



Essay Writing

Engineering



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Annotated example

The first year Engineering essay on the following pages was written in response to the question:

“Today's engineers face the same challenges as those of previous generations.” Do you agree? If so why? If not, why not?

OUTLINE

Introduction

Stated as aims of essay.

Orientation

Engineering began by observing natural phenomena and applying principles.

Point

Challenges facing early engineers developed in complexity: eg early engineers built structures for worship, glory of their leaders, and military – not for society's fundamental needs.

Point

Challenge facing engineers in the 15th century were different:

- required to invent alternative sources of power to replace slave labour.

Point

Generations of engineers have faced the challenge of applying scientific knowledge/developments to engineering.

Transition

Introduces criterion how to evaluate and compare the challenges facing engineers – the role engineering plays in society.

Argument

The process of adapting to society's needs results in new challenges.

Point/Example

Example of challenge facing modern engineers, and how engineers respond to changing needs of society – responding to advances in computer technology.

Point

Since the aims of engineering should be in synchronisation with aims of society, challenges facing engineering constantly evolving (reinforcement of transition paragraph).
Challenge facing all engineers is they must be responsible to clients and public.

Conclusion

ACADEMIC LITERACY

Learning, Teaching & Curriculum – [Learning Development](#)



ANNOTATION TO THE ESSAY

Annotations in the right hand column highlight significant features of the essay, such as structure and how evidence for the argument is built up and incorporated. Referencing is done in IEEE style.

Example: student essay

To determine if today's engineers face the same challenges as those of previous generations, it is necessary to establish what challenges the engineers of previous generations faced. This will allow a comparison with the primary challenge facing modern day engineers: the impact of technology on society.

Engineering began thousands of years ago as man observed natural phenomena occurring in nature.¹ Man realised that he could adopt these natural phenomena in his everyday life by applying his discovery and knowledge to useful purposes, which would subsequently improve early man's quality of living. Hence the first engineers were born, as they realised for example that if someone propped a log under a boulder that was too heavy to be moved by manual lifting, the boulder could be moved.

As civilisations developed, the challenges facing engineers became more complex. The first engineers had simple problems that were often solved simply by trial and error.¹ The common man probably performed these duties and there was no need for a profession such as engineers. However as time passed civilisations began to emerge in which there was a need for the profession of engineers. In early civilisations engineers were responsible for the executive of great works such as the pyramids. These early engineering feats were built primarily to serve the superstitions of man or the ambitions of leaders, rather than to serve man's fundamental needs. The engineers of early civilisations played an important role in the military, building more efficient weapons for the army so that they could conquer their enemies.

In the fifteenth century a major challenge for engineers was precipitated by the decline in slavery. Industry once powered by slave labour now required alternative and cheaper forms of power. Engineers were required to invent and construct mechanical devices that could replace slave labour. As a result engineering made significant advancements, knowledge of which was assisted by the invention of the printing press. This facilitated increased distribution of knowledge through society, and greatly helped the wider education of the profession.

Generations of engineers have faced the challenge of applying scientific discoveries and knowledge to the field of engineering.¹ However, prior to the twentieth century engineering was an underdeveloped profession. The scarcity of engineers often meant a great delay between scientific discoveries and advancements, and any application of these discoveries to engineering. In the twentieth century there has been greater interaction between science and engineering, and this has greatly contributed to the boom in engineering which occurred throughout the twentieth century.

One way of evaluating the challenges facing engineers of today as opposed to the challenges previous generations of engineers faced is to consider the role engineering plays in society. This role is primarily to benefit society.² Generally the engineer works towards the objectives or goals of the society, so that if the society changes its objectives then the engineer must also change his or her focus. For engineering the process of adapting to society's changing needs often results in new challenges and developments.

introduction states aims, rather than thesis of argument. Alternative could be: eg Modern day engineers face similar /quite different challenges compared to ... Introduction should also preview essay's main points.

*topic sentence
early engineers faced less complex challenges
supporting evidence they played important role in building for worship, for leaders, and for military*

*topic sentence
previous generations of engineers faced challenge posed by decline in slave labour*

*topic sentence
application of scientific knowledge to engineering
modern day engineers are more able to respond to this challenge*

transition: writer introduces criterion on evaluating the challenges facing different generations of engineers

topic sentence



Example: student essay

In the past many societies' objectives were determined by their leaders or kings, or religious orientation. As a result engineering challenges were primarily building weapons, places of worship, shrines or monuments to honour their leaders. However, in the more recent past, industrialised societies have demanded electricity, cars and other labour saving devices. Increased wealth for larger sections of society has also meant that these commodities were desired in great quantities and at accessible cost. These demands were factors contributing to the technology of mass production.² However the repercussions of this is pollution, despoliation and unemployment.

supporting information

Technology's contribution to the despoliation of the environment has slowly resulted in a re-appraisal of the natural environment and its importance. Hence the engineer of the present time faces new challenges in adapting to these changing needs of society. For the modern engineer the challenge lies in achieving a balance between the consumer demands products, scarcity of natural resources, and containing the impact of technology on the natural environment.¹

further supporting information

modern engineers adapting to changing needs of society

A specific example of a challenge facing modern engineers is the application of computer technology to engineering. Computing is now a significant component of engineering design. Initially computers were an instrument that could speed up calculations that had previously been done manually but over much longer time intervals.³ They have now developed into very powerful instruments that are capable of doing complex calculations that were out of reach of normal or manual techniques due mainly to time and cost restrictions. This has opened up a host of new challenges to engineers that were previously too costly to attempt such as large scale structural analysis problems and also aerodynamic ones.

*topic sentence
example of challenge for modern engineers*

supporting information

As engineers' objectives are to be in synchronisation with the objectives and needs of society, it is to be expected that the challenges facing engineers will be constantly evolving and responding to the needs of society. If we consider engineers' objectives from this perspective, it can be said that the objective of engineering is to develop devices which are of value to human society usually using scientific principles available at the time.² These devices are usually to fulfil the particular need of society or to invent a solution to a particular problem. Hence we can see that this has been a common challenge to all engineers throughout time. Although the specific problems have changed, the actual role or challenge for the engineer has remained the same, that being to solve or create devices to find solutions for society's needs or objectives.

topic sentence

concluding statement for paragraph, and answer to essay question

An example of a challenge for engineers which has remained the same is the requirement for engineers to be professionally responsibility to their clients and to the public⁴. Australian engineers abide by a code of ethics produced for Australian engineers as a standard by the institution of engineers, Australia. If there is a breach of regulations the institution has the authority to set up a hearing. If the engineer is found guilty, this can result in expulsion or fines. Early engineers have also been held to certain professional standards. The Babylonians, who were the first recorded engineers as an actual profession, had harsh penalties for professional misconduct.

topic sentence

all engineers must be responsible to clients and public

supporting information

"1. If a builder build a house for a man and do not make its construction firm and the house which he- has built collapse and cause the death of the owner of the house -the builder shall be put to death.

*evidence
primary source*

2. If it cause the death of the son of the owner of the house - they shall put



Example: student essay

to death the son of the builder.”

These standards reflect the public’s desire to have those who are supposedly skilled in building responsible for their actions just as they are today. Hence engineers in this case have had to face this challenge of professional responsibility throughout the past.

Engineers throughout time have shared similar challenges, such as the requirement of professional responsibility to the public. Engineers throughout time have also faced the challenge of responding to the needs of society. In this regard we can say that engineers today face the same challenges as those which faced previous generations of engineers. However there are challenges that engineers of different generations have had to face. These are the actual problems that the engineers have had to solve and these generally have evolved over time much the same as man and his civilisations evolved over time.

[1] L. Harrisberger, *Engineermanship*, Brooks/Cole Publishing Company, California, United States of America, 1967

[2] N. L. Svensson, *Introduction to Engineering Design*, Flame Printing Co. Pty. Ltd., Sydney, Australia, 1974

[3] T. T. Furmon, *The Use of Computers in Engineering Design*, Butler & Tanner Ltd., London, 1970

[4] C. V. Baker, “Engineering and Professional Responsibility”, *Journal of Professional Issues in Engineering Education*, vol. 117, no. 2, pp. 111-114, April 1991

*concluding
comment for
paragraph*

*Conclusion
engineers have
always faced similar
challenges*

*However, actual
problems differ*

