

Fundamental Study of Nobel Prize Winners at Cambridge University

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Abstract: This paper statistically analyses the Nobel Prize at Cambridge University. The critical factors for the excellence of teaching and research at Cambridge University are also discussed in this paper.

Keywords: Nobel Prize, tradition, creativity, original thinking, personal interests, government encouragement, Cambridge University

Introduction

The University of Cambridge was established in 1209 by scholars escaping from Oxford after a fight with local townpeople. In the last few centuries, Cambridge University has made great contributions to science and technology, and produced some of the most influential scientists who have had a significant impact on human thinking in the world, for example, Newton, Bacon, Kelvin, Harvey, Darwin, Thomson, Rutherford, Maxwell, Watson, Crick, Dirac, Turing, and Whittle.

The Nobel Prize is an international award given yearly since 1901 for achievements in physics, chemistry, medicine, and literature. In 1968, the Bank of Sweden instituted the Prize in Economic Sciences in Memory of Alfred Nobel, founder of the Nobel Prize. The Prize Winners are announced in October every year. On December 10, the anniversary of Nobel's

death each year, the Nobel Prize winners receive their awards including prize money, a gold medal and a diploma from The Royal Swedish Academy of Sciences.

Since 1901, 81 affiliates of the University of Cambridge have won the Nobel Prize. Affiliates have won in every category, with 29 Nobel Prizes in Physics, 22 in Medicine, 19 in Chemistry, 7 in Economics, 2 in Literature and 2 in Peace^[1]. Of those affiliates, 70 had attended Cambridge as undergraduates or graduate students.

Statistical Analysis of Nobel Prize winners at Cambridge

Since Lord Rayleigh first obtained his Nobel Prize in Physics in 1904, 81 affiliates of the University of Cambridge had won the Nobel Prize by 2005. Figure 1 demonstrates, on a bar graph, the Nobel Prizes at Cambridge University from 1901 to 2000. The horizontal axis

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is the time period in 20 year bands from 1901 to 2000, and the vertical axis shows the number of Nobel Prize at Cambridge University in each 20-year period.

It can be seen from Fig. 1 that from 1901 to 1920, Cambridge University won 5 and 1 Nobel Prizes in Physics and Chemistry, respectively. After 1920, the number of Nobel Prizes in Chemistry increased till 2000, but in Physics the number of Nobel Prizes increased up to 1980. After 1980, the number of Nobel Prizes in Physics has decreased. Since 1996, Cambridge University has not won a Nobel Prize in Physics. Figure 1 shows that 1961 to 1980 was the time when Cambridge won the largest number of Nobel Prize both in Physics and Medicine within the period of 1901 to 2000. After 1980, the number of Nobel Prizes both in Physics and Medicine at Cambridge decreased. Figure 1 also shows that the number of Nobel Prizes in Chemistry was the highest from 1961

to 2000, and the number of Nobel Prize in Economics increased in the period of 1981 to 2000.

Figure 2 gives the number of Nobel Prizes at Cambridge as a percentage of the total number of Nobel Prizes in the world. Surprisingly, from 1921 to 1940, Cambridge won more than 32% and 20% of the total Nobel Prizes in the world in Physics and Medicine, respectively. From 1901 to 1980, Cambridge won more than 23% of the total Nobel Prizes in Physics in the world. From 1941 to 2000, Cambridge won about 17% of the total Nobel Prizes in Chemistry in the world. From 1921 to 2000, Cambridge won about 12.5% of the total Nobel Prizes in Medicine in the world. In total, Cambridge won more than 11% of the total Nobel Prizes in the world from 1901 to 2005^[2].

Critical Factors in winning Nobel Prizes at Cambridge University

During the last century Cambridge University has made most important contributions in science and technology, especially in Physics, Chemistry, and Medicine. This can be seen clearly from the above analysis of Nobel Prizes won by Cambridge University.

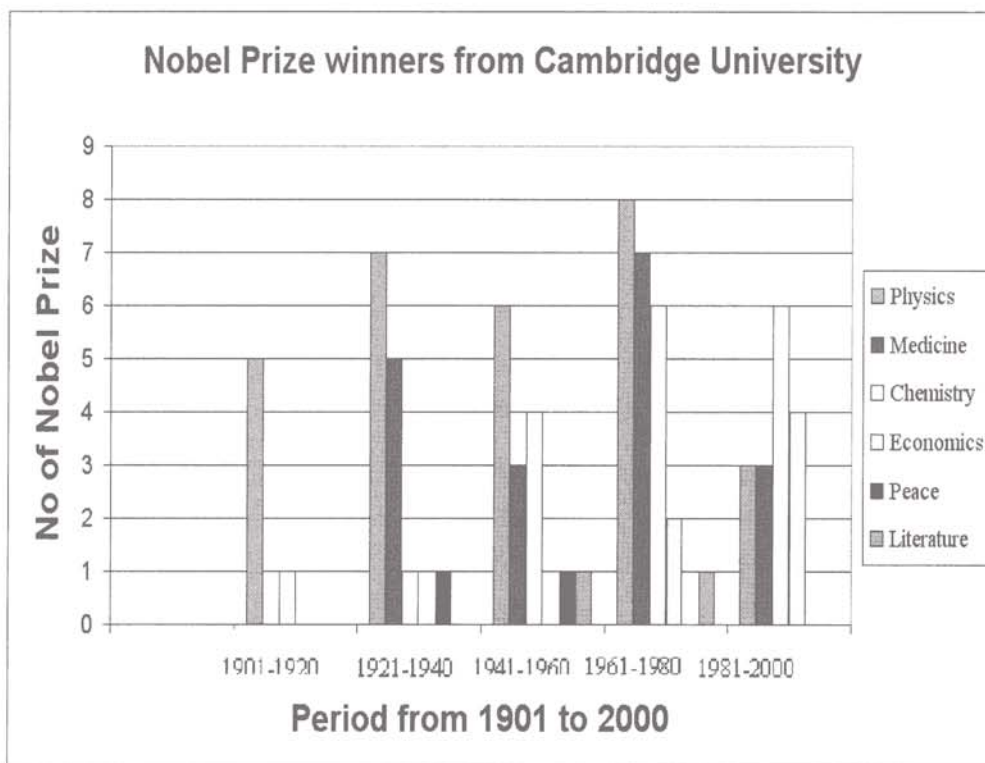


Figure 1 Nobel Prizes at Cambridge University in the last century

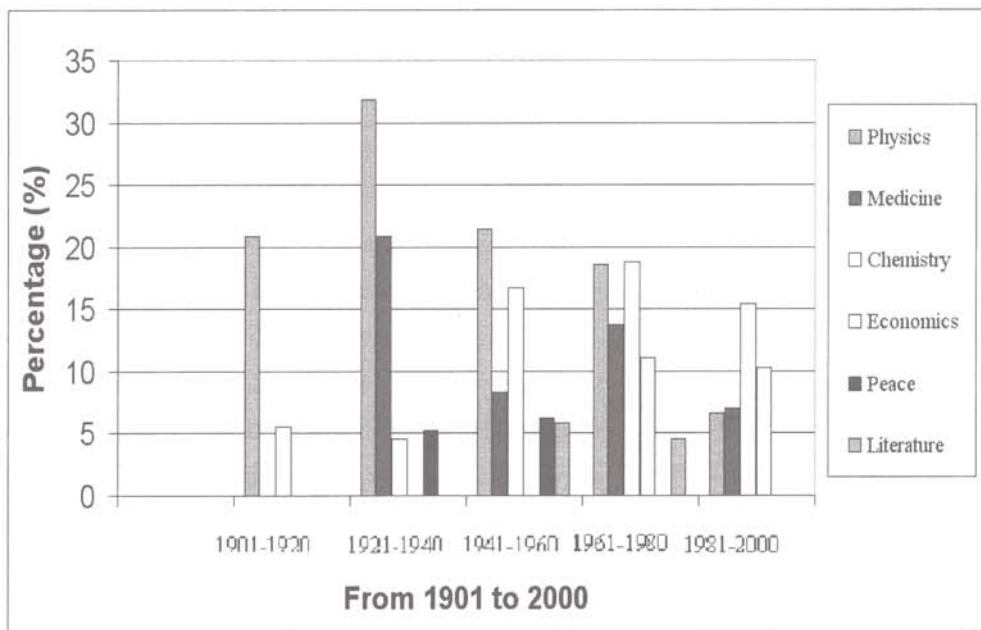


Figure 2 Cambridge Nobel Prizes as a percentage of the total Nobel Prizes in the world

There are couples of important factors that affect the achievement of the Nobel Prize at Cambridge University.

Tradition of Cambridge University

Although the University of Cambridge is almost 800 years old, it still keeps its good traditions, especially its emphasis on mathematics, and creative thinking and teaching. It is well known that Cambridge University had a particularly strong emphasis on mathematics from the time of Isaac Newton until the mid-19th century, and study of this subject was compulsory for graduation. The mathematics Tripos was competitive and helped produce some of the most famous names in British science and even in the whole world, including Lord Kelvin, James Clerk Maxwell, Lord Rayleigh, Owen Richardson, Frederick Sanger, and Maurice Wilkins. Today, Cambridge maintains its strength in mathematics. The Isaac Newton Institute, part of the university, is widely recognized as the UK's national research institute for maths and theoretical

physics. Cambridge alumni have won eight Fields Medals and one Abel Prize for mathematics.

Cambridge University also emphasises creative thinking and teaching. In selecting undergraduate students, the college fellows not only focus on A-level grades,

but also they select candidates on their potential for original thinking and creativity as expressed in extra-curricular activities and at interview. In teaching, the professors and lecturers always give their students problem-solving course work that help the students to learn how to solve problems independently demonstrating original thinking.

Besides emphasising on mathematics, original thinking, and creativity, the supervision system also play an important role in the excellence of Cambridge University. Each first, second, and third year Cambridge student has one or several supervisors. The supervisors are normally PhD students and academic fellows of the university. The students can ask their supervisors any question regarding their course studies. Maybe only Cambridge University and Oxford University still keep the supervision system in the world. Therefore, if you really understand the teaching and research philosophy at Cambridge University, you may not be surprised that 70 Nobel Prize winners were educated in Cambridge either for their under

graduate or graduate studies.

Personal Interests

The academic staff especially those famous professors at Cambridge University show great personal interests and dedication to their research. A good example is Lord Rayleigh^[3]. In 1861 he entered Trinity College, Cambridge, where he studied mathematics. He graduated in the Mathematical Tripos in 1865 as the top First Class student. In 1866 he obtained a fellowship at Trinity College which he held until 1871. In 1873, his father died and he succeeded to the barony. However, after managing his inherited estate for three years, he left the entire estate management to his younger brother, and from then on he devoted all his time to science.

Lord Rayleigh investigated wave theory, light scattering, electrodynamics, hydrodynamics, viscosity and photography. He was also famous for his book "Theory of Sound", which was published in two volumes during 1877-1878. Lord Rayleigh was awarded the Nobel Prize in Physics 1904, for discovering Argon. He was the only Nobel Prize winner in Cambridge who came from a noble family and the title of Lord was inherited from his father.

Even now, most academic staff at Cambridge work very hard. It is not surprising to see famous professors working in their offices or laboratories on Saturday or Sunday. Also, it is quite normal for retired professors to continue to carry out research and attend academic seminars at Cambridge.

Government Encouragement

It is interesting to see that among the 81 Nobel Prize winners in Cambridge, more than 16 were knighted and most others were given

great honors by the British government. The British government not only gave high honors to the Nobel Prize winners when they are alive, but also pay great tribute to them after their death. Some of Nobel Prize winners, for instance, J.J. Thomson and E. Rutherford were buried next to Isaac Newton in Westminster Abbey, a place of worship for well over a thousand of years in British history. Although to win the Nobel Prize was not the objective of their life for the winners, the honors received by the Nobel Prize winners did play an important role in maintaining the good tradition of Cambridge University.

Conclusion

In the last few centuries Cambridge University has made great contributions to modern science and technology. Since 1901, 81 affiliates of the University of Cambridge have won the Nobel Prize, which took more than 10% of the total Nobel Prizes in the world. Some of the Nobel Prize winners from Cambridge University in the last century have greatly changed the life of people throughout the world. The great success of Cambridge University is due to its excellent traditions, such as emphasising mathematics, problem solving and research, original and creative thinking, and the supervision system. Although the government greatly honors and pays tribute to those who have made significant contributions to science and technology, personal interests and dedication to science are the most important factors in the success of Nobel Prize winners in Cambridge.

References:

- [1] The University of Cambridge website.
- [2] Nobelprize.org
- [3] Lord Rayleigh - Biography