Unlocking Potential : The Imperative for Research Facilities in Higher Education Institutions

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ABSTRACT

Gone are the days when higher education institutions were treated as degree-granting institutes or universities. Rather, it is expected that higher education institutions will foster innovation and conduct research on a variety of subjects of interest. Academic institutions are ranked and accredited based on their innovation and research outcomes. The rubric component for research output accounts for approximately 30-40% of the overall performance metrics defined by national and international ranking bodies. This alerts higher education institutions to immediately increase their research and innovation indices to be ranked among the top institutions.

Innovation cues are generally drawn from the positive environment created by the institution to foster creativity and innovation among its students and faculty. Encouraging students to participate in hackathons at the national and international level and filing patents are two measures of fostering innovation. In hackathons, several industries and incumbent industrialists challenge the student community to provide workable and achievable solutions.

KEYWORDS- research, imperative, unlocking, potential, higher, education, institutions

1. INTRODUCTION

These challenges stimulate creativity and innovation among students, who in turn use their knowledge acquired through the curriculum to seek and propose good solutions to the problems raised. Hackathons can last several days, with additional series of evaluation of the proposed solutions and the construction of a workable solution to the stated problem. Usually, good rewards of cash prizes and citations will be offered to the winning teams. The winning teams will also have the opportunity to patent their idea or product and are encouraged to become entrepreneur.[1,2,3]

The off-the-cuff competition for innovation rankings by higher education institutions has forced them to file as many patents as possible. However, not all proposed ideas are patentable and not all patents granted are commercially viable. Unless our innovation leads to practical implementation, these patents are nothing more than a stack of paper documents. Recent trends in the measurement of the innovation index in HEIs take into account only commercially converted patents from

HEIs. Thus, higher education institutions simply cannot accumulate patents, but must also make efforts to push them into the market in order to obtain commercial recognition and reward.

The 'Start-Up' is another buzz word used while measuring the innovation output from HEI. Every HEI claims to have nurtured many start-ups, but in reality, less than 0.5% of them survive beyond two to three years of existence and thrive in the market. The eco-system for powering a start-up must be robust and provide 360º encapsulation. Many enterprise and technology incubators (ITBs) created by higher education institutions will simply have office space with computers and an Internet connection. This ambiance could help software development projects, but are not very useful for product development startup ideas. Product development start-up ideas need Fab-Labs with a variety of fabricating and manufacturing tools. Therefore, creating a Fab-Lab with cutting-edge tools for manufacturing, including profile measuring machines, CNC machines, 3D printers, etc., is essential. It provides a real benefit and impact to startups. Another important component of TBIs is appropriate mentoring by mentors, who have proven themselves in their startups and businesses. Mentoring helps young people learn from the mistakes of their elders and prevents pitfalls. A TBI's comprehensive eco-system should also provide guidance to the beginners on product design, manufacturing, marketing, legal, administrative and financial aspects. It is not easy to establish a company without knowing the local rules and regulations, various financing avenues, marketing strategies and legal issues related to the company acts, GST and other tax filing systems etc.

On the whole, higher education institutions need to make prompt effort to provide 360-degree support to their innovators in order to establish and support start-ups on their campuses. Since, majority of the TBIs do not even comply to a small percentage of the requirements mentioned above, the failure rate of startups is as high as 97.6% in India as per the survey data released by concerned department of Government of India.[4,5,6]

So far, "research" has been considered as an outcome in the form of many research papers published in journals. The current requirements are publication in highly reputable journals, maintaining the shelf life of published paper over a long period of time, and getting good citations. The publications in Scopus Indexed, Web of Science (WoS), Science Citation Index Expanded (SCIE) journals with good impact factor and cite-score fetch good accolades. Faculty and students must work together with other national and international researchers to publish in reputable journals and also to maintain high citations for published articles. The term "research" is not limited to publications, but extends to obtaining research grants from government and private organizations. Therefore, the rubric proposed by the Ranking Agencies for Higher Education Institutions focuses on the research and consultancy grant received by higher education institutions.

A good research ambience should be created by higher education institutions to encourage the faculty and students to make research one of the core activities of the institution. The faculty and students must be encouraged with incentives to publish research papers, seed grant to undertake preparatory research work. Reducing the teaching burden of accomplished researchers is another good measure by higher education institutions' authorities. Encouraging the registration of Junior Research Fellow (JFR) and Senior Research Fellow (SFR), attracting full-time researchers with good research scholarships and many such initiatives help to improve the research rubric.

Hence , all higher education institutions must promote the culture of research and innovation among their faculty and students and contribute to the scientific community in particular and to society as a whole.

2. DISCUSSION

Teaching and learning, research and discovery, synthesis and creativity, understanding and engagement, service and outreach. There are many "core elements" to the mission of a great university. Teaching would seem the most obvious, but for those outside of the university, "research" (taken to include scientific research, scholarship more broadly, as well as creative activity) may be the least well understood. This creates misunderstanding of how universities invest resources, especially those deriving from undergraduate tuition and state (or other public) support, and the misperception that those resources are being diverted away from what is believed should be the core (and sole) focus, teaching. This has led to a loss of trust, confidence,

and willingness to continue to invest or otherwise support (especially our public) universities.

Why are universities engaged in the conduct of research? Who pays? Who benefits? And why does it all matter? Good questions. Let's get to some straightforward answers. Because the academic research enterprise really is not that difficult to explain, and its impacts are profound.

So let's demystify university-based research. And in doing so, hopefully we can begin building both better understanding and a better relationship between the public and higher education, both of which are essential to the future of US higher education.

Universities engage in research as part of their missions around learning and discovery. This, in turn, contributes directly and indirectly to their primary mission of teaching. Universities and many colleges (the exception being those dedicated exclusively to undergraduate teaching) have as part of their mission the pursuit of scholarship. This can come in the form of fundamental or applied research (both are most common in the STEM fields, broadly defined), research-based scholarship or what often is called "scholarly activity" (most common in the social sciences and humanities), or creative activity (most common in the arts). Increasingly, these simple categorizations are being blurred, for all good reasons and to the good of the discovery of new knowledge and greater understanding of complex (transdisciplinary) challenges and the creation of increasingly interrelated fields needed to address them.

It goes without saying that the advancement of knowledge (discovery, innovation, creation) is essential to any civilization. Our nation's research universities represent some of the most concentrated communities of scholars, facilities, and collective expertise engaged in these activities. But more importantly, this is where higher education is delivered, where students develop breadth and depth of knowledge in foundational and advanced subjects, where the skills for knowledge acquisition and understanding (including contextualization, interpretation, and inference) are honed, and where students are educated, trained, and otherwise prepared for successful careers. Part of that training and preparation derives from exposure to faculty who are engaged at the leading-edge of their fields, through their research and scholarly work. The best faculty, the teacher-scholars, seamlessly weave their teaching and research efforts together, to their mutual benefit, and in a way that excites and engages their students. In this way, the next generation of scholars (academic or otherwise) is trained, research and discovery continue to advance inter-generationally, and the cycle is perpetuated.[7,8,9]

University research can be expensive, particularly in laboratory-intensive fields. But the responsibility for much (indeed most) of the cost of conducting research falls to the faculty member. Faculty who are engaged in research write grants for funding (e.g., from federal and state agencies, foundations, and private companies) to support their work and the work of their students and staff. In some cases, the universities do need to invest heavily in equipment, facilities, and personnel to support select research activities. But they do so judiciously, with an eye toward both their mission, their strategic priorities, and their available resources.

Medical research, and medical education more broadly, is expensive and often requires substantial institutional investment beyond what can be covered by clinical operations or externally funded research. But universities with medical schools/medical centers have determined that the value to their educational and training missions as well as to their communities justifies the investment. And most would agree that university-based medical centers are of significant value to their communities, often providing best-in-class treatment and care in midsize and smaller communities at a level more often seen in larger metropolitan areas.

Research in the STEM fields (broadly defined) can also be expensive. Scientific (including medical) and engineering research often involves specialized facilities or pieces of equipment, advanced computing capabilities, materials requiring controlled handling and storage, and so forth. But much of this work is funded, in large part, by federal agencies such as the National Science Foundation, National Institutes of Health, US Department of Energy, US Department of Agriculture, and many others.

Research in the social sciences is often (not always) less expensive, requiring smaller amount of grant funding. As mentioned previously, however, it is now becoming common to have physical, natural, and social scientist teams pursuing large grant funding. This is an exciting and very promising trend for many reasons, not the least

of which is the nature of the complex problems being studied.

Research in the arts and humanities typically requires the least amount of funding as it rarely requires the expensive items listed previously. Funding from such organizations as the National Endowment for the Arts, National Endowment for the Humanities, and private foundations may be able to support significant scholarship and creation of new knowledge or works through much more modest grants than would be required in the natural or physical sciences, for example. Philanthropy may also be directed toward the support of research and scholarly activity at universities. Support from individual donors, family foundations, private or corporate foundations may be directed to support students, faculty, labs or other facilities, research programs, galleries, centers, and institutes.

Students, both undergraduate and graduate, benefit from studying in an environment rich with research and discovery. Besides what the faculty can bring back to the classroom, there are opportunities to engage with faculty as part of their research teams and even conduct independent research under their supervision, often for credit. There are opportunities to learn about and learn on state-of-the-art equipment, in state-of-the-art laboratories, and from those working on the leading edge in a discipline. There are opportunities to co-author, present at conferences, make important connections, and explore post-graduate pathways.

The broader university benefits from active research programs. Research on timely and important topics attracts attention, which in turn leads to greater institutional visibility and reputation. As a university becomes known for its research in certain fields, they become magnets for students, faculty, grants, media coverage, and even philanthropy. Strength in research helps to define a university's "brand" in the national and international marketplace, impacting everything from student recruitment, to faculty retention, to attracting new investments.[10,11,12]

The community, region, and state benefits from the research activity of the university. This is especially true for public research universities. Research also contributes directly to economic development, clinical, commercial, and business opportunities. Resources brought into the university through grants and contracts support faculty, staff, and student salaries, often adding additional jobs, contributing directly to the tax base. Research universities, through their expertise, reputation, and facilities, can attract new businesses into their communities or states. They can also launch and incubate startup companies, or license and sell their technologies to other companies. Research universities often host meeting and conferences which creates revenue for local hotels, restaurants, event centers, and more. And as mentioned previously, university medical centers provide high-quality medical care, often in midsize communities that wouldn't otherwise have such outstanding services and state-of-the-art facilities.

Research is essential to advancing society, strengthening the economy, driving innovation, and addressing the vexing and challenging problems we face as a people, place, and planet. It's through research, scholarship, and discovery that we learn about our history and ourselves, understand the present context in which we live, and plan for and secure our future.

Research universities are vibrant, exciting, and inspiring places to learn and to work. They offer opportunities for students that few other institutions can match – whether small liberal arts colleges, mid-size teaching universities, or community colleges – and while not right for every learner or every educator, they are right for many, if not most. The advantages simply cannot be ignored. Neither can the importance or the need for these institutions. They need not be for everyone, and everyone need not find their way to study or work at our research universities, and we stipulate that there are many outstanding options to meet and support different learning styles and provide different environments for teaching and learning. But it's critically important that we continue to support, protect, and respect research universities for all they do for their students, their communities and states, our standing in the global scientific community, our economy, and our nation.

3. RESULTS

Top 7 Universities with the Best Research Facilities

To attract bright students and faculty members, universities are ready to make major investments in research facilities. They create excellent infrastructure and world-class laboratories, centers, software, and equipment.

These resources help to train a new generation of scientists who can dive into experiential work to pursue their ideas.

Using a strong scientific base and transferring their knowledge, students and faculty members can have a global impact and make the world a better place.

If you are interested in research, consider one of the following universities to continue your education.

List of Universities

1. Harvard University

Harvard offers research opportunities in a variety of fields. You do not need any prior experience to use them. The only thing that is required from you is to be proactive and motivated to conduct research.

There are several options that you can choose from. You can pick course-based or thesis research as well as research assistantship or research programs.[13,14,15]

You will get a chance to work at world-class research facilities. More than 100 such centers are available to students and faculty members on campus and across the world.

There are impressive Core Facilities, or the so-called Cores, that provide equipment and resources for laboratory experiments.

At Harvard University, every school has cutting-edge facilities, including the Arnold Arboretum of Harvard University, the Harvard University Herbaria, the Image and Data Analysis Core, and many others.

2. Stanford University

As one of the leading research institutions, Stanford University encourages students to join their faculty members at laboratories, centers, studios, libraries, and other facilities.

Here you can satisfy your intellectual interests and start your independent research already as an undergraduate student. Besides, you can choose to join honors programs, department, or faculty research.

With any of these options, you will get professional mentorship and build your research toolbox.

If you are interested in sciences, research facilities such as Bio X, ChEM-H, and the Feldman Lab will support you in your discovery.

RISE, the Language Center, and CESTA are for those of you interested in humanities. These are only a few examples of research centers and institutions out of numerous other options available at Stanford University.

3. Massachusetts Institute of Technology (MIT)

At MIT, the Undergraduate Research Opportunities Program supports students at the beginning of their careers in science.

The institution lifts all the boundaries by encouraging interdisciplinary research across different departments and schools. You will enjoy the benefits of academic collaboration and be able to learn from the greatest. Thus, this will enrich your skillset and career goals.

To drive exploration, the institution has a number of impressive facilities, such as a federally funded research and development center Lincoln Laboratory, the Laboratory for Nuclear Science, MIT.nano, the Research Laboratory of Electronics, the Haystack Observatory, to name but a few.

4. The University of Cambridge

This is a UK-based research institution with an 800-year history of excellence. The University of Cambridge has more than 100 Nobel Prize winners and significant achievements in each study area.

The institution supports an interdisciplinary approach to challenges. This helps to establish a single vision and set common goals among faculty members and students who participate in research.

The University's Interdisciplinary Research Centres facilitate research in different fields, from conservation and energy to neuroscience and public health. WritePaper experts single out the center of language sciences. It gathers leading scholars who drive language research across the humanities and social sciences.[16,17,18]

5. Yale University

Yale University is advancing research in different areas. It aims to improve the world with quality initiatives and solutions.

Outstanding research facilities help students and faculty members advance in their inquiry.

Yale University has 800 laboratories on campus. Besides, the Diabetes Research Center, the Yale Center for Analytical Sciences, the Yale Stress Center, and around 40 other facilities provide everything necessary for research in arts, humanities, and social sciences.

Medical and health sciences are empowered by the Bone Center, YCMI, the Yale Stem Cell Center, and numerous other institutions.

Among Yale science and engineering facilities, the Forests Dialogue, Yale Climate Connections, and the Energy Sciences Institute definitely stand out.

6. The Johns Hopkins University

As the first research university in the US, it has a long history of revolutionary breakthroughs in research. Johns Hopkins University offers its students unique resources that allow them to become part of great discoveries.

It is home to a number of world-class research facilities. You might have heard about the Johns Hopkins Hospital, the Applied Physics Laboratory, the Space Telescope Science Institute, and the Center for Language and Speech Processing.

These are only some of the facilities that you can explore. The university has a range of programs and initiatives that provide students with research opportunities regardless of their experience or field of interest.

7. University of Toronto

The University of Toronto is committed to supporting research across disciplines. Here researchers can find everything they need to work on their projects.

The institution offers a wide range of options for students, such as seminars, courses, summer positions, volunteer work, among other research opportunities.

Besides, on-campus facilities allow students to gain actual experiential practice.

Some of them function within a certain faculty while others, operate across different departments. Some of such facilities are the Goldcorp Mining Innovation Suite, the Institute of Biomaterials and Biomedical Engineering, and the Centre for Healthcare Engineering.[18,19]

4. CONCLUSION

Research is typically separated into two different types: fundamental and applied research. While fundamental research aims to bring knowledge from a natural phenomenon and improve our understanding of it, applied research uses existing scientific knowledge to solve real-world problems or address other practical issues. But why are fundamental and applied research so important in our society? Why is it critical for an educational institution to invest its resources in research and development? How does this apply to the hospitality industry?

In today's world, research is becoming increasingly important. Indeed, the total global spending on research & development (R&D) has increased steadily over the past 25 years and reached USD 2.34 trillion in 2021,

according to Statista.i In the European context, Horizon Europe is considered the key funding program for research and innovation, with an overall budget of EUR 95.5 billion (2021-2027). But why is so much investment poured into research?

The strong impact of research in today's world

Research impact is defined by the Research Excellence Framework as having "an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment, or quality of life, beyond academia".ii As a result, educational institutions, with both fundamental and applied research, have a major role to play and can positively contribute to those aspects. In this article, we aim to show in 3 key reasons why it is important for educational institutions to contribute to research.

1. The role educational institutions play in addressing global problems and fostering innovation via research

"Science lies at the heart of solutions to important problems" and management scholars have a distinctive advantage in tackling significant societal issues. They can confront key obstacles related to individuals, behaviors, organizations, and institutions that frequently arise when addressing society-wide challenges. By overcoming these obstacles, they can help create a more inclusive society.iii According to a recent study, 36% of researchers believe that solving political, social, economic or environmental problems is one of their most important roles. The European Council Resolution describes European universities as being at the forefront of "Europe's drive to create a knowledge-based society and economy and improve its competitiveness".iv .As a result, educational institutions can make a significant contribution to the economy and society through research, more specifically on companies, cultural and social-health institutions, the authorities and civil society. For example, in 2020, the collaborative efforts of Oxford University and AstraZeneca resulted in the successful development of the Oxford/AstraZeneca Covid-19 Vaccine, offering widespread protection against the global pandemic. Similarly, researchers at University College London made significant strides in breast cancer treatment, showcasing a pioneering therapy that proved to be as effective as traditional approaches.

Addressing complex global challenges requires a comprehensive approach that encompasses effective policymaking. Consequently, it becomes imperative for policy changes to be grounded in rigorous fundamental research, as emphasized by Aurélie Boulos, Head of Faculty Affairs at EHL Hospitality Business School.

"I know most of the knowledge fundamental researchers create may not have an immediate impact on policymaking or practical applications, but the untapped potential of such knowledge is immense, and integrating fundamental research into the policymaking process can unlock novel insights and drive innovation in unforeseen ways."

Aurélie Boulos, Head of Faculty Affairs at EHL Hospitality Business School

Also, the impact of university-industry links on innovation has been studied by scholars in various fields such as management, economics, sociology, science, and technologyv and 46% of researchers believe that their main role in society involves "enabling innovation". As a result, educational institutions play an important role in technological, cultural and societal innovations and value creation. As mentioned at the 2023 World Economic Forum in Davos: "Fundamental scientific research has laid the foundations for many of today's most important innovations", such as the discovery of the structure of DNA or the invention of the internet.

It is also important to develop new knowledge that is both of high quality and reliable in order to foster the innovation of products and services that meet existing needs.vi The European Innovation Council (EIC) supports start-ups, SMEs and research teams in creating innovation, and has a budget of EUR 10.6 billion (2021-2027) for innovation, including European innovation ecosystems. In some cases, research can have a broad impact if it causes a shift in thinking that extends beyond its original scope and is applied to new organizations and institutions. One salient example is the advent of the sharing economy, which has become ubiquitous around the globe in just a few years.vii.2. Educational institutions have an impact on knowledge sharing and dissemination via scientific partnerships

Developing cross-collaborations between universities and industries, and across different fields of expertise, is important to create accurate knowledge and understanding of the world phenomena. Interestingly, 43% of researchers surveyed prefer to involve people outside of their specific field in order to better shape their research. This is therefore not surprising to see that, according to statistics from Horizon 2020, more than 1.5 million research collaborations have been created from more than 150 countries. The Covid-19 pandemic has indeed proven that "science has become a team activity", and that a strong partnership will only bring better solutions to the current world. Indeed, the complexity of this crisis has encouraged the collaboration of molecular biologists, epidemiologists, clinicians, social scientists, engineers, material scientists, among others.

Creating collaborations is one important thing, sharing new knowledge to the public is another, as a majority (63%) of researchers believe they contribute to "educating others". Indeed, 57% of Americans are more likely to believe in research if the data is publicly available. The pandemic also had an impact on knowledge sharing, with 78% of researchers surveyed agreeing that the pandemic increased the importance of science bodies and the need for researchers to explain research findings to the public.

Faculty members conduct applied hospitality research in a variety of managerial disciplines. Researchers tackle applied research questions for the benefit of the industry while simultaneously contributing to excellence in hospitality research.

3. Research contributes to the growth and success of higher education institutions

While the impact of educational institutions' research on society has been widely explored, it is worth remembering that research also has a strong impact on the institutions themselves. First, research has an impact on teaching that helps "the training of responsible and autonomous professionals, who take a reflective look at their practice and have acquired the ability to constantly develop their skills". However, the benefits are not only for the teachers but also for the students. Students who engage in research tend to have higher critical thinking and problem-solving skills.viii.Also, research plays a significant role in accreditations as well as the competitiveness of the university, which ultimately enables it to attract top talent in terms of both students and faculty. It has been shown that research productivity is positively correlated with institutional ranking and reputation.ix.The focus is now on finding ways to evaluate and compare the quality and effectiveness of university teaching, learning, and research. Over the

past few years, there has been a gradual increase in techniques for assessing higher education activities and results, especially when it comes to university-based research. For example, university rankings have become ubiquitous across the globe.x However, measuring research impact needs to go beyond numbers and understand its overall impact on society. As the world becomes more interconnected, there will be more and more global evaluations of research quality and performance.xi."The current rankings, based on bibliometrics or citations, tend to overlook the crucial aspect of research's impact on society, innovation, and institutions. Funding and research partnerships are determined by these rankings. This does not give much room for acknowledging how research can truly make a difference in our society. Also, in universities, the impact of researchers on societal or industrial issues should also be considered further, when possible, in their evaluation alongside their publications and the funds they raised." Aurélie Boulos, Head of Faculty Affairs at EHL Hospitality Business School[19]

As a result, a multidimensional system combining indicators and expert knowledge is needed. In order to have a better assessment of universities' research, combining quantitative data with qualitative information, recognizing disciplinary differences, assessing impact and benefits, and integrating self-evaluation seem to be the key.xii.Collaborations, communication and funding help educational institutions develop research, even in the hospitality industry

Universities play a multifaceted role beyond education, as exemplified earlier. It is crucial for these educational institutions to prioritize research investment, given its profound positive impact on global society. Research can continue to be developed and enhanced through partnerships and collaborations, along with good communication and funding mechanisms. Horizon Europe supports, through the European Research Council (ERC), frontier research, fellowships, doctoral networks, training, and exchanges for researchers. It also develops research infrastructure, with an overall investment budget of EUR 25 billion. At the Swiss level, the Swiss National Science Foundation (SNSF) in 2022 has approved 2,732 new grants with a total of CHF 1.08 billion for researchers in all research institutions.

The hospitality industry also relies on partnerships with the universities for its development. Indeed, the research developed in educational institutions enables "shedding new light on various fields such as management, human behavior, finance, planning, marketing and many more", which are very relevant to the hospitality industry, particularly in the areas of technology and sustainability. Research in this field is crucial because consumer demand and market conditions are fluctuating all the time, which has a direct impact on the industry. As hospitality is a sector that is fluctuating and—by nature—highly international, research also enables industry players and the general public to have a better understanding of various issues when a crisis erupts, such as the one we faced during the Covid-19 pandemic.xiii By critically evaluating research as a significant scientific endeavor, universities can develop accessible and credible methodologies, addressing current challenges and providing practical solutions. This emphasis on research not only contributes to economic development, but also enhances practices and services in the hospitality sector.xiv

At EHL Hospitality Business School, many fundamental and applied research partnerships are possible within the broad industry of hospitality and tourism. Should you be interested in a potential collaboration in the future, you can use the contact form directly available on the EHL Hospitality Business School research website.[20]

Conflict of interest statement
Authors declare that they do not have any conflict of interest.

REFERENCES
[1] OECD (2015). Frascati Manual. The Measurement of Scientific, Technological and Innovation Activities. doi:10.1787/9789264239012-en. hdl:20.500.12749/13290. ISBN 978-9264238800. Archived from the original on 5 June 2020. Retrieved 4 April 2020.

[2] ^ Sha, Mandy (14 May 2019). "Professional Association and Pathways to Leadership in Our Profession". Survey Practice. 12 (1). doi:10.29115/SP-2018-0039.

[3] ^ "The Origins of Science Archived 3 March 2003 at the Wayback Machine". Scientific American Frontiers.

[4] ^ "Research". Merriam-Webster. Archived from the original on 18 October 2018. Retrieved 20 May 2018.

[5] ^ Grover, Vijey (2015). "RESEARCH APPROACH: AN OVERVIEW". Golden Research Thoughts. 4.

[6] ^ Creswell, J.W. (2008). Educational Research: Planning, conducting, and evaluating quantitative and qualitative research (3rd ed.). Upper Saddle River: Pearson.[

[7] ^ "What is Original Research? Original research is considered a primary source". Thomas G. Carpenter Library, University of North Florida. Archived from the original on 9 July 2011. Retrieved 9 August 2014.

[8] ^ Rozakis, Laurie (2007). Schaum's Quick Guide to Writing Great Research Papers. McGraw Hill Professional. ISBN 978-0071511223 – via Google Books.

[9] ^ Singh, Michael; Li, Bingyi (6 October 2009). "Early career researcher originality: Engaging Richard Florida's international competition for creative workers" (PDF). Centre for Educational Research, University of Western Sydney. p. 2. Archived (PDF) from the original on 10 April 2011. Retrieved 12 January 2012.

[10] ^ Callaham, Michael; Wears, Robert; Weber, Ellen L. (2002). "Journal Prestige, Publication Bias, and Other Characteristics Associated With Citation of Published Studies in Peer-Reviewed Journals". JAMA. 287 (21): 2847–50. doi:10.1001/jama.287.21.2847. PMID 12038930.

[11] ^ US Department of Labor (2006). Occupational Outlook Handbook, 2006–2007 edition. Mcgraw-hill. ISBN 978-0071472883 – via Google Books.

[12] ^ Roffee, James A; Waling, Andrea (18 August 2016). "Resolving ethical challenges when researching with minority and vulnerable populations: LGBTIQ victims of violence, harassment and bullying". Research Ethics. 13 (1): 4–22. doi:10.1177/1747016116658693.

[13] ^ Lesage, Dieter (Spring 2009). "Who's Afraid of Artistic Research? On measuring artistic research output" (PDF). Art & Research. 2 (2). ISSN 1752-6388. Archived (PDF) from the original on 5 October 2011. Retrieved 14 August 2011.

[14] ^ Eisner, E. W. (1981). "On the Differences between Scientific and Artistic Approaches to Qualitative Research". Educational Researcher. 10 (4): 5–9. doi:10.2307/1175121. JSTOR 1175121.

[15] ^ Unattributed. "Artistic research at DOCH". Dans och Cirkushögskolan (website). Archived from the original on 5 November 2011. Retrieved 14 August 2011.

[16] ^ Schwab, M. (2009). "Draft Proposal". Journal for Artistic Research. Bern University of the Arts.

[17] ^ Julian Klein (2010). "What is artistic research?". Archived from the original on 13 May 2021. Retrieved 15 June 2021.

[18] ^ Schiesser, G. (2015). What is at stake – Qu'est ce que l'enjeu? Paradoxes – Problematics – Perspectives in Artistic Research Today, in: Arts, Research, Innovation and Society. Eds. Gerald Bast, Elias G. Carayannis [= ARIS, Vol. 1]. Wien/New York: Springer. pp. 197–210.

[19] ^ Topal, H. (2014). "Whose Terms? A Glossary for Social Practice: Research". newmuseum.org. Archived from the original on 9 September 2014.

[20] ^ Hoffman, A. (2003). Research for Writers, pp. 4–5. London: A&C Black Publishers Limited.