; Jenkins, 2000; Gresty, Heffernan, Pan & Edwards-Jones, 2015). Further difficulties in feeding research into undergraduate teaching come from modular systems, dynamism of research and constraints of syllabi (McLernon & Hughes, 2003). Robertson and Bond's (2001) allusion to five different experiences of the relationship between the two activities of research and teaching, is instructive. These include the experience of teaching and research as symbiotic activities in a learning community between academics and students; the experience of teaching being a means of transmitting new research findings (research-led teaching); and the experience that teachers demonstrate and facilitate inquiry-based learning (research-based teaching). The remaining two experiences they postulate are less visible in contradistinction to the foregoing three which constitute the prominent ideal: the experience that research and teaching are mutually incompatible, and the experience of no or little connection between research and teaching at undergraduate level, earlier reported in meta-analyses such as by uz Zaman (2004). Hence, it does not matter the level of study, the integration can be made manifest and achieve the intended results.

Results from other studies suggest further that students' perceptions of the university learning environment may contribute to academic achievement, irrespective of the students' prior academic experiences and successes. Students' perception of research were also found to be related to undergraduate research experiences as well as institutional factors (Brew, 2010; Prosser & Trigwell, 2014; Spronken-Smith, Mirosa, & Darrou, 2014). Arguably, in the twenty-first century, as student diversity increases and institutional missions diverge, a range of approaches to developing the research-teaching nexus, which are sensitive to inter-levels of study and disciplinary differences, are required.

Indeed, it cannot be denied that appropriately designed student-centred approaches foster deep learning regardless of the level of study. This is forcefully brought to the fore by Gresty, Heffernan, Pan and Edwards-Jones (2015) when they emphatically asserted that "student-centred teaching and learning processes are intrinsically favourable towards a positive nexus, while more traditional teaching methods may at best lead to a positive nexus for the most able students regardless of students' level of study." This suggests that, although the balance and form might vary, a greater emphasis on engaging students actively with research would enhance research-teaching links and benefit students' learning across all types of levels of study in higher educational institutions. In other words, there is a strong case for reshaping universities to place greater emphasis on pedagogies that have the tendency to effectively integrate research into teaching to promote effective and lifelong learning.

Conclusion and Recommendations

Results from the study suggest that perceptions of the university learning environment by students may contribute to academic achievement, irrespective of the students' prior academic experiences and successes. This pre-supposes that a wide range of students' research experiences in the university is likely to augment their learning outcomes. On the issue of non-research masters getting more exposed to research by participating in some research project run by a lecturer, and contributing to a research project in any way, it appears faculty members would feel more comfortable involving non-research masters' students in their research than undergraduates since these non-research masters' students had passed the academic stage of the undergraduates and are expected to do better than the undergraduate students in terms of research engagement.

Overall, it seems obvious that in the students' mixed engagement with research exposure across the various levels their exposure is largely passive more than being active. The students' experience of research-led teaching is such that the learning is not so much an active endeavour, but rather, a passive one; not being research-based which is described as "learning-by-doing," something the student does and actively participates in. The dominant research experience across all student levels was hearing lecturers discuss research during lessons. Thus, undergraduate students normally experience research through research work being discussed with them by their lecturers and the reading of research papers. Similarly, non-research master students experienced research through research work discussed with them by lecturers, contributing only little to direct research. Research master students also experienced research through reading research papers, attending research seminars and conferences and contributing to research. The PhD students also experienced through lecturers discussing research with them, reading papers, attending research seminars, participating in research projects and contributing to research in any way. It is even better to integrate research into teaching at the undergraduate level to serve as a preparatory ground for the students so that they can imbibe it right from the foundation period before they progress on the academic ladder to reach their optimum.

On the basis of the foregoing, it is recommended that the university

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authorities, coupled with faculty members create the enabling environment to allow all manner of students, regardless of level, to benefit from research-related activities to enhance the research-teaching nexus. The faculty should encourage their students to attend research experience platforms and events such as research conferences, seminars, exhibitions to enrich their research experience and exposure to serve as preparatory grounds to achieve the research-teaching nexus goals. These research exposures and experiences should be part of the assessment process and must be strictly enforced to benefit students' learning outcomes. Lecturers should also entreat their students to constantly search for current information on the content they are exposed to. This could be facilitated through giving students presentations and practical hands-on assignments.

The university should ensure that the curriculum of each programme of study and courses is re-designed in such a way that students' experiences are connected sequentially based on learning activities that expose the students to practical research. This will empower them to apply the skills and dispositions needed to undertake personal inquiry in the knowledge creation process. The review should incorporate research experiences such as building small scale literature reviews into assignments, undertaking mini-projects and attending lecture series to enhance the knowledge creation process.

Research culture needs to be embedded in departmental activities as part of encouraging and preparing both faculty members and students for effective integration of research into teaching.

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