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# RELEVANCE OF ENGINEERING PROFESSION IN MODERN SOCIETY

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## ABSTRACT

Engineering is a career in which scientific knowledge and mathematics are applied and experimented with in order to discover methods that help people, making it incredibly vital to society for a variety of reasons. Engineering covers a wide range of industries, including on-site, hands-on building work as well as analysing safety systems from an office. They apply their understanding of a specialised business to make things work and address problems, whether in transportation, medical, entertainment, space, or the environment.

**Keywords: engineering, profession, mathematics, awareness, important**

## 1. ENGINEERING PROFESSION IN MODERN SOCIETY

Despite the fact that engineering practice is becoming increasingly important to society, the engineering profession is not as respected as other professions. Due to the "undergraduate nature" of the curriculum, the "evolution of the profession from a trade," and the all-too-common tendency of industry to view engineers as "consumable commodities, discarding them when their skills become obsolete or replaceable by cheaper engineering services from abroad," Duderstadt (2008) attributes this poor reputation to these factors. In addition, students' interest in engineering occupations is dropping in comparison to other professions like commerce, law, and medical, which is indicative of

the poor public esteem of the engineering profession. Because the profession and the educational system that supports it have not kept up with the changing nature of both our knowledge-intensive society and the global marketplace, modern engineers no longer hold the leadership positions in business and government that their forebears did in the 19th and 20th centuries. In fact, the vulnerability of the degradation of the engineering profession in America and with it our nation's technological competence and capacity for technological innovation is raised by the offshoring of engineering jobs of increasing value and the outsourcing of engineering services of increasing complexity (Duderstadt 2008).

The National Academy of Engineering (NAE) discovered that there is no easily recognisable "public face" of engineering in a study on perceptions of engineers and engineering. They added that despite engineering being all around us, seeing it requires a "strong awareness." According to the NAE, some engineers "may be quite severe on themselves" and consider themselves to be "nerds and geeks." One of the study subjects claims "People outside of the field have a difficult time understanding what we do, and we also don't express it well. They perceive engineering to be a series of complicated technical concepts that are also uninteresting ". According to the NAE, issues conveying engineering are a result of the perceived difficulty of engineering's technical parts, particularly mathematics and science (National Academy of Engineering 2008).

According to Jane Grimson (2002), engineers' failure to recognise the significance of the context-sensitive view undermines the engineering profession and the context-free approach of engineering science is not easily adaptable to solving real-world problems. According to her, society favours engineers who can apply their expertise across disciplines, and she emphasises the significance of engineers having strong non-technical communication skills. Engineers, according to her, should be able to communicate technological issues. Grimson emphasises the necessity for the engineering profession to stay current and to gain business, financial, marketing, and management capabilities given the rate of development of new engineering knowledge (Grimson 2002).

## 2. MATHEMATICS IN ENGINEERING PROFESSION

The lack of published research on the use of mathematics by practising engineers is regrettable in light of the arguments raised in this literature review. These issues include the variety of mathematics as a subject, students' disinterest in and difficulty learning mathematics, the decline in interest in engineering careers, the perception that students' math difficulties are a significant factor in the decline in interest in engineering careers, the need to reform engineering education, the rapidly changing nature of engineering practise, and the role of engineering in the global economy. A measurement of the use of mathematics in general professional engineering work needs to be developed through research. This includes how engineers employ particular mathematical concepts, topics, contexts, and levels of complexity, how math is applied to and used in engineering practise, and how engineers are motivated to apply math in their work. To inform the teaching of engineering mathematics, this information is necessary.

### Mathematics Application for Engineers

Burkhard Alpers (2010) emphasises the importance of learning about the mathematics that engineers utilise in their daily job. According to him, it is necessary to conduct studies that attempt to capture engineers' mathematical competence in order to give engineering students "a mathematical education that is appropriate for their subsequent job as engineers" (Alpers 2010b). Alpers claims that few studies have been done on engineers' use of mathematics because "they are not straightforward to undertake." In contrast to investigating the work of practising engineers generally, researchers have focused their investigations on specific engineering areas, and some have looked into how engineering students use mathematics. Investigative techniques used to better understand how engineers utilise mathematics include ethnography, interviews, and tool usage studies. Studies concentrate on mathematical comprehension, mathematical application, and hidden mathematics. According to Alpers, examining the work of engineering students is "unrealistic" since, unlike engineers, students are not under any time constraints, their jobs are not typical of all engineering activities, and there is no organisational structure that they must fit into. However, it is more easier for students to participate in studies than it is for working engineers. Another potential drawback of studying engineers' use of mathematics is that

lack of expertise with engineering work may make it difficult for researchers to recognise engineers' use of mathematics (Alpers 2010b).

The research literature on the sort of mathematics utilised in engineering practise is scarce given the apparent relevance of mathematics knowledge and abilities in the engineering curriculum. One of the few individuals who has studied how mathematics is used in engineering practise is Monica Cardella from the University of Washington Seattle. She discovered that "few works offer empirical evidence for the role and the value of mathematics in engineering" (Cardella 2007).

"Although many instructors believe that mathematics is crucial for engineering students, there is a notion among some practising engineers that the mathematics they acquired in college is not practical to their everyday work," comments Cardella (2007). (Cardella, 2007). According to Kent and Noss (2003), two British academics, there are "different uses of mathematics in engineering practise: the direct usefulness of mathematical techniques and ideas to practise" and the "implicit usefulness - the ways in which mathematics contributes to the development of engineering expertise and judgement" (Kent and Noss 2003).

Contemporary authors of published research on the subject of engineers' usage of mathematics include: Monica Cardella (United States of America): Cynthia Atman (United States of America); Burkhard Alpers (Germany); Elton Graves (United States of America); Peter Petocz (Australia); Anna Reid (Australia); Julie Gainsburg (United States of America); Philip Kent (United Kingdom); Richard Noss (United Kingdom); Mike Ellis (United States of America); Brian Williams (United States of America); Habib Sadid (United States of America); Ken Bosworth (United States of America); Larry Stout (United States of America); Zlatan Magajna (Slovenia); John Monaghan (United Kingdom); Chrissavgi Triantafillou (Greece); Despina Potari (Greece); and Jim Ridgway (United Kingdom).

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