

ТЕОРЕТИЧНІ ТА МЕТОДОЛОГІЧНІ ЗАСАДИ ПРОФЕСІЙНОЇ ОСВІТИ

DOI 10.32342/2522-41-5-2017-0-14-116-122

УДК 37.046.16

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APPROACH TO RESEARCH-TEACHING NEXUS IN UNDERGRADUATE EDUCATION

This paper reports on the question of relationship of research to teaching and learning seeking to gain a clearer and deeper understanding of the main concepts within research-teaching nexus and their application in undergraduate education. The literature review conducted has been the basis for clarifying the terms in existing classification of teaching models focused on research such as research-led, research-oriented, research-based, research-tutored and research-informed education; and for suggesting a modification to it by introducing a conceptualizing root for the classification tree. In the result of careful investigation of current research, the author makes an attempt to model an approach to education in research-intensive environment that focuses on the development of students' research culture, problem solving skills, independence of thinking and learning, intellectual capabilities and critical thinking skills. Having identified the goals and principles of learning in research-intensive environment, the ways to support such education have been introduced. The article points to the value and possibilities for further research in the area.

Key words: kresearch-teaching nexus, research-led education, research-intensive environment, undergraduate programmes.

Problem statement. New values and requirements placed by employers in a competitive international entrepreneurial environment account for increasing demand in graduates who are able to work in cross-disciplinary collaborative environment, switch the tasks easily, solve problems, find effective solutions, think critically and independently and to seek information out as opposed to being simply knowledgeable in the area as evidenced by international employer recruitment surveys [21] and reports [8; 27]. These global drivers initiated the reforms to the UK [19; 28] and European Union [9, 29] higher education focusing on educational quality enhancement with research and innovation as leading forces to promulgate excellence and sustain the countries intellectual and creative capital. In Ukraine, this aim has also been reflected in the strategic objectives set by the Ministry of Education and Science of Ukraine for the higher education sector and The Law on Higher Education of Ukraine which is underpinned by a democratic and pro-European agenda [35]. As a response to these governments' intentions and initiatives, the purpose of university education is being reconceptualised with a main focus on creation of a research-intensive educational environment as a central strategy of an institution in order to equip students for innovation and problem solving in professional contexts [1; 3, 11; 30]. However, since this shift in focus is relatively new, there exists a need to develop and test innovative teaching methods and practical ways to actively engage students in their learning in research-intensive environment. Moreover, although there is a substantial amount of publications on linkage between education and research within a higher education setting, there is still much ambiguity in the definitions relating to research-teaching nexus which heightens the need to clearly articulate the terminology used.

Analysis of recent researches and publications. A growing body of literature has examined the nature of the relationship between teaching and research (A. Brew [6], G. Broek [7], G. Gibbs

[12], J. Hattie and W. Marsh [14], M. Healey [18], A. Jenkins, M. Healey and R. Zetter [20]), often claiming a positive effect of this link on the outcomes of learning which has also been supported by clear evidence from studies conducted in different institutions where students learn in a research-intensive environment [1; 10; 16]. Studies of the research-teaching nexus revealed multidisciplinary nature of research and heterogeneous character of teaching and described discipline specific approaches of integrating research into teaching (R. Griffiths [13], M. Healey [18], A. Miller, J. Sharp, J. Strong [23]). Conceptualizing research and teaching linkage, basic principles of research-led education have been explored (J. Biggs and C. Tang [2], P. Ramsden [26], J. Schapper and S. Mayson [32]). And four main approaches to teaching in research-intensive environment have been proposed [17] as descriptive frameworks to clarify educational purpose and outcomes. It has also been challenged to develop research-based curricula that extend students' limits and develops the skills of inquiry and research [25]. Many attempts have been made to investigate and understand the impact of these new modes of learning and teaching advocating research-teaching nexus on students' learning outcomes, universities and teachers (J. Fuming and P. Roberts [10], P. Scott [33]).

The reader should bear in mind that the study is mostly based on the analysis of studies in the UK, European Union and USA. A synopsis of literature in Ukraine has shown that there seem to be a lack of studies in the specific field of research-led education except for a fundamental work on constructivist blended approach to teaching [34] which can be underpinning for further studies of research-led education in Ukraine because it advocates students' autonomy, role of inquiry, experiential learning, complex authentic collaborative tasks, i.e. principles and concepts that correlate with the goals and principles to create research-intensive educational environment (see further in the article).

Purpose of the article. Whilst there is evidence showing a strong institutional focus on supporting and adding value of research-learning relationship in order to meet the current and future demands of the labour market prevalent in innovation, this article seeks to explore and clarify the ways in which students are enabled to engage in research-intensive learning environment in undergraduate course to enhance their competency and employability.

Main material. Despite the fact that there exists a large volume of studies describing the link of research and learning in institutions, there is still a need for consistency in using the terms related to research-teaching nexus, as has already been noted by K. Valter and G. Akerlind [36] and other researchers [18]. For example, it should be recognized that the term "research-led education" is frequently used in literature to refer to such disparate ideas as being one of the methods of teaching where the students are passive participants of the process and learn about the research, versus a broad concept of education often highlighted as intensive student-focused which include research-tutored, research-oriented, research-based, research-informed and again research-led teaching and learning. See, for example [13, 23]. This shows the need to be more explicit about the terms and what exactly is meant by "research-led" education. For this reason, throughout this paper in order to avoid ambiguity, we will use the definition suggested by M. Healey and A. Jenkins [17] following R. Griffiths [13], who saw *research-led education* as one of the four methods in which research connects with teaching, content and curriculum where students learn about current research in the discipline, the curriculum content is dominated by staff research interests, and information transmission is the main teaching mode. The other three methods are *research-oriented*, in which students develop research, enquiry skills and techniques by understanding the processes by which knowledge is formed and staff try to engender a research ethos through their teaching; *research-tutored*, in which students engage in research discussions; *research-based*, in which students undertake research and enquiry as researchers, the curriculum is largely designed around inquiry-based activities. In addition to these four approaches, S. Ozay [24] suggests a *research-informed one* in the sense that it draws consciously on systematic inquiry into the teaching and learning process itself.

The first two of these categories involve students as an audience, learning content or skills from an expert researcher. The second two encourage students to actively participate and the division of roles between teacher and student is minimised, discussing or debating current research questions with each other or disciplinary experts, or actively practising the methods and processes of research.

To avoid ambiguity in using the term “research-led education”, we will make an attempt to expand the existing classifications [17; 24] by integrating the term “research-driven education” as an approach to conceptualize all the above described methods which create a research-intensive teaching/learning environment. Fig. 1 below presents a research-driven education as a root of the classification of teaching methods focused on research and shows main focuses of those methods.

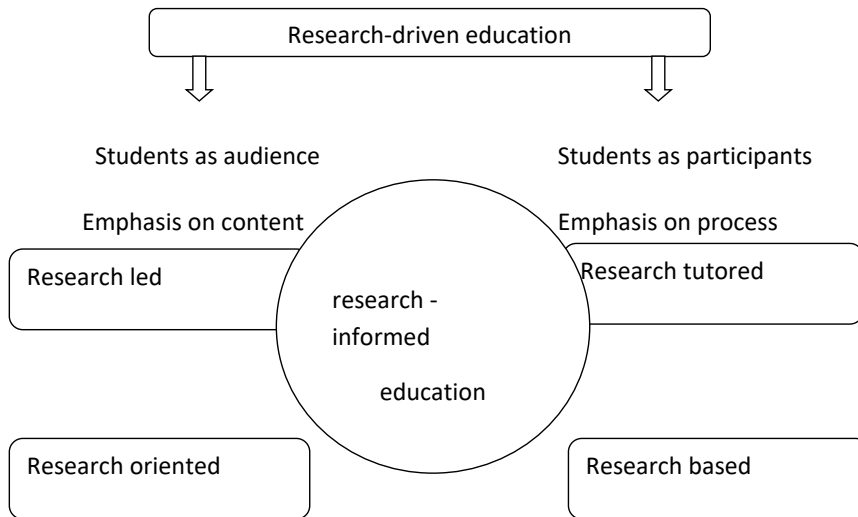


Fig. 1. A model of research-driven education

As seen from the model, creation of a research-intensive environment in which teaching and learning occur, can be done by a combination of methods when students actively immerse themselves in research as well as learning about the research. All these methods require students and teachers undertake a systematic inquiry as a thorough and deliberate effort to deal with problems, explore something insufficiently known or understood in order to develop new knowledge. It is suggested that the influence of each of these types of interaction between research and teaching can be found in all disciplinary fields and that their applicability is likely to vary according to the discipline context [18; 20]. Having clarified the terms, it is necessary to formulate the goals and principles of research-driven education in order to identify its practical applications.

The analysis of current research [7; 22; 32] has allowed to formulate the goal for research-driven education as follows: to develop a research-rich culture of a student who pursues new knowledge and is able to: **think critically, independently and evaluate information intelligently** and objectively; handle uncertainty and new problems; seek accurate information about the complex issues of our time; sustain the country’s intellectual and creative potential to make a profound difference in the world through their individual choices, work, and actions.

Research-driven education can be supported in a number of ways, including through the content and structure of the curriculum, through teaching practice, and through providing students with research opportunities – variously by research-led, research-based, research-oriented or research-tutored teaching and learning. Based on the educational theory which suggests a spectrum of ways to practice research-teaching nexus [2; 3; 6; 23; 32] the principles for research-driven education can be defined as follows: 1) the student is an active participant in the process; 2) the student is a part of a community of scholars; 3) the teaching and learning are research-active; 4) interdisciplinary learning; 5) innovation; 6) systematic inquiry and reflection on teaching and learning; 7) the embedding of research skills into the curriculum. We will consider how each principle can be realized in practice at undergraduate courses focusing on interactions between teaching, learning and research activities.

The first principle implies that the aim for the students is to experience for themselves how research leads to new understandings. In this case, the teacher might design student-centered

activities that engage the student in research. For example, individual or group projects supervised by an academic, small group activities where students work together to define and explore a problem; or in shorter projects where the student has a considerable degree of control over the question being asked. The key element is an immersion in the activity, so that learning occurs through the elements of the research process that the student engages in. It should be noted that although research-driven education involves a combination of methods including research-led and research-oriented in which the students have mostly passive role and the emphasis is put on the content rather than experience, practice has shown that student-centrism and active engagement of the students in activities should be dominant to successfully achieve the outcomes [10; 11; 30]. The key of the second principle is that the students are engaged in exploring and framing research-like questions and problems in lectures and class discussions, work constructively with active researchers on real research problems, plan and complete an independent and sustained critical investigation and evaluation of a chosen research topic. The teachers engage the students in research activities by using current research papers to introduce them to the interesting problems and questions in their field; and by bringing in researchers as expert guest who can become role models for students who want to undertake research in the future. This principle reflects the strengths of being at a research-intensive university where colleagues can work collaboratively with external experts bringing together knowledge and experience, showing the students that knowledge is contested. The third principle means that teachers are highly research-active and requires them to develop research-oriented modules focused on research skills for students. Being an active researcher gives them a depth of knowledge to help students make sense of issues, sources and contexts, and qualities such as confidence and passion for the subject matter. Individual student led seminars requiring data collection, complex analysis aimed at problem solving, critical evaluation and synthesis integrate the latest research into teaching and learning. Students learn about current research in the discipline and develop research methods and skills to undertake research activities. The third principle of interdisciplinary learning is characterized by orientation to cross disciplinary boundaries and an attempt to find solutions to multidimensional research problems [4; 11]. This principle aims at providing the students with cross-disciplinary opportunities enabling them to take modules and courses not directly related to their field of study or to study specialist topics in great depth, to work cooperatively on projects of mutual interests across disciplines realizing and accepting that knowledge, inquiry, and teaching needs somehow to be transcended to enrich their learning experience. The fourth principle of innovation implies that teacher informs the students about new theories and stimulates them to put new technologies and theories into practice, implements new educational technologies (iPods, blogs, wikis) and tools of innovative pedagogies. Students learn new theories and put new technologies into practice as they are being developed. The sixth principle is underpinned by the constructivism belief [34] and reflects the process of how knowledge is being constructed and means that teaching co-exists and interrelates with learning. It implies that students are engaged with systematic inquiry and reflection on teaching and learning being aware of their learning outcomes. Group based seminars requiring the aforesaid, critical review of research and class based reflection on learning experience to critically evaluate subject based knowledge and students' work form the basis of the teaching material. The key element is that learning occurs through the elements of the research process that the student engages in accompanied by explicit reflection. The seventh principle is aimed at embedding research skills into the curriculum. Depending on the policy of the institution, the teacher himself or collaboratively with colleagues uses own research to inform curricula, selects the course content, lecture and seminars topics and activities, reading and recourses.

As seen from the above, the seven principles highlight learning where students are engaged in real world problems, explore real research questions cross disciplines. Research driven-learning shifts the emphasis from transferring knowledge and developing separate skills onto developing the students' abilities to approach problems and questions to seek for the best solution, building their knowledge via engagement in research, reflection and critical thinking, maximizing opportunities for real world contexts.

With regard to learning outcomes, evidence has shown benefits of studying in a research-intensive learning environment or fostering a research-driven education [7; 9; 10; 30]. Firstly,

such education engages students in their learning experience which enables them to develop a number of transferrable skills such as independence of thought and learning, critical thinking, entrepreneurial skills and ability to handle uncertainty and new problems so valued by employers. Secondly, maximizing the opportunities for cross-disciplinary research can facilitate an access to a wide range of career options. Last but not least, promoting a research ethos and giving an access to research opportunities has a positive impact on students' confidence and motivation.

Conclusions and further researches directions. The present study has been undertaken to investigate the current situation relating to research-intensive environment in education. It is evident that there is a considerable interest in strengthening linkage of research, teaching and learning at institutions as a consequence of new demands in international labor market which puts more value on the abilities to solve problems in cross-disciplinary areas, multitask and seek knowledge rather than be simply knowledgeable in any area. Having reviewed current studies, this paper has found that there exist a degree of uncertainty around terminology in research-teaching nexus. Therefore, the attempt has been made to clarify the term "research-led education" and avoid ambiguity in its meaning by introducing the term "research-driven education" as a conceptualizing framework for research-led, research-tutored, research-informed, research-based and research-oriented education. This differentiation in terms has allowed to formulate clear goals for research-driven education and explore eight principles of its realization in practice: 1) the student being an active participant in the process; 2) the student being a part of a community of scholars; 3) research-active character of teaching and learning; 4) interdisciplinary learning; 5) innovation; 6) teaching co-exists and interrelates with learning; 7) the embedding of research skills into the curriculum; 8) systematic inquiry and reflection on teaching and learning. A number of ways to deploy these principles has been identified to support more advanced levels of learning. The literature reviewed provides evidence that studying in research-intensive environment enables the development of a range of high level skills and crucial attributes valued by employers such as team-working, communication, analytical and problem-solving skills pointing out that the link of research, teaching and learning should be carefully managed across disciplines.

Further research might explore this framework as a way for academics to think about their own intended learning outcomes when designing research-driven learning activities for students in either coursework or project contexts. Collectively, faculties and institutions can develop own guidelines to assist academics in specifying learning outcomes and assessment standards for research-driven learning, explore in detail and adapt research-led, research-oriented, research-tutored, research-based and research-informed methods as appropriate according to different disciplines and departments.

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У статті розглянуто питання зв'язку дослідної роботи з навчанням та викладанням. Основна мета роботи – глибше розуміння головних понять у сфері дослідно-орієнтованого навчання (*research-led education*) і можливостей його реалізації на практиці в рамках програм підготовки бакалаврів. Аналіз літератури дозволив уточнити терміни в існуючій класифікації моделей дослідно-орієнтованого навчання та запропонувати модифікацію класифікації за допомогою введення поняття «*research-driven education*» (дослідно-кероване навчання) як концептуалізуючого корення. У статті сформульовано цілі та принципи навчання в дослідно-інтенсивному середовищі, яке має за головну мету розвинути вміння студентів вирішувати проблемні питання, незалежно та критично мислити, формувати дослідницьку культуру. Це дозволило змодельовати підхід до навчання в дослідно-інтенсивному середовищі і розглянути можливі засоби впровадження такого підходу у вищих навчальних закладах освіти. Автор також наголосив на перевагах дослідно-орієнтованого навчання та необхідності подальших досліджень у сфері відношення дослідницької роботи до навчання та викладання, розробки інструментів та методів імплементації дослідно-орієнтованого навчання у вищих навчальних закладах.

Ключові слова: дослідно-педагогічний зв'язок, дослідно-орієнтоване навчання, дослідно-інтенсивне середовище, програми підготовки бакалаврів.

В статье рассмотрен вопрос связи исследовательской работы с учебной и преподавательской деятельностью в высших учебных заведениях. Основная цель работы – уточнить ключевые понятия в области исследовательско-ориентированного обучения (*research-led education*) и возможностей его реализации на практике в рамках программ подготовки бакалавров. Анализ литературы позволил уточнить термины в существующей классификации моделей исследовательско-ориентированного обучения и предложить модификацию данной классификации с помощью введения понятия «*research-driven education*» как концептуализирующего корня. В статье сформулированы цели и принципы обучения в исследовательско-интенсивной среде, основная цель которой – развитие умений студентов решать проблемные вопросы, независимо и критически мыслить и формировать исследовательскую культуру. Автором сделана попытка смоделировать подход к обучению в исследовательско-интенсивной среде и рассмотреть возможные средства внедрения такого обучения в высших учебных заведениях. В статье также рассматриваются преимущества исследовательско-ориентированного обучения и направления дальнейших работ в области изучения роли и места исследования в учебном процессе и разработки инструментов имплементации исследовательско-ориентированного обучения в высших учебных заведениях.

Ключевые слова: исследовательско-педагогическая связь, исследовательско-ориентированное обучение, исследовательско-интенсивная среда обучения, программы подготовки бакалавров.

Одержано 7.11.2017.