

Understanding Research

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Introduction

“Science, by itself, provides no panacea for individual, social, or economic ills.....But without scientific progress no amount of achievement in other directions can insure our health, prosperity, and security as a nation in the modern world.”

Vannevar Bush, *Science – The Endless Frontier*, p. 11

Education in the Responsible Conduct of Research (RCR) involves an ever expanding body of knowledge concerning an even greater expanse of emerging topics and specialties. Both the body of knowledge and the expansive topics increase exponentially over time as new concepts about research and new challenges to research integrity emerge. These factors are not limited to any one particular branch or discipline of research in any of the sciences, the humanities, or technologies. However, to achieve a mature posture in the face of these expansive realities, there is a need for researchers, research leaders, and other colleagues to be securely grounded in key fundamentals.

One of these fundamentals is the concept of research itself. How is research defined? What contemporary factors have emerged that affect one’s understanding of research? What are the constitutive parts of the concept of research? How do all of these questions challenge the personal and professional formation of researchers and research leaders? How can these deepen one’s commitment to research with integrity?

One interesting metaphor for research is “Genius Becoming Innovation.” (cf. Gabriele). In other words, research occurs when the human gifts of intellect, curiosity, and skill coalesce in a type of synergy that results in a desire to investigate questions, advance explorations, and invent new processes or products for the good of individuals and society in general. This metaphorical understanding certainly has power; however, one must go deeper. It is essential that researchers and research leaders appreciate the critical defining factors about research so that the ever changing societal factors in institutions and cultures do not erode the fundamental purpose of research itself.

This syllabus chapter explores a number of critically central points that must be kept in mind when preparing substantive programs and educational resources. Only substantive educational programs and resources can aid researchers and research leaders in their maturing understanding of the efforts they perform. Such programs and resources are critical to ensure that all of the forms of research our communities undertake reach their final end, namely the betterment of our fellow human beings and the cosmos itself.

Core Points

1. Defining Research

- a. In today's environment, it is readily demonstrated and accepted that research has become a powerful enterprise with strong financial visibility in the world market place. From the development of pharmaceutical firms to the powerful place of the ongoing development of social media and information technologies, research is a powerful business presence. This is historically consistent. However, research does not have its origins in business but in scholarship and the formation of scholars both in the past and continuing today. (cf. Walker, et al). Of particular interest, regulatory documents concerned with finance and management actually preserve the fundamental role of research as it is tied to human discovery and intellectual achievement.
- b. Diverse U.S. federal regulations consistently define various forms of research as being about systematic investigations that are designed or intended to contribute to the advancement of generalizable knowledge. Such documents address also various levels of research and necessary compliance with regulations for sound financial stewardship and accountability to the public trust. However, their adherence to the fundamental definition of research as an intellectual activity is more than noteworthy. This assists our understanding that research is supported by appropriations/funds; however, it is not defined by them. (cf. OMB Circular A-11; DoD 7000.14-R; DoDI 3210.7)
- c. It is noteworthy that the same federal regulations do not give evidence of any bias that the term "research" is only used of the physical or social sciences. The definitions used and promoted are applicable to any and all fields in the humanities, the social sciences, the physical sciences, and technology development. This information is challenging to some forms of popular bias that would think of research or of research methodologies as only being applicable to obvious activities in the sciences.
- d. Finally, to understand and appreciate the richly complex definition of research and the performance of actual research activities, it is critically important to remember that, in the contemporary United States scenario, research is often an interagency activity. This interagency phenomenon includes any or all inter-relationships among federal, university, private sector, or international peers. In such a vibrant and many-faceted geography, it is very important that researchers, their leadership, and their institutions maintain a complete longitudinal and latitudinal clarity concerning research understandings, principles, parameters, expectations, and requirements for ethical conduct as well as for regulatory compliance.

2. The Four “iQualities” of Research

- a. Research as **Integral** to Healthcare: History attests to the critical importance of research in the history of civilization. Research in any and all disciplines has been central to human advancement and the progress of peoples. Obviously, its strongest energies come from the human desire for discovery, the quest to better life, and the multiple processes that undergird human achievement. In healthcare, research is critical. Human longevity and betterment are directly related to the vast discoveries made over the centuries in medicine and the healthcare sciences and arts. In military medicine, research is central to force health protection and readiness, ensures the well being of the force, their dependents, and our veterans. Discoveries abound in broad and diverse areas such as infectious disease prevention and cure (cf. Savarino), operational medicine (cf. Stuhmiller), and all of the many diverse and disparate disciplines that comprise or contribute to holistic healthcare (cf. Beyer). In the current era, research is critical to Wounded Warrior Care: the total care of our heroes, their families, and the impact this has on local communities. In very important ways, military medicine and its integral research efforts enrich healthcare worldwide.

- b. Research as **Integrated** within Institutional Mission: In some cases, there has been an awareness that some corners within institutions believe that research is or can be extraneous to the core mission. This is clearly not the case in healthcare. The preceding paragraph gives just a brief glimpse of the central place of research in healthcare. Perhaps this misconception occurs due to a lack of integration of research within the overall mission and structures of the institution. The creation of silos is a difficulty in general institutional life today. However, regarding research, literature underscores the need to integrate research within an institution’s daily life precisely because research is central to the institution’s mission. With this in mind, there is a clear appreciation how research is central to scholarship and academic excellence not only for the doctoral student or post-doctoral fellow, but for the seasoned scholar as well (cf. Walker et al). Even casual/informal conversation with medical students preparing for internship and residency make clear the importance of research. Many of them gravitate strongly toward medical centers and healthcare systems with strong research programs. They are attracted to these because of their belief that a strongly integrated research atmosphere helps them to, in the popular parlance, “stay on top of their game” as physicians and healthcare providers. Research, therefore, is not a variable easily kept to the side. It requires integration at every level of the institution’s mission, its future development, and its daily operations. With this in mind, it is easy to see why literature abounds with standards and best practices for the productive administration and management of research programs precisely within institutional procedures etc (cf. Kulakowski/Chronister; Norris/Youngers).

- c. Research as *Interdisciplinary*: Science and the arts are increasingly addressing the holistic nature of human experience and the systemic reality of nature itself. As a consequence, executive leaders and developers have increasingly become more appreciative about the interdisciplinary nature of research. Research is interdisciplinary precisely because human life is predicated upon the experience of interrelationships both within the self and with others. This has a profound impact upon the conduct of research in all of the arts and sciences. Too often in the past, the individual researcher practiced one's scholarship and skills in some form of isolation. The individual had an individual lab conducting individual efforts etc. With this in mind and given recent issues with funding etc, the problem of isolation too often resulted in an unfortunate but understandable sense of territoriality. Yet contemporary currents (e.g. the Clinical Translational Science Award System of the National Institutes of Health) have called for research to become more interdisciplinary. Worldwide research leaders are highlighting the essential nature of research as interdisciplinary because of the systemic needs of the human person and human society (cf. Johanson/Hohland; Repko; National Academy). Of particular importance in healthcare, and all the medical arts and sciences, the needs of wounded warriors is catapulting the interdisciplinary nature of research as central for the development of holistic, systemic, synergistic healthcare for suffering heroes, their families, and their communities (cf. Godwin/Garnier; *Providing*). The needs of wounded warriors require attention minimally to four general domains: health/wellness, personal formation/spirituality, social relationships/community, and professional development etc. Such needs are not tied to any one specific discipline. The technologies and discoveries required to meet these needs cannot be researched in isolation. The development of the most effective therapies and resources requires intense interdisciplinary dialogue. This has long term benefit on healthcare research and on human wellness as a whole.
- d. Research and *Internationalization*: One of the results of discovery and innovation has been the increased connectivity among members of society. Especially in the last 150 years with the advancement of communication/information technologies and knowledge systems, human beings have sought to overcome the reality of geographical distance. Such is clear from the efforts of historical research giants such as Nikolas Tesla and Marshall McLuhan (cf. McLuhan/Powers; Seifer). Using the language of McLuhan, the world has become a "global village." With this concept clearly in evidence, as well as many popular adaptations of the same, research efforts have increasingly been designed, configured, implemented and brought to benefit among many nations the world over. In fact, even within government direction, the concept of expanding research outward as a public-private partnership for world-wide benefit has been directed for many years (cf. *Technology Transfer Act*). With all of these points in mind, it is clear that research is an international or global reality. In many corporate as well as academic institutions, both public and private, research today is often

designed as a partnership among diverse, multinational and multiagency scholars/executives in all disciplines. The international nature of research is designed to create greater world-wide benefits, and likewise to make research truly an ever-generating activity for untold horizons and emerging human needs over time (cf. Osterhammer/Petersson). One of the challenges for the ongoing internationalization of research is to appreciate the impact that multicultural diversity has upon the communication of goals, strategies and outcomes for research activities. Individual cultures sometimes engage in international relations in a univocal manner without understanding that distinct cultures operate from distinct paradigms. Such distinct paradigms affect the ability to bring research discoveries to effective realities. For healthcare research, the effects of globalization are profoundly enriching and challenging at the same time. As healthcare and wellness have become increasingly more systemic and holistic, the breadth of internationalization for research in these areas adds to the depth and potential empowerment of newer and more comprehensive opportunities and needs to discover and affect positively those whose lives and livelihood are impacted by research efforts.

3. Research: Creating Cultures of Inquiry

In the past decades, various institutions have adopted best business practices and sound entrepreneurial structures for the founding, development, and the implementation of successful research programs, departments, and project management entities. However, it is important that institutional leaders, members, and research professionals appreciate that these do not capture the fundamental nature of research. Business and finance support research, however they do not define it. Ultimately, the *fundamentum in re* of research is that it is a culture of inquiry and discovery, of genius becoming innovation. This does not mean that institutions should not emulate, adopt, adapt, and develop the best business and entrepreneurial practices. These are essential for research to reach its proper end, as the Greeks term it, its *telos*. In addition, maintaining and developing the finest financial, administrative, and management operations is essential to ensure that the research mission is accountable to the public trust. Yet these are best practiced within the context of research as a cultural phenomenon, a human and humane activity.

Cultures are amalgams of individuals who have shared systems of language and belief, shared systems of ethics and behavior, and shared ways of interacting with one another both interpersonally and professionally. They are founded upon shared ways of conceiving of reality, namely unarticulated paradigms that create a distinct universe. Cultures are not necessarily confined to geographies or other proximities. Families have their own cultures in the same way as nations. In this respect, research as a phenomenon is a culture. The different disciplines of research also comprise cultures of their own. Research cultures of all disciplines also exist within the broader cultures that are their parent university or contextualizing institution. Hence, to understand research as a culture means developing a perceptive ability to operate within a system of concentric circles of interlocking cultures.

It is with this in mind that one can appreciate the impact of the 2002 investigations of the National Research Council (cf. NRC, *Integrity*). In that work, the National Research Council clearly saw that research is a culture in which research integrity and ethics sustain and advance the rhythms and pace of discovery and invention. In fact, it is the appreciation of the cultural nature of research and the role of scientific integrity that are central to avoiding problems related to research misconduct or any form of non-compliance that erodes the ethical nature of research and its importance for human respect, beneficence, and justice. To advance these benefits, it is therefore essential that all members of a research program or institution reflect carefully on how individuals can understand, protect, and promote ongoingly the culture that is research and the proper ends of research endeavors on behalf of the public trust.

Points for Reflection

1. From practical observation, how is research really “defined” in your institution? What are the factors that lead you to make your conclusions? If you had the opportunity to align better your institution’s daily operations with the definition of research per above, what changes might you suggest?
2. Reflect on the four iQualities of Research discussed above. Compare and contrast these with your practical experience of research in your institution. Where are the similarities? Where are the gaps? What strategies might assist your institution to putting into practice each of the four more closely? How might you yourself practice and promote these in your own activities?
3. Let us assume that becoming a “culture” is a goal that requires ongoing quality improvement in a group’s self understanding as well as its operations and activities. If you had the opportunity, what activities might you design to deepen your institution’s sense of being a “culture?” What educational or other awareness activities might assist your institution to deepen its commitment to becoming a culture of integrity?

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