

Discuss the following statement: "So much of the work done in science now requires input from multiple disciplines, that the separation of the disciplines is irrelevant and unnecessary"

Introduction

Let's assume that life is like a mystery story in progress. In this story, the researchers are protagonists, the figures are pictures and the academic disciplines are different chapters that, when brought together, provide the full narrative. An academic discipline is defined as an "organisation of learning and the systematic production of new knowledge, often identified with taught subjects" (Krishnan, 2009) with science being "the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence." (The Science Council, 2009). Disciplines are generally categorised as the following: Humanities, Social Sciences, Natural Sciences, Formal Sciences and Applied Sciences. At times, these categories may overlap, with the boundaries being less distinct, this is interdisciplinarity.

François (2006) criticises that "sloppy and inaccurate linguistics and semantics" lead to increased misunderstandings in discourse. Therefore, it is important to note what is meant by the term "interdisciplinarity". Stock and Burton (2011) distinguish between the different forms of integration; multi-, inter-, and trans-disciplinarity, which respectively differ by an increased incorporation between disciplines. During this paper, the term interdisciplinarity will be used to account for all three terms.

The world of academia has fluctuated in terms of interdisciplinarity. Renaissance doctors and scientists often spread themselves across multiple domains and disciplines. Contrastingly, increased scientific knowledge led to the specialisation of experts, remaining in a field of study for their entire career. These two approaches have contributed greatly to discoveries and breakthroughs in research, both past and present. However, are both approaches as effective as the other? Is interdisciplinarity a help to the world of research or a mere hinderance?

Perception of the world

Many argue that interdisciplinarity provides a more accurate understanding of the world that we live in. The constant combination and recombination of disciplines give rise to two outcomes. One being that the disciplines and their findings support one another, thus increasing the validity and reliability of discoveries. For instance, Rosalind Franklin bridged physical sciences, life sciences *and* technology when discovering Photograph 51, aiding the discovery of the structure of DNA. On the other hand, disciplines may conflict with each other. Though seemingly counterproductive, it may be what researches need to get closer to the truth. If you are familiar with the term "Darwinism", then the popular theory of "Survival of the Fittest" would provide a fitting analogy. There is a sense of **competition** between theories, where researchers work tirelessly to have their theories "**survive**". Instead of the increased

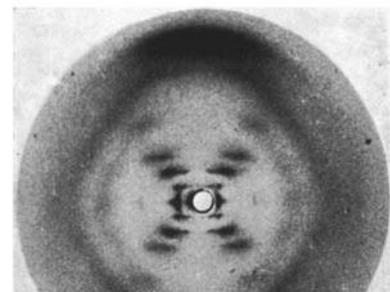


Figure 1; Photograph 51: The structure of DNA was seen for the first time in 1952.

ability to procreate, scientists go through intense prosecution and scrutinization in order to win awards like the Nobel Prize.

However, this scrutinization is applied to scientists by scientists. Arguably, interdisciplinary conflict provides pressure from an alternative angle. As a result, theories would need to be even more accurate, in order to adapt, “survive” and be accredited for.

Problem solving & Progression of research

“We are not students of some subject matter but students of problems. And problems may cut right across the borders of any subject or discipline.”

— Karl Popper (1963, pg.88)

It is clear to see that there are many problems in our world, be it environmental, social, or financial. With this complex array of problems requires and even more complex proposal of solutions. The world is not solely a scientific one, but a cacophony of interdisciplinarity, in which everything is connected. Showing its importance and value, interdisciplinarity has been described as “‘problem oriented’, since [it] addresses problems originating from our society and its needs” (Morillo, Bordons, & Gómez, 2013). To explain, so long as our world has problems, there is a requirement for interdisciplinarity. After all, “the most difficult and challenging problems require ambitious partnerships” (Breckler, 2005).

In addition to an improved ability to provide new solutions, interdisciplinarity is seen as proof of development as “it reflects an expansion of knowledge” (Breckler, 2005). Like the theory of evolution, the progression through time gives rise to increased complexity and ability. In a way, the drive for interdisciplinarity is a sign of more abstract thinking which is controlled by the frontal lobes (Leonardo C. de Souza, 2014). This ability to exercise this part of the brain with abstract thinking potentially leads to the better understanding of the world and how it operates, which is what science is all about.

Science supplies the foundation of knowledge

Despite the increase of interdisciplinarity of science, the implication of the phrase that science “requires input” from other disciplines may be frowned down upon by those that take the stance that science does not utilise other disciplines, but other disciplines utilise science. Revolving around “methodology based on evidence”, science is a self-standing discipline as it only relies on discovering what is and what is not, which requires little input from other less objective disciplines. Science is the foundation for all other disciplines because of what they are based on. Disciplines such as Humanities focus on human interaction, but how can one study human interaction without knowing a thing about human beings? This “need to understand the entire human organism- not just one part of it- is driving disciplines toward each other” (Pellmar TC, 2000). Although, this may be an overemphasis on the contribution of science.

Theories that have impacted social research often have little to no affiliation with science, such as the sociological Labelling theory, questioning whether science is as essential as made out to be. Nevertheless,

a hot topic in the humanities is to identify whether they are a science or not. The need for this confirmation shows the impact that science has had, even on unrelated disciplines; they are adopting scientific characteristics so much so that they need to question to which discipline they belong.

The need for experts

Whether science utilises other disciplines or vice versa, the need for separation is still apparent as it ensures the maintenance of field experts. The more separated the disciplines, the more specialised those involved are. Specialisation is important because it increases productivity (Dineshbakshi, 2020) by being “more efficient [as] maximum knowledge can be attained as a whole” (Breckler, 2005). As individuals become experts, less errors are made and more accurate discoveries are found, thus keeping science at its cutting-edge. A disadvantage of interdisciplinarity is shown during the renaissance period, where “too much need[ed] to be known and maintained within any area of science [for] individuals who know it all and can do it all” (Breckler, 2005).

Realistically, complete specialisation, may not be as beneficial for the individual as it is for the scientific community. For instance, staying in one discipline for the rest of your career could leave you vulnerable if changing careers or becoming jaded with your work. Therefore, there still would be a need for the input of multiple disciplines as interdisciplinarity continuously uses different approaches, which may keep the research exciting and more viable, as a result.

Battle of subjective

Interdisciplinarity gives rise to too many conflicting voices as disciplines have their own distinct characteristics. (Humanities Libre Texts, 2020) lists characteristics such as object of study, terminologies, and specific research methods and that define what a discipline is. As truth is not subjected to science, it is inevitable for disciplines to cross if the truth is to be achieved.

However, it can be argued that truth, is subjective, leading to two disciplines seeing the same data in opposite ways. Contestably, this is why the separation of disciplines is necessary; to stop blurring the lines and turning the objective to a battle of the subjective. Although, as previously stated, this competition may drive research closer to the truth and to solutions. Psychologists believe that interdisciplinarity improves our “ability to recognize bias, think critically, and acknowledge ethical concerns”. The early exposure to critical thinking provides many psychological benefits, including cognitive development and problem solving. This explains why 86% of education leaders at 60 funded CTSA institutions reported that interdisciplinary preparation is important in science careers (Begg, et al., 2014).

Conclusion

In a word, the statement can be both agreed and disagreed with. Interdisciplinarity is equally as useful as it is important. In this essay alone, approximately 4 disciplines and subjects were utilised (Psychology, Philosophy, Natural Science, History and Sociology). Hopefully, using them gave this essay more sustenance and a sense of reliability. By integrating different disciplines, we get a new outlook on research and how it can be used. Although easy to say that interdisciplinarity can cause conflict, being able to use that conflict to fuel research is something that you could not get in complete segregation. However, the skills and knowledge that experts provide would not be attained in a world with complete interdisciplinarity. Interdisciplinarity should not be an all or nothing approach. It is about finding and appreciating the balance between utilising other disciplines, whilst focusing on a specific field of study.

So, when thinking about whether or not there is a need for segregation, think about a book. Think about how the chapters, though reference and build from each other, are contained, and separated from one another. They are all talking about the same thing, just in different situations. It is only when they are read together that you get the full picture.

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