“Areas of knowledge are most useful in combination with each other.” Discuss this claim with reference to two areas of knowledge.

As an IB DP student I often find that what I learn in one subject may be linked to theories, concepts, and postulates of other subjects. For example, the concept of air pollution due to automobiles studied in ESS, is also discussed in economics in the form of negative externalities. This means that while the issue of pollution is global, when I study it in two different subjects, from two different perspectives, I not only acquire a greater knowledge, but I also deepen my comprehension of the concept. Environmental sciences as a discipline emerges from Natural Sciences and Economics from Human Sciences. When I analyse the title, I do agree that when combined, areas of knowledge do become more useful; in this instance, usefulness being linked to a better outcome and greater applications in the real world. Sometimes, usefulness can also cause paradigm shifts in knowledge. However, the title goes on to assert that it is only when such combinations are made that the areas of knowledge become useful to the highest extent. This may be debated as there are instances wherein usefulness of knowledge produced in an AOK may not be an outcome of such a combination. Some AOKs work well in seclusion while others may have their own methods of knowledge production that promote usefulness. The essay aims to discuss these propositions in natural sciences and human sciences.

How do we know what defines ‘most useful’? The answer to this question is probably contextual in natural sciences. Seeking to describe, understand and draw causal relationships, natural sciences study the physical world. In this process, they depend heavily on area of knowledge such as mathematics to achieve knowledge, which is more efficient, reliable and perhaps has a high degree of universality in terms of its application. One such example can be seen in Maxwell's Equations. Maxwell’s equations, proposed by James Clerk Maxwell are among the best-known equations in science, also forming a part of the fundamental laws of

classical physics. They are famous for their simplicity and elegance in describing the tenets of electricity and magnetism. What is worth noting here is that these equations have been derived through the application of mathematical technique of differential equations[1]. Their derivations have furthered the systems of knowledge in the sciences by facilitating construction of working relationships in the sciences. In fact, these equations are believed to have formed the basis for a majority of modern electronic technology[2]. The example illustrates how bringing together two AOKs of maths and natural sciences through the use of their techniques have helped in acquiring a high degree of sophistication in the knowledge so produced. This relationship, under the current circumstances may also be considered to be most useful, possibly linked to the application of the outcome. However, it is also important to understand that a lot of these equations are based on a certain set of assumptions and if proven wrong may lead to collapse of the entire structure of these equations, questioning the validity of the claim of being the most useful combination.

On the other hand, it might not always be necessary that useful knowledge can be derived only if two or more AOKs combine with each other. For example, in the recent Covid outbreak example, the development of the vaccine took place due to efforts of the scientists and researchers who worked in tandem across the globe. This vaccine was made possible due to the research in biology and biotechnology, disciplines of natural sciences. The vaccine was developed using the scientific method which involves the key steps of hypotheses, experiment, observation, analysis and conclusion. The results produced by a group of scientists can be

[1]P., Hampshire Damian, et al. *A Derivation of Maxwell's Equations Using the HEAVISIDE NOTATION*. 29 Oct. 2018, royalsocietypublishing.org/doi/10.1098/rsta.2017.0447.

[2] "Maxwell's Equations." *Maxwell's Equations | Institute of Physics*, 20 Jan. 2021, www.iop.org/explore-physics/physics-stepping-stones/maxwells-equations#gref.

replicated by others as well, confirming the validity and reliability of the knowledge produced. Currently, it may be stated that the vaccine has been synthesized by application of the tried and tested scientific method. Irrespective of the combination of areas of knowledge, this knowledge is both essential and useful in the current times. While we are yet to see its implications, the same vaccine could also be modified in future by using the same methods of knowledge production in natural sciences again. however, the contribution of other AOK such as maths here cannot be completely ignored. The scientists, in their use of the scientific method do use maths to record data and observations to say the least, but the argument of most useful however, can be contested

In human sciences, the knowledge production revolves around understanding human behaviour and predicting this behaviour under different circumstances. Psychology, a discipline of human sciences attempts to do just this by building on structures of its own knowledge but also effectively integrates knowledge from other AOKs such as the natural sciences in improving this knowledge. For example, psychologists use a number of scientific instruments, tools and techniques which are derived through knowledge in AOKs such as the natural sciences. One such example is that of brain scanning and imaging techniques. To study human behaviour in greater depth and detail, psychologists use brain scanning techniques like MRI, CT SCAN, and so on. They help psychologists to understand the functioning of the human brain better and also enable diagnosis and treatment of many psychological and brain related issues. In the absence of such techniques, knowledge in psychology and consequently human sciences would not be supplemented with scientific evidence, leaving experts in this AOK to encounter greater difficulties in solving the mysteries of human mind and behaviour. In addition, exercise of such a form of combination of knowledge provides a defence against issues of bias and promotes a more scientific study of human behaviour. This does lead to agreement with the title to the extent that AOKs in combination are indeed very helpful. There again may be a disagreement

in use of the term “most”. It may be acceptable in the current paradigm where biological approaches have been woven together with psychological in the interest of knowledge but remains open to further revision until a new and in all likelihood a better combination comes along. In a further critique of this approach, human sciences are also often censured and blamed for being too reductionist by reducing human mind to mere biology.

Shifting perspectives now, a counter argument in relation to combining different AOKs can be discussed. Going back to psychology, a branch under human sciences, examples of prominent social psychology theories such as the social attribution theory and social learning theory can be considered. These theories help determine why certain persons are more active in social life and why some others are more aloof and alone. Using the field of psychology, human scientists can understand a number of behaviours that human beings exhibit and understand the human mind and behaviour better. While it cannot be said with absolute certainty that other AOKs did not play a role in formulation of these theories, they are built through a large reliance on methods of human sciences themselves. When human scientists propose a hypothesis, they use mechanisms of observation, experimentation and models to predict human behaviour. It is these methods on which human sciences fall back on to test the validity and reliability of hypotheses, achieving success in terms of a greater understanding of human behaviour.

While so far, the essay speaks of combining two areas of knowledge, what happens when more than two are brought together? Does the knowledge produced have a universal application? The result could be either an enhanced usefulness or failure of the knowledge so produced to function under certain circumstance. The term most in the title, the distinguishing factor can be further debated here. For instance, if the example of Maxwell Equations is examined again, the role played by mathematics in producing a more efficient knowledge cannot be undermined. On the other hand, the derivations of these equations are also disparaged due to

their imprecision. When the equations accommodate sociology from human sciences[3], they do not cause easy calculations in physics in the use of maxwell equations , emphasizing how even with combinations of AOKs, knowledge production has its own constraints.

To conclude, although we can get useful knowledge from only one single AOK, a combination of two AOKs can certainly lead to an even better knowledge and that means that we can expect a more useful knowledge in that situation. This was seen in the examples of Maxwell Equations that uses mathematical techniques for deriving proof. It was also seen in the example of use of knowledge from natural sciences in generating further knowledge in human sciences through the use of techniques such as PET scans. However, alternatively, both human sciences and natural sciences have counted on their own methods of knowledge production, perhaps reducing the role of other AOKs to a mere fraction Also, both the AOKs do acknowledge that knowledge is provisional, best fitting the current paradigm; with the vaccine for Covid19 and theories in psychology. Each of these AOKs respond differently to use of knowledge from other AOKs. It was also seen that at times, the mix of these AOKs together may fit a large scheme of things but break down in some circumstances in all, some situations do encourage the use of combination of AOKs in the interest of knowledge production, perhaps nearing the use of the word most useful. On the other hand, some situations promote AOKs using their own approaches to be useful.

1560 Words

Bibliography

https://www.sciencedaily.com/terms/social_psychology_(psychology).html

[3] www.astro.princeton.edu/~jstone/AST541/Boozer-MathMaxwell.pdf.

https://www.verywellmind.com/social-psychology-4157177

https://www.simplypsychology.org/social-psychology.html

https://www.apa.org/action/science/social

https://www.sciencedaily.com/terms/evolutionary_psychology.html

https://plato.stanford.edu/entries/evolutionary-psychology/

https://www.britannica.com/science/evolutionary-psychology

https://www.psychologytoday.com/intl/basics/evolutionary-psychology

https://health.economictimes.indiatimes.com/news/industry/enormous-evidence-that-coronavirus-came-from-china-lab-us/75525118

https://health.economictimes.indiatimes.com/news/industry/china-virologist-claims-she-has-proof-virus-made-in-wuhan-lab/78084802

https://www.theweek.in/theweek/cover/2020/10/01/made-in-china.html

https://www.hindustantimes.com/world-news/covid-19-made-in-wuhan-lab-controlled-by-china-govt-claims-virologist-offers-evidence/story-JJTyD7Ts61FLOzPvEQHHQL.html

https://www.ndtv.com/world-news/chinese-virologist-li-meng-yan-claims-coronavirus-was-made-in-wuhan-lab-report-2295323

https://www.financialexpress.com/lifestyle/health/coronavirus-vaccination-india-dates-announcement-live-updates-covid-vaccine-india-latest-news/2167799/

https://www.bbc.com/news/health-51665497

https://www.ndtv.com/india-news/todays-latest-and-breaking-news-live-updates-on-coronavirus-and-farmers-protest-2349901