THE RELATIONSHIP AMONG FACTORS INFLUENCING LECTURERS' WILLINGNESS TO IMPLEMENT INTERDISCIPLINARY TEACHING AT A PRIVATE HIGHER EDUCATION INSTITUTION

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ABSTRACT

Many topics are not addressed in classrooms because of the breadth and depth of information that is accessible in a globalized, technological society (Cone, 1998). Real-world problems are complex and no single discipline can adequately describe and resolve these issues (Edwards, 1996, Gaff & Ratcliff, 1997). Educational experiences are more authentic and of greater value to students when the curricula reflects real life, which is multi-faceted rather than being compartmentalized into neat subject-matter packages (The National Council for Teachers of English, 1995).Interdisciplinary teaching (IT) fosters advances in cognitive ability. Vess (2009) identified gains from interdisciplinary learning such as the ability to recognize bias, think critically, tolerate ambiguity, acknowledge and appreciate ethical concerns. Five (5) factors identified from literature were education, teaching, lecturer, curriculum and willingness towards implementing IT. The primary data were collected using survey questionnaires. A total of 104 questionnaires were collected using convenience sampling. The ANOVA tests revealed no significant differences in means existed among lecturers' teaching and industrial experiences as well as their years of services in implementing IT. Bivariate correlation analysis showed positive correlation coefficient to willingness, lecturer, curriculum, education and teaching in implementing IT. The higher the lecturers' willingness (r=.775, p=.0001), their intention to implement interdisciplinary teaching (IT) increases. Among implications of the study that HEIs to formulate policies and incentives to encourage more lecturers to implement IT to ensure lecturers strengthen collaboration by giving recognition of the benefits of interdisciplinary learning to be matched by recognition of the need for both financial and related resources. This in turn will support collaborative teaching initiatives, workload, career rewards and pedagogy of lecturers wanting to provide students with IT opportunities.

Key words: interdisciplinary teaching, interdisciplinary learning

Introduction

Earlier researchers defined Interdisciplinary Teaching (IT) as "a knowledge view and **curriculum** approach that consciously applies methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience" (Jacobs,2015). Cone et al. (1998) defines it as an approach that integrates two or more subject areas into a meaningful association in order to enhance and enrich students' learning in each subject area. Cone asserted that daily schedules often fragments learning so that each teacher is given a defined time block to cover material that will likely be assessed on a state-mandated test. Conversely, IT is different from multi- or cross-disciplinary teaching in that it requires the integration and synthesis of different perspectives rather than a simple consideration of multiple viewpoints (Lattuca, Voigt & Fath 2004). The fact that real practical problems can rarely be addressed through the context of single disciplines, interdisciplinary approaches or interdisciplinary teaching (IT) present unique opportunities to nurture students' development in this area of interaction. IT involves Interdisciplinary learning that nurtures students' disposition towards effective participation, local problem solving and responsible action. It does so by inviting them to draw on multiple sources of expertise to find solutions, create objects or explain phenomena in ways that would have been unlikely without the support of the disciplines or through single disciplinary means (Boix-Mansilla, 2010). IT is based on Cognition and Technology Group at Vanderbilt (CTGV) in 1993 by Jacobs (1989).The cognitive neuroscience confirm that there are many ways of learning as there are leaners and knowledge is inextricably tied to the context in which it is used. As our daily life is not separated by academic disciplines instead; the environment presents problems that one must address in an interdisciplinary, free flowing way, usually in collaboration with others (Barab & Landa, 1997). These lines of reasoning point towards **curriculum** that are problem centered; IT presents interactive, cooperative manner appeal to a multitude of students. There is a clear evidence from the existing literature that some sort of IT or dominant idea is important for providing a strong intellectual basis for integration (Petrie, 1976; Barab & Landa 1997; Moore 2014; Hall & Weaver,2001). Such integrated course must capture the imagination of the students, be perceived as important by learners, legitimize the disciplinary content which is being integrated, and accommodate a variety of learning approaches (Barab & Landa 1997). Repko (2011) asserts that IT provides interdisciplinary instruction that fosters advances in cognitive ability and other educational researchers Newell (2001), Friedow (2012),Vess (2009) identified a number of distinct educational benefits of interdisciplinary learning including gains in the ability to **recognize bias, think critically, tolerate ambiguity as well as acknowledge and appreciate ethical concerns. Benefits will be gained by students and lecturers whether the latter are willing to implement IT in HEI requires further investigation.**

Problem Statement: Research has shown that working with problems requires students to generate ideas, provide explanations and promotes learning (Knowlton,2003). The Malaysia Education Blueprint (MEB)(2015 – 2025) quotes: 'employers reported

that graduates lack critical thinking, communication skills and the English language proficiency which are essential for success in the 21st century`. Similarly, using real world contexts is a key component of 21st century curriculum; instruction and research shows that when teachers/lecturers create meaningful learning activities that centre on the resources, strategies, and contexts that students will encounter in adult life, such teaching reduces absenteeism, fosters cooperation and communication, builds critical thinking skills, and boosts academic performance (Curtis and Amstrong 2002). The quality of Malaysia's HE system can only be good as the quality of its academic community, from educators and researchers to support staff (MEB). **C**urrently, students learn skills and concepts as tools to meet present demands rather than as facts to be memorized today in hopes of application tomorrow and knowledge is tied to the context in which it is used (Barab and Landa, 2008).However,our daily life is not separated into academic disciplines but environments in an interdisciplinary, free flowing way, usually in collaboration with others (Barab and Landa, 1997). Even economists engaged in IT benefits from integration of ideas from other disciplines (Colander,2015). For Malaysia to achieve one of the first-world class talents is by lifting the quality of human capital--who are critical thinkers, skilled commuicators and innovaters for the future (MEB). Past studies had shown vast benefits from implemnting IT. " Are lecturers willing to implement IT to nurture and develop such human capital? Whats led to lectureres willingness or unwillingness to implement IT? As such, it is timely to investigate five factors (education, teaching, lecturers, curriculum and willingness).Whether lecturers' industrial and teaching experiences and years of services in such implementation and the extent of relationships among these factors in a private HEI.

Research Objectives: The objectives of this study are:

- to determine significant differences that may exist among lecturers in terms of teaching experiences, industrial experiences and years of services towards their willingness to implement IT in the HEI
- to investigate the relationship among factors influencing lecturers' willingness to implement IT in the HEI.

Research Questions: The research questions of this study as follows:

- Are there any significant differences among lecturers in terms of their teaching experience, industrial experiences and years of services towards their willingness to implement IT in the HEI?
- What is the relationship between factors of lecturers' willingness towards implementing IT in their HEI?

Literature Review

New and emerging technologies and business management skills are among the most sought after supplemental courses that are part of standard curricula in many disciplines today (Lorenzen-Huber et al., 2010; Loewer, 2012). In response to the changing context of higher education, interdisciplinarity is seen as a way of confronting many contemporary challenges and opportunities including production of collaborative, collective, creative, and interdisciplinary knowledge (Holley, 2009). Technology shifts occur at such a rapid rate that it is virtually impossible to keep up with them through the traditional tenure stream faculty lines. Additionally, interdisciplinary teaching (IT) focused on problems worth solving and provides common round, motivate students, and offer opportunities for a multitude of learning activities as described by Barab and Landa (1997) include *(i) Framing for Maximum learning:* Finding topics that provide common grounds; facilitate insights into why specific proficiencies and information are important, ample opportunities for an abundance of learning activities and modes. Specific questions kept the theme anchored to students' interest broaden the curricular to other disciplines and activities beyond disciplines.*(ii) A problem worth solving:* The complex problem(s) that students acknowledge as worth solving and validates the learning set of relevant skill and concepts suggest that carefully designed helps students learn techniques, facts, and ideas in long-term and transferable ways. IT must capture the imagination, be perceived as important by learners, legitimates the disciplinary content leads to further disciplines, accommodate a variety of learning approaches (Barab *et al.,*1996). More important, students learning in the context of engaging connections among various disciplinary concepts, even seeing relations between the computerized lesson and between lessons and personal experience. *(iii) Orchestrating the disciplines* in which students are implementing IT must accommodate other subjects-e.g. cultural, political, research writing and editing, business skills, video production, other skills in different disciplines. In striving for the IT, is not how many disciplines one can integrate but rather "Will the IT provide a diversity of learners' opportunities to try difficult tasks and learn new skills in motivating and rewarding context? *(iv) Structuring, Scheduling and Finding Time*: Although interdisciplinary units(IU) are a creative and effective way of motivating students and engaging more learners, they present obstacles both practical and philosophical to designing and implementing them i.e. structure of the discipline (Barab,1997).

The rationale of Interdisciplinary Teaching (IT): The interdisciplinary model of teaching enables students to see the links between subject areas (e.g. the relationship between literature and history or mathematics and science (Jacobs,1989). IT differs from discipline- and field-based teaching in that it does not necessarily carve out spaces for each individual subject area, and instead, connects content and consciously identifies the relationships between these subjects. The National Council for Teachers of English (NCTE)(1995) emphasized the importance of ITin a position statement on integration of multiple curricula. Based on discussions from a combined meeting of the major national subject-matter organizations, the NCTE explain that "educational experiences are more authentic and of greater value to students when the curricula reflect real life, which is multi-faceted — rather than being compartmentalized into neat subject-matter packages." NCTE highlights the benefits of interdisciplinary teaching and promote the "natural and logical connections that cut across content areas" which can be organized around "questions, themes, problems, or projects rather than along traditional subject-matter boundaries". This study focus on relationships among 5 factors based on literature (**education, teaching, lecturer, curriculum and willingness)** influencing lecturers' willingness to implement IT in HEIs.

(i) Relationship between education and interdisciplinary teaching (IT)

Curriculum is essentially a design, or roadmap for learning, and as such focuses on knowledge and skills that are judged important to learn. Instruction is the means by which that learning will be achieved (Partnership for 21st century Skills,2017).The

Stanford University in 2007 found that 'good interdisciplinary education has to begin with good disciplinary education. To encourage departments to provide a more disciplinary education, is to provide support for the IDP (Interdisciplinary Programme) as the main focus for the IT in the university.Fink (2003) added that **gains from IT** fosters the acquisition of foundational knowledge, promotes integration of ideas from multiple disciplines and provides insight on how to apply knowledge all of which advance a student's understanding of how to learn. Moreover, students are encouraged to account for the contribution of disciplines that highlight the roles of caring and social interaction when analysing problems. Thus, students are expected to find interdisciplinary education engaging and thus an effective way to advance their understanding of topics under investigation. Thus, education and IT works hand in hand to create good interdisciplinary education. The relationship between curriculum and instruction (in this case interdisciplinary teaching) is obviously a very close one.

(ii) Relationship between teaching and interdisciplinary teaching (IT)
IT in HE aims to develop boundary-crossing skills, such as interdisciplinary thinking, defined as the capacity to integrate knowledge of two or more disciplines to produce a cognitive advancement in ways that would have been impossible or unlikely through single disciplinary means (Spelt, Biemans, Tobi and Luning (2009). "The capacity to integrate knowledge and modes of thinking in two or more disciplines or established areas of expertise to produce a cognitive advancement—such as explaining a phenomenon, solving a problem, or creating a product—in ways that would have been impossible or unlikely through single disciplinary means." (Spelt et al.,) however, Bransford (2000) from the fields of neuroscience found that cognitive science asserts that interdisciplinary forms of instruction by introducing students to subject matter from a variety of perspectives that challenge their existing notions. IT in HE should aim for new formations of knowledge and inquiry to constitute new learning communities. The challenge in IT is to hold open spaces for thinking, developing, and teaching alternative values to link the intellectual work of interdisciplinary with the generation of new forms of community inside and outside the walls of universities(Hearn,2003).

(iii) **Relationship between lecturer/teacher and Interdisciplinary Teaching (IT)**

A positive relationship between the students and the teacher is difficult to establish, but can be found for both individuals at either end. The qualities for a positive relationship can vary to set a learning experience approachable and inviting the student to learn. A teacher and student who have the qualities of good communications, respect in a class room, and show interest in teaching from the point of view of the teacher and learning from a student will establish a positive relationship in the classroom (Urooj, 2013).Implementing IT **allows i**nterdisciplinary instruction accomplishes this goal in two ways :(i) Students can identify insights from a range of disciplines that contribute to an understanding of the issue under consideration. (ii) Students develop the ability to integrate concepts and ideas from these disciplines into a broader conceptual framework of analysis. (iii)Students put aside their pre-existing notions they position themselves to learn facts more readily and are more open to adopting a range of methodologies that promote understanding. On the other hand, **teachers** can spend more time exploring issues with them that promote Significant Learning which takes place when meaningful and lasting classroom experiences occur (Fink,2003). Additionally, when **teachers** impart students with a range of skills, and insights about the educational process, students will see as meaningful and salient to them, teachers promote student engagement in the learning process and greater learning occurs. IT links content and also provides possibilities for collaboration between **teachers** who share information about their instructional objectives, curricula, pedagogical expertise, student motivation, and learning styles (Coffey 2004).Thus, **teachers** find a natural connection between disciplines and develop integrated learning experiences that are meaningfully connected (Placek, 2003).

The three faculty taught each lecture together and modeled interdisciplinary thinking by discussing each topic from all three points of views, then synthesizing the lecture, often in an interactive discussion with the students (Willermet,et al., 2013).

(iv) Relationship between Curriculum and Interdisciplinary Teaching (IT)
Innovative educators concerned with improving student achievement are seeking ways to create rigorous, relevant, and engaging curriculum (Drake and Burns,2007). IT is defined as an interdisciplinary learning as "a knowledge view and curriculum approach that consciously applied methodology and language from more than one discipline to examine a central theme, issue, problem, topic, or experience" (Jacobs, 1989). Additionally, Davies and Devlin (2007) states "two or more disciplines which combine their expertise to jointly address an area of common concern". However, interdisciplinary forces one to "think across, beyond, and through the academic disciplines to encompass all types of knowledge about an idea, issue, or subject"(Ertas, Maxwell, Rainey and Tanik, 2003).This confluence of disciplinary power offers possibilities for richer and deeper student learning. IT makes it possible for such curriculum to be implemented. Integrated curriculum set in a project based learning environment utilizing various delivery means can produce positive results from students' perspectives (Barlow, 2011).

(v) Relationship between lecturers' willingness and IT
In embedding interdisciplinary pedagogy programmatically and/or systemically, three elements of interdisciplinarity stand out in the literature: (1) teachers' attitudes to, and **willingness** to explore, new approaches to interdisciplinary learning (Winberg, 2008; Yang, 2009); (2) creating positive student perceptions of, and experiences with, interdisciplinary learning (Boix Mansilla & Duraising, 2007; Chen, Hsu, & Wu 2009; Yang, 2009); and (3) the ongoing provision of institutional support for interdisciplinary modalities (Brint, Turk-Bicakci, Proctor, & Murphy, 2009; Holley, 2009; Sá, 2007).Key factors in the success of interdisciplinary learning identified in the literature are student-centered learning (Chen et al., 2009; Yang, 2009), professional development for teachers (Winberg, 2008; Yang, 2009), course material development support (Holley, 2009; Sá, 2007), technical support for learners (Brint et al., 2009), and interdisciplinary formative and summative assessment (Boix Mansilla & Duraising, 2007; Yang, 2009).Similarly, benefits that IT could bring to students and lecturers are numerous.

Among Gains of Interdisciplinary Teaching(IT) to Students:
Interdisciplinary learning (IL) helps students:(i) to acquire Perspective-Taking Techniques (Baloche, Hynes, and Berger 1996) i.e the capacity to understand multiple viewpoints on a given topic. (ii) to develop an appreciation of the differences between disciplines on how to approach a problem and their discipline specific rules regarding viable evidence. This leads to both *declarative knowledge* (factual information) and *procedural knowledge* (process-based information) and each of these forms of knowledge are needed to solve complex problems. Thus, students enhance their knowledge formation capacity, teachers can engage them in conversations dealing with more complex issues and integrate conflicting insights from alternative disciplines. Repko (2011) identifies among **gains from interdisciplinary instruction (II)** helps: (i) students understand why conflicts commonly arise over; the causes and consequences of an issue and, the ideal way for policy to address the issue of concern. (ii) students understand that there are ethical dimensions to most issues of concern. Ethical considerations entail moral concerns which means accounting for perceptions of right vs. wrong, good vs. bad, and the provision of justice. (iii) promotes the integration of ideas from relevant disciplines - including moral philosophy when exploring an issue so ethical considerations are often part of an interdisciplinary examination of an issue. This is useful since or perspectives on a question, and policy considerations are likely to include discussion and valuation of ethical factors. However, "educational experiences are more authentic and of greater value to students when the curricula reflects real life, which is multi-faceted rather than being compartmentalized into neat subject-matter packages. (The National Council for Teachers of English (NCTE 1995)). (ii) In their view, real-world problems are complex, so no single discipline can adequately describe and resolve these issues. Therefore, they are not surprised that interdisciplinary forms of learning are prevalent and growing in abundance and stature throughout higher education (Edwards, 1996, Gaff & Ratclif, 1997, and Liein, 1996) and (iii) students recognize that there are a variety of perspectives that can be brought to bear in an effort to understand most issues. (iv) IT is not too costly and it's rewarding. Bransford (2000) asserts that IT (i) helps students overcome a tendency to maintain preconceived notions. (ii) *Students identify insights from a range of disciplines that contribute to an understanding of the issue under consideration*. (iii*) Students develop the ability to integrate concepts and ideas* from these disciplines into a broader conceptual framework of analysis. *(iv) Helps advance critical thinking and cognitive development.*Students acquire Perspective-Taking Techniques (Baloche, Hynes, and Berger 1996) - the capacity to understand multiple viewpoints on a given topic. Students gain in the following ways: (i) students develop an appreciation of the differences between disciplines on how to approach a problem and their discipline specific rules regarding viable evidence.(ii) each of these forms of knowledge are needed to solve complex problems. Thus, as students enhance their knowledge formation capacity, teachers can engage them in conversations dealing with more complex issues. Obtaining a clear understanding of problems with roots in multiple disciplines requires the capacity to integrate ideas and this skill is advanced by interdisciplinary learning.

Among Gains of IT to educators: Most educators are familiar with the methodologies and empirical practices of related disciplines so acquiring the necessary cross disciplinary knowledge to become an interdisciplinary teacher will not be overly stressful or time consuming.(ii) most educators are familiar with task modelling - an instructional strategy that promotes learning through observation - which is fundamental to interdisciplinary teaching since most students are unfamiliar with interdisciplinary approaches to learning, so instructors do not have to learn an entirely new form of pedagogy.(iii) synthesis of insights from across disciplines, the most demanding element of interdisciplinary teaching, is an activity that most scholar-educators have engaged in previously or can learn to do with modest effort.(vi) instructors can determine the share of the course that is interdisciplinary, so they insert into their course the level of interdisciplinary that is ideal for them given their experience with this form of teaching and the nature of the course they are leading education (Edwards, 1996, Gaff & Ratclif, 1997, and Liein, 1996). Meanwhile, Pharo and Birdle (2012) argued that teachers who were generally well informed about IT, but viewed the traditional disciplines based structure as a major obstacle to collaboration, mostly because of competition between disciplines for student income. Whether private HEI lecturers are facing similar situations has yet to be determined in this study.

Among difficulties faced by lecturers in implementing IT: (i) there are various difficulties of sustaining teaching teams, and other university structures such as inflexible timetables (Pharo and Birdle,2012).They suggested that to strengthen teacher collaboration in a university whose administrative structure are predominately disciplined based. **Solutions:** there is a need for recognition of the benefits of interdisciplinary learning to be matched by recognition of the need for financial and other resources to support collaborative teaching initiatives. Implementing IT encourages **teachers** to provide students with meaningfully relevant content, authentically coherent learning experiences, and practically applied contexts. Implementing IT involves (i) inquiry processes and thinking skills are embedded into learning concepts, topics, themes, or problems among students. *(ii) students' motivation toward learning* can be enhanced by recognizing that knowledge learned in the classroom is relevant to real-life situations. (iii) *students can gain a better understanding o*f abstract concepts by making connections in concrete and applied situations and by developing higher order thinking and problem-solving skills. (iv) **teachers** to use classroom time more efficiently and address content in depth, while giving students opportunities to see relationships between content areas and engage in authentic tasks. v**)** teachers are familiar with the methodologies and empirical practices of related disciplines so acquiring the necessary cross disciplinary knowledge to become an interdisciplinary teacher will not be overly stressful or time consuming. (vi) they are familiar with task modelling - an instructional strategy that promotes learning through observation - which is fundamental to IT since most students are unfamiliar with interdisciplinary approaches to learning, so instructors do not have to learn an entirely new form of pedagogy. *(vii)* the synthesis of insights from across disciplines, the most demanding element of IT, is an activity that most scholar-educators have engaged in previously or can learn with modest effort and they can determine the share of the course that is interdisciplinary, so they insert into their course the level of interdisciplinary, an ideal for them given their experience with this form of teaching and the nature of the course they are leading (Repko,2011). Thus, based on Repko (2011) suggestion, the conceptual framework in this study is shown in Figure 1.

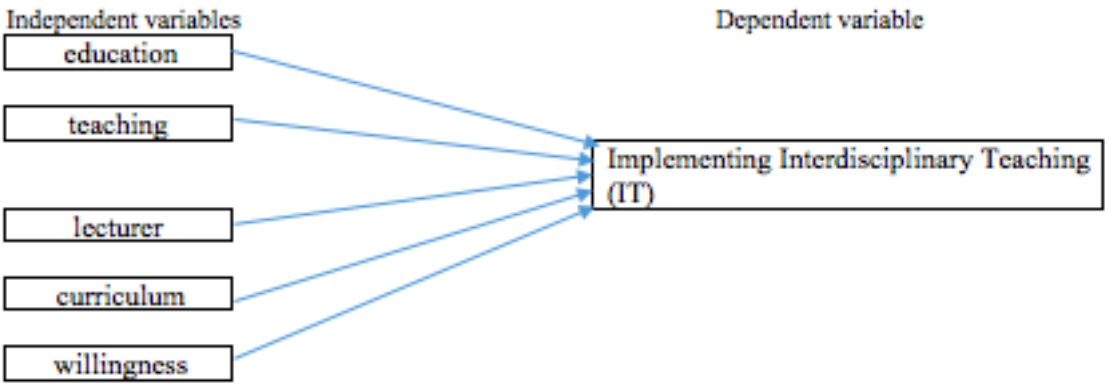

Figure 1: The Conceptual Framework of Relationships among Factors influencing lecturers' willingness to implement interdisciplinary teaching at a private higher education institution

Significance of the study: This study has several significance which are : (i)To inculcate the development of policies on interdisciplianry teaching (IT) in higher eduation institutions and leads to furthter future reserach in related fields such as pedagogy and in education field. (ii) To develop greater moblity of lecturers to conduct IT with other counterparts. (iii)To collaborate with public and private entities in the creation of new knowledge, discoveries and technologies in meeting their goals. (iv) To enhance scientific and innovation capabilities of students and lecturers. (v) To develop and nurture interdisciplinary qualtiy research and development in higher learning instituions.

Limitations of the study: Among the limitations of this study are: (i) The study solely focus on dimensions such as education, teaching, lecturer, curriculum,willingness towards the implementation of IT. (ii) Dimensions such as support from top management, policy of the insitutions and faculty could influence lecturers' willingness to impelement IT in classrooms.(iii) Time and financial constraints. (iv) The study only focused on a cross-sectional area of one private higher learning institution ,thus limiting the generalizability of the findings.

Methodology: This is a descriptive correlational study using convenience sampling technique. It is a descriptive study because it generates data which can be used to ascertain and to describe the characteristics of variables in a situation (Sekaran, 2015) and variables have not been manipulated (Weirsma, 2009). This research has been contextualized with the objectives determined earlier. A total of 120 questionnaires were adminstered to lecturers across faculties. Only 104 questionnaires were usable (a response rate of 86.66%).The main reason being lecturers were having classes when questionnaires were distributed.

Findings and Discussions: As a rule of thumb, George,Darren , Mallary & Paul (2001) interpreted Cronbach's Alpha as follows: $\alpha > .9$ excellent ; $\alpha > .8$ good;$\alpha > .7$ acceptable;$\alpha > .6$ questionable ;$\alpha > .5$ poor and $\alpha < .4$ unacceptable. In this study, Cronbach's Alpha reliabilities of all dimensions ranged from excellent to acceptable: willingness (.952) ;Interdisciplinary teaching (.941) ; lecturer (.914) ; education (.790); teaching (.762) to curriculum (.741). The generally agreed upon lower limit for Cronbach's Alpha was .70 (Robinson). To prove for normality**:** P- plots portrayed the normality of the data. Skewness of six variables in the study rage from -.035 to -1.58, despite all distribution being negatively skewed, they were all far below the skewness of modulus 3.0, a level which would be considered extremely skewed (Chou and Bentler, 1995).Skewness less than modulus 1.0 is not likely to affect the parameters of standard errors for testing the statistical significance of parameters (Dillon & Goldstein, 1984).In this study skewness is below 3 and normality of data is proven.

Profile of respondents: From a total of 104 respondents in this study, female lecturers (64.4%) outnumbered the male (35.6 %). A total of 22.1% from Faculty of Business and Accounting (FBA), 22.1% Faculty of Architecture and Built Environment (FABE); 20.2% Faculty of Engineering Technology Infrastructure (FETI), 20.2% Faculty of Applied Science and Foundation Studies (FASF); while Faculty of Creative Media and Innovation Technology (FCMIT) and Faculty of Arts, Communication and Education both accounted for 7.7% of the respondents. Respondents consisted of 75% master holders, 13.5% PhD holders; 10.5% degree holders and 1% possessed other qualifications. In terms of teaching experiences, 26.9% (0 to 4 years); 26.9% (4.1 to 8 years); 23% (from 12.1 to 16 years) and a total of 14% (from 8.1 to 12 years) and the lowest (9%) had taught more than 16 years in HEI. A majority 68.3% (from 0 to 4 years) of lecturers do not possessed industrial experience and 31.7% (from 4.1 to 8 years) had field experiences. As such, a lower percentage of lecturers were able to impart knowledge about real work situations to students in classrooms. **Levels of five (5)factors influencing lecturers' willingness to implement interdisciplinary teaching** (IT) in this study were divided into six (6) categories: strongly disagree (0 to 1); disagree (1.1 to 2.0); fairly disagree (2.1 to 3.0) fairly disagree (3.1 to 4.0); agree (4.1 to 5.0) and strongly agree (5.1 to 6.0). Means for lecturers' perceptions ranged from the highest to the lowest are as follows: (i) lecturer (M=4.69,SD=.68);(ii) willingness (M=4.53,SD=.799);(iii)curriculum M=4.45,SD=.681);(iv)education (M=4.33,SD=.748)

and (v) teaching (*M*=4.27 ,*SD*=.769) all obtained from 'agree' to 'strongly agree' levels. The **lecturer** dimension shows the highest mean (*M*=5.15, *SD*=.844); followed by 'education should involve students in reflective thinking' ; and 'education should lead society towards practical preparation for life' and ' the ultimate aim of education is to cultivate the rational intellect' obtained agreed (*M*=4.84, *SD*=1.03).However, lecturers were 'fairly disagree' in terms of 'The aim of education should be the same in every age and society' (*M*=3.56,*SD*=1.64). The **willingness** as perceived by lecturers in terms of 'setting certain standards that students are required to meet' (*M*=4.53,*SD*=.799); 'willing to assess students as a group' (*M*=4.64,*SD*=.95); 'willing to set aims for students they teach' (*M*=4.57; *SD*=.98).However, the lowest mean (*M*=4.34;*SD*=1.03) was obtained from 'willing to set a planning unit to gather information about students past and present performance(eg: records of their work, grades etc.)'.This shows that not all lecturers are willing to implement IT in their learning institutions because others tend to 'fairly disagree' with it. 'Overall, I believe that our daily life is not separated into academic disciplines so interdisciplinary teaching is a practical way to prepare students for life' obtained for **curriculum** (*M* =4.45, *SD*=.681). Similarly, lecturers seemed to 'fairly disagree' that 'the curriculum should be the same for everyone delivered through lecture and discussion (*M*=4.0, *SD*=1.13). Next, in terms of **education,** specifically, lecturers 'agree' in terms of 'education should lead society towards practical preparation for life' (*M*=4.33,*SD* =.748) and tend to show higher level of agreeableness in terms of ' education should involve students in reflective thinking' (*M*= 4.98, *SD* =.963);…'the ultimate aim of education is to cultivate the rational intellect (*M*=4.82,*SD* =1.03).Conversely, lower means were obtained for ' education should enhance personal growth through problem solving in the present time only' (*M*=3.57,*SD*=1.48) and 'the aim of education should be the same for everyone'(*M*= 3.56 ,*SD* =1.64). In terms of **teaching,** particularly, the university should emphasize discipline, hard work and respect for authority (*M*=4.27, *SD* =.769) and 'the purpose of faculties in universities is to ensure practical preparation for life not to encourage personal choice' received the lowest (*M*= 4.00; *SD*= 1.18).On the whole, lecturers agreed that faculties exist to prepare students for life not merely to achieve their ambitions (personal). Implemention IT in PHEI showed values of mean which ranged from (*M*= 4.17; *SD* =1.01) to (*M*=4.44; *SD*=1.07).The highest mean was in terms of 'overall, I am very keen to implement interdisciplinary teaching in this university (*M*=4.44;*SD*=1.07), followed by 'I am able to find time if my schedule interacts with my colleagues (*M*=4.29;*SD*=1.06), and lower mean (*M*=4.17 ; *SD*=1.02)'I am able to allocate my time to develop the interdisciplinary unit, ' I am able to plan time to develop the interdisciplinary unit; 'I am able to have a common planning time if I want to teach with my colleagues'.

Research Question 1: Is there any significant differences among PHEIs' lecturers in terms of their teaching experience, industrial experiences and years of services towards their willingness to implement IT?Findings showed there is no significant difference among lecturers' teaching experience to implement interdisciplinary teaching(IT) in a private higher education institution with p values of > than .05 level of significance. The ANOVA test showed no significant difference in means among lecturers' industrial experience and years of service towards such implementation with *p* values of > than .05 level of significance.

Research Question 2: What is the relationship between perceived factors of lecturers' willingness and their intention to implement IT in a PHEI? Bi-variate correlation analyses were performed on five factors (education, teaching, and lecturer, curriculum and willingness) influencing IT in the HE. The relationship between all five factors and implementing IT was investigated using Pearson's' Product –Moment (r) correlation. Preliminary analysis was performed to ensure non violation of assumptions of normality and linearity. The strongest linear relationship was found between willingness of lecturers in implementing IT (*r* = .775,*p* =.0001). In the field of behavioural science, correlation coefficient values of .10, .30 and .50 irrespective of sign, is typically interpreted as small, medium and large coefficients ,respectively (Green, Salkind & Akey,2000).Table 3 below shows the positive correlation coefficient, *r* =.775 indicated that as the score for willingness increase, so do lecturers implementations towards IT.

Table 3: Descriptive Statistics, Zero order Correlations of Implementing Interdisciplinary Teaching (IT) and Independent variables (x1 to x5) (N=104)

	x1	x2	x3	x4	x5	Y
Education (x1)(10)	1					.
Teaching(x2)(6)	.583**	1				
Lecturer(x3)(10)	.503**	.533**	1			
Curriculum(x4)(3)	.615**	.598**	.724**	1	.	
Willingness (x5)(11)	.474**	.439**	.765**	.612**	1	
Implementing Interdisciplinary Teaching(IT) (Y)(7)	.373**	.359**	.563**	.479**	.775**	1

Note: Figures in parentheses are the number of items measuring each variable
**. Correlation is significant at the 0.01 level (1-tailed).

Hence, it would seem logical to say that lecturers who implement interdisciplinary teaching (IT) was more apt (likely) to increase when their willingness increases. Implementing IT was also positively correlated to lecturer (*r*= .563, *p*=.0001); curriculum (*r*= .479, *p*=.0001); education(*r*= .373 , *p*=.0001) and teaching(*r*= .359, *p*=.0001).Values of coefficients and its associated significance value (P).The output confirms that significant positive relationships exist between education (*r*=.373, *p*=.0001),teaching (*r*=.359, *p*=.0001), lecturer (*r*=.563, *p*=.0001),curriculum (*r*=.479; *p*=.0001) and willingness (*r*=.775;

p=.0001) towards implementation of IT in HEI. Table 3 above shows moderate positive linear correlations between both education and teaching towards implementing IT among lecturers. However, the linear relation between willingness, lecturer and curriculum towards implementing IT in the institutions were stronger. This study had empirically demonstrated that lecturers' implementation towards IT will increase when perceptions are high on factors such as willingness, lecturer, curriculum, education and teaching (refer to Table 3).

Several implications of the study are: (i) HEIs need to encourage lecturers to strengthen collaboration by giving recognition of the benefits of interdisciplinary learning to be matched by recognition of the need for both financial and related resources to support interdisciplinary teaching (IT) initiatives.(ii) HEIs also need to support workload, career rewards and pedagogy if HEIs want to provide students with IT opportunities.

Conclusion: Implementing IT showed positive correlation coefficients of five factors (willingness, lecturer, curriculum, education and teaching). The higher the lecturers' willingness, the higher their intentions to implement IT in private HEI. Implementing interdisciplinary instruction and interdisciplinary learning help HEIs to develop creativity and problem solving skills among students and apply different perspectives of solving issues in the real workplace. The integrated efforts of researchers from multiple backgrounds and areas of expertise show the advantage of IT approach to problem solving, innovation, training next generation leaders, and advancing research and development (Jacob, 2015). As suggested by Millar (2016), the depth of interdisciplinary knowledge requires the consideration of a structure and the place of interdisciplinary curricula in HEIs. Administrators, policymakers and curriculum developers need to formulate strategies to encourage lecturers to implement IT, thus generating higher quality of human capital for the in line with MEB (2015 – 2025).

References

Association for Supervision and Curriculum Development (ASCD)(2017),1703 NorthBeauregard St.Alexandria, VA 22311-1714

Baloche, L., Hynes, J. L., & Berger, H. A. (1996). Moving toward the integration of professional and general education. *Action in Teacher Education*, *18,* 1–9.

Barab and Landa. (1997).Designing Effective Interdisciplinary Anchors. Educational Leadership March 1997.52-55.

Boix Mansilla, V., & Duraising, E. D. (2007). Targeted assessment of students' Interdisciplinary work: An empirically grounded framework proposed. *The Journal of Higher Education, 78*(2), 218-237. doi:10.1353/jhe.2007.0008

Bransford JD, Brown AL, Cocking RR, Donovan MS, Pellegrino J.W.(2003). How People Learn. Brain, Mind, Experience and School. National Research Council, National Academic Press; Washington, DC:

Brint, S. G., Turk-Bicakci, L., Proctor, K., & Murphy, S. P. (2009). Expanding the social frame of knowledge: Interdisciplinary, degree-granting fields in American colleges and universities, 1975-2000. *The Review of Higher Education, 32*(2), 155-183.
doi:10.1353/rhe.0.0042

Chen,PurcellCone,and ConeJacobs, H.H. (1989). Interdisciplinary curriculum: Design and implementation.

Chen, S., Hsu, I. C., &Wu, C.-M. (2009).Evaluation of undergraduate curriculum reformfor interdisciplinary learning.*Teaching in Higher Education, 14*(2), 161-173.doi:10.1080/13562510902757203

Christie, B. (2000). Topic teamwork: A collaborative integrative model for increasing Student-centered learning in grades K-12. Journal of Physical Education, Recreation and Dance, 71(8), 28-32.

Chou, C.-P., Bentler, P. M., & Satorra, A. (1991). Scaled test statistics and robust standard errors for nonnormal data in covariance structure analysis: A Monte Carlo study.British Journal of Mathematical and Statistical Psychology, 347-357.

Coffey H. (2004).Interdisciplinary Teaching: http://www.learnnc.org/lp/pages/5196 Retrieved date 24 August 2017

Cone, T.P., Werner, P., Cone, S.L., & Woods, A.M. (1998). Interdisciplinary teaching through physical education.Champaign, IL: Human Kinetics.Cognition and Technology Group at Vanderbilt.(March 1993).Anchored Instruction and Situated Cognition Revisisted;Edcatioanl Tehcnilogy 33,3: 52-70.

Colander .D ; & Zhuo,D. (2015). *Where Do PhDs in English Get Jobs?An Economist's View of the English PhD Market.* Duke University Press Online Journal.

Curtis, D. & Armstrong, S. "Project-based Learning Online," in The George Lucas Educational Foundation (2002).

Davies. M.,& Devlin, M. (2007).*Interdisciplinary higher education: Implications for teaching and learning*. Melbourne,Australia: The University of Melbourne,Centre for the Study of HigherEducation. Retrieved date 25 July2017. https://cshe.unimelb.edu.au/resources_teach/curriculum_design/docs/InterdisciplinaryHEd.pdf

Dillon, W. R .& Goldstein M (1984) Multivariate Analysis: Methods and Application ISBN: 978-0-471-08317-7 .August 1984

Drake,S and Burns R.C (2007).Meeting Standards Through Integrated Curriculum**.**

Edwards, A. (1996). Interdisciplinary undergraduate programs: A directory (2nd ed.). Acton, MA: Copley.

Erickson, L.H. (2002). Stirring the head, heart, and soul: Redefining curriculum and instruction. Thousand Oaks, CA: Cor win.Fostering interdisciplinary teaching and learning in the MYP published on behalf International Baccalaureate Organization,
(UK) Ltd.Peterson House, Malthouse Avenue, Cardiff Gate,Cardiff, Wales CF23 8GL,United Kingdom,Website: www.ibo.org.Retrieved on 12 Sept 2016

Fink, L. D. (2003) .*Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses*. San Francisco: Jossey Bass Higher and Adult Education Series). Available from: http:www.ou.edu/idp/significant/WHAT%20IS.pdf. retrieved 23 30 June 2007]

Friedow, A. J., Blankenship, E.E., Green, J.L.,& Stroup,W.W. (2012).Learning interdisciplinarypedagogies.*Pedagogy, 12*(3), 405-424.doi:10.1215/15314200-1625235

Gaff, I. G. & Ratcliff, J.L. (Eds.). (1997). Handbook of the undergraduate curriculum. San Francisco: JosseyBass.

Hall, P., & Weaver, L. (2001). Interdisciplinary Education and Teamwork: A Long and Winding Road. Medical Education, 35, 867-875. http://dx.doi.org/10.1046/j.1365-2923.2001.00919.

Hearn, A. (2003).Interdisciplinarity/extradisciplinarity:On the universityand the active pursuit ofcommunity.*History of Intellectual Culture, 3*(1), 3. Retrieved fromhttp://www.ucalgary.ca/hic/issues/vol3/3

Holley, K. A. (2009). Interdisciplinary strategies as transformative change in higher education.*Innovative Higher Education, 34*(5), 331-344.doi:10.1007/s10755-009-9121-4

Jacob W J (2015) Interdisciplinary trends in higher education. *Palgrave Communications*1:15001 doi: 10.1057/palcomms.2015.1. Retrieved date 15 June 2017.

Jacobs, H. (1989). *Interdisciplinary Curriculum: Design and Implementation. Ale*xandria, VA:Association for Supervision and Curriculum Development. (4-5).

Jacobs, H. H. & Borland, J.H. (1986). "The Interdisciplinary Concept Model: Design and Implementation." *Gifted Child Quarterly*. Winter.

Klein & Schneider.(2010). National Academy of Sciences, National Academy of Engineering, & Institute of Medicine.

Knowlton, D. (2003). "Preparing Students for Educated Living" in Knowlton, D. & Sharp, D., eds.(2003). Problem-based Learning for the Information Age. San Francisco: Jossey Bass

Lattuca, L.R., Voigt, L.J., and Fath K.Q., 2004. Does Interdisciplinarity Promote Learning? Theoretical Support and Researchable Questions." *The Review of Higher Education*, 28, 1, pp. 23-48.

Loewer O J (2012) Teaching the linkages among technology, economics and societal values to interdisciplinary graduate students. *International Journal of Science in Society*; **3** (4): 81–106.

Lorenzen-Huber L, Allen P and Kennedy-Armbruster C (2010) Synergy and sensibility: A course on entrepreneurship in gerotechnologies. *Gerontology & Geriatrics Education*; 31 (2): 181–197.

Malaysia Education Blueprint (MEB) 2015 – 2025.

Millar.V.(2016) Interdisciplinary Curriculum Reform in the Changing. http://dx.doi.org/10.1080/13562517.2016.1155549. Retrieved 1 August 2017

Moore (2014) Implementing Interdisciplinary Methods in Traditional Subjects .AIM Academy Amy Holt Cline. http://mathcclessonplan.weebly.com/uploads/3/0/8/0/30805123/interdisciplinarylessonexamples.steam.pdf . Retrieved 3 August 2017

National Association for Sport and Physical Education (NASPE). (2004). Moving into the future: National standards for physical education. 2nd ed. Reston, VA:

National Council for Teachers of English (1995). "Position Statement on Interdisciplinary Learning, Pre-K to Grade 4." http://www.ncte.org/positions/statements/interdisclearnprek4. Nov 25th 2015.

Newell, William H. (2001), A Theory of Interdisciplinary Studies*, Issues in Integrative Studies*, 19, 1-25.

O'Brien L, Marzano M and White R M (2013) "Participatory interdisciplinarity": Towards the integration of disciplinary diversity with stakeholder engagement for new models of knowledge production. *Science & Public Policy*; **40** (1): 51–61.

Petrie, H. G. (1976). Do you see what I see? The Epistemology of Interdisciplinary Inquiry.*Educational Researcher, February*, 9-15.

Pharo E and Bidle K (2012) Does Interdisciplinary Exist Behind the Faced of Traditional Disciplines? A Study of Natural Resource Management Teaching. *Journal of Geography in Higher Education* Vol 36,No.1 pp.65-80.

Pharo E.J; Davidson.A; Warr.K,Nursery-Bray .M; Beswick.K; Wapstra E. Jones.C (2012) Can teacher coollboration overcome barries to interdisciplinary learning in a disciplinary university? A case study usfing climate change.

Placek, J.H. (2003). Interdisciplinary curriculum in physical education: Possibilities and problems. In S.J. Silverman and C.D. Ennis (Eds.), Student learning in physical education: Applying research to enhance instruction.(2nd ed.) (pp. 255-271). Champaign, IL: Human Kinetics.

Repko,A.F.(2011). *Interdisciplinary research: Process and theory*, 2nd edn. Sage Publications: London.

Robinson, C., Mandleco, B., Olsen, S. F., & Hart, C. H. (2001). The parenting styles and dimensions questionnaire. In B. F. Perlmutter, J. Touliatos, & G. W. Holden, Handbook of family measurement techniques: Vol. 3. Instruments &index (pp. 319–321). Thousand Oaks: SagePublication.

Sá, C. M. (2007). "Interdisciplinary strategies" in U.S. research universities. *Higher Education, 55*(5), 537-552. doi:10.1007/s10734-007-9073-5

Stevens, D. (1994). Integrated learning: Collaboration among teachers. Teaching Elementary Physical Education, 5(6), 7-8.

Sekaran, U.**(**2015**).** Research Methods for Business by Uma Sekaran 6th edition

Spelt E J. H. & Harm J. A. Biemans & Hilde Tobi & Pieternel A. Luning & Martin Mulder (2009). *Teaching and Learning in Interdisciplinary Higher Education: A Systematic Review.*

Urooj Safia (2013*).Effects of Positive Teacher – Students Relationship on Students' Learning.* Interdisciplinary Journal of Contemporary Research in Business, Institute of Interdisciplinary Business Research April 2013 Vol 4, No 12

Vess, D.(2009). Explorations in interdisciplinary teaching and learning. www.faculty.de.gcsu.edu/~dvess/ids/courseportfolios/front.htm [A hands on introduction to Interdisciplinary via development of two courses] accessed 22 February 2017

Werner, P. (1996). Interdisciplinary programming: An idea whose time has come again. Teaching Elementary Physical Education, 7(4), 28-30

Wiersma.W (2009). Research Methods in Education: An Introduction (9th Edition).

Willermet E.A; Stephen J. J.; Chhetri. P. (2014). A Case Study Cathy: An Integrated Interdisciplinary Faculty-Student Learning Community Focused on Central Michigan University, Learning Community Research and Practices

Winberg, C. (2008). Teaching engineering/engineering teaching: Interdisciplinary collaboration and the construction of academic identities. *Teaching in Higher Education, 13*(3), 353-367. doi:10.1080/13562510802045394

Yang, M. (2009). Making interdisciplinary subjects relevant to students: An interdisciplinary approach. *Teaching in Higher Education, 14*(6), 597-606. doi:10.1080/13562510903315019

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