Humanisation of engineering studies

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ABSTRACT: Recent decades have brought about an increased specialisation of students' professional skills. Progressively, narrower competencies are also conducive to deepening acquired knowledge and extending the scope of skills. On the one hand, this is a beneficial phenomenon, but on the other, it limits students' knowledge and awareness of current developments in other areas, including art, such as painting, literature and music. At Cracow University of Technology, the first attempts to introduce into the engineering curriculum art classes presenting the achievements of contemporary artists were made in the 1970s. In general, their subject concerned trends in Kraków's artistic circles, which reflected global artistic and cultural developments. Such efforts have continued and new ones introduced to supplement engineering education with humanities.

INTRODUCTION

In the various fields of science, culture and art some topics and issues are readily addressed, analysed or described. Human interest focuses, for example, on the evolution of civilisation, threats that appear in various spheres of life or problems concerning narrow social groups. Such peculiar fashions are phenomena that have been noted for centuries. Globalisation has resulted, among other things, in the disappearance of borders and other barriers, and the merging of communities, which has led to a situation where similar problems are experienced by members of the same profession across the world. Hence, the international conferences whose participants collaborate in one area of science or interdisciplinary teams work on a selected problem.

Specialists from disciplines as varied as linguistics, psychology, technical sciences, history, theology or law allow a synthetic view of the problem, so that solutions can be designed and created, for example, in the field of education. Various ways of taking action, methods of analysis or research can lead to the development of innovative solutions that can be tested in practice.

According to some researchers *…dehermetising scientific disciplines and creating levels of non-specialist dialogue is a humanistic form of communication* [1]. *Humanisation* of all the spheres of life viewed as a remedy for many shortcomings of contemporary times is a particular challenge.

TECHNICAL EDUCATION

Past decades have seen an ever-growing specialisation in shaping the professional skills of students, including, first of all, those of technical faculties. Increasingly, narrower competencies are also conducive to deepening acquired knowledge and scope of skills. On the one hand, it is a beneficial phenomenon, but on the other, it contributes to limiting the students' awareness of phenomena in other areas, such as fine arts, literature and music. Hence, the demand for classes of a humanistic nature, the aim of which would be to teach students skills in communication, self-presentation and assertiveness, as well as provide knowledge about fine art et al.

ACTIVITIES AT CRACOW UNIVERSITY OF TECHNOLOGY

In 1970, the Department of New Teaching Techniques was set up at Cracow University of Technology (CUT), with a view to preparing university teachers for the implementation of new techniques and technology in the education of students. It was subsequently transformed into the Pedagogical Department, the focus being to improve the methods of teaching of future academic teachers. In 1990, the Department became the University Department of Pedagogy and Psychology and, since 1996 the aim has been to specialise in the humanisation of engineering studies [2].

Since then, the students have been offered a chance to participate in classes that promote the idea of humanising engineering education through, for example, music education. In the years between 1994 and 2003, the Department was in charge of the University choir, *Cantata* [3]. The final transformation of the unit into the Centre for Pedagogy and Psychology took place in 1999.

The Centre is supervised by the Scientific Council (formerly the Programme Council), the ten members of which represent particular University departments. The idea of the humanisation of engineering studies was introduced by Professor Andrzej Samek, a specialist in the field of robotics and bionics who, before retiring, was an employee of the Institute of Machine Technology and Production Automation at Cracow University of Technology [4]. The unit was established on his initiative.

Professor Andrzej Samek is the author of many educational publications (university textbooks) and other instructional materials, including a study on the principles and prospects of the humanisation of engineering studies as an immanent element of education in contemporary programmes of many technical universities across the world. [4]. In his opinion, professional education alone is insufficient, because students should be provided with an opportunity to acquire a body of knowledge and skills that would give them a sense of enjoyment and satisfaction with their studies; to help them form a broad outlook on life; and to have a greater scope of general knowledge, in accordance with their own interests [4].

The author of this article justifies this aspect of education by arguing that a broader scope of accumulated knowledge results in increased flexibility, when it comes to choosing satisfying employment or changing jobs. Later in this discussion, the author distinguishes two areas of humanisation: one in relation to the methods of education, and the other to humanisation of the curriculum by increasing the scope of general knowledge.

In an era of rapid social and economic changes in Poland, the role of the academic teacher is evolving. Former methods of lecturing *ex cathedra* have lost their value, while the educator's role has been extended to that of a co-ordinator of the educational process, where knowledge is gained through the widespread use of diverse teaching aids, such as multimedia. The aim is to supplement the curriculum with the most up-to-date knowledge. The teacher's approach is also of decisive importance as they should strive to raise students' interest in the presented issues, so that they could get satisfaction from the education.

Humanisation of the professional education curriculum involves the introduction of issues that broaden students' outlook on life through making them understand the continuity of the development of human civilisation, culture, history and technology. A wide range of possibilities exist in this respect, but conveying the knowledge of the areas outside the scope of the interest declared by students requires significant involvement on the part of the educators, as well as considerable skill and knowledge.

Professor Kazimierz Flaga, a long-term chair of the Scientific Council and Rector of CUT from 1996 to 2002, supported the activities of the Centre. He took up the subject of humanisation of technical universities in many publications, where he reflected on the polytechnic schools. He opined:

> *...emerging technical colleges, fascinated with engineering topics, easily resigned from including the humanistic content in the shaping of the personality of the future intelligentsia. There occurred a breach between the development of the humanities and social sciences and the development of technical sciences* [5].

Therefore, he took up the challenge of introducing innovation into the university curricula.

At Cracow University of Technology, first attempts to introduce art classes presenting the achievements of contemporary artists into the engineering curriculum were made in the 1980s. In general, their subject concerned trends in Kraków's artistic circles, which reflected global artistic and cultural developments. The classes were taught by the staff of the Faculty of Architecture (FA). Such encounters of students educated in the field of sciences and the world of technology with art let them catch a fleeting glimpse of the area of the humanities and new artistic trends. The classes might not have provided them with in-depth knowledge of art, but at least it gave them an idea of what was going on in other spheres of contemporary life that were so distant from their future profession.

In an era when knowledge and technology developments snowball, there is growing confusion and a sense of becoming lost. Intensity of sensations generates social problems, the solving of which is a growing challenge. According to Professor Kazimierz Furtak, formerly Rector of CUT:

> *…Once, the knowledge gained in the course of studies was sufficient for many years to come. Nowadays, for merely a month. Many years of studies are no more than just a good start. The experience gained two decades ago in many areas is no longer an advantage but a burden due to one's habits and routine.* [6].

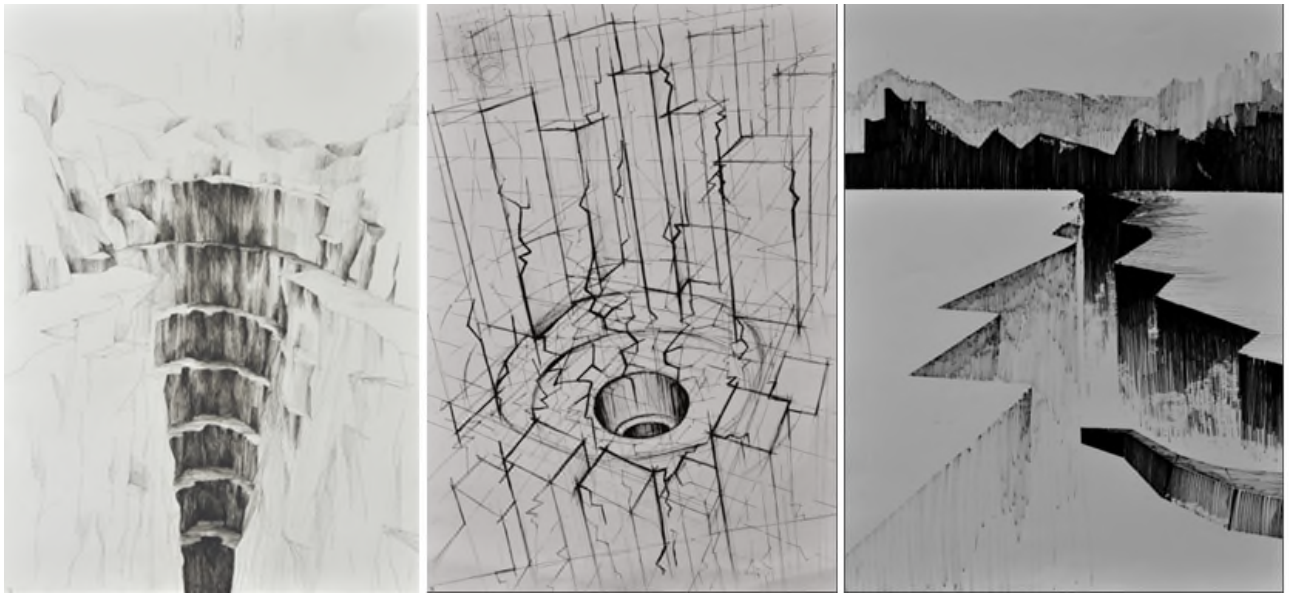
Therefore, the educational challenge is the need to prepare students for the perception of permanent changes in the modern world and continuous learning, both in the field of technical sciences and innovative technologies, as well as in

the areas of social sciences and humanities providing a flexible understanding of the new reality. Such actions are ongoing and new tasks are undertaken aimed at the innovative shaping of engineering education supported by the humanities in a broad sense of the word.

FACULTY OF ARCHITECTURE (FA-CUT)

Classes of freehand drawing, painting and sculpture are still included in the curriculum of the Faculty of Architecture, and these help to improve students' professional skills. Their scope has been reduced because of successive changes in the programme that do not allow an extensive presentation of contemporary trends in art and culture [7]. Therefore, within the present classes, attention is paid to updating the subject matter, so that the students are taught skills and competencies on the basis of unique or avant-garde phenomena, which are both valuable and interesting through their innovativeness. This requires constant preparation on the part of the teachers and their permanent self-education, but the creation of such an extended offer will add value to the educational process and ultimately, to the competencies, knowledge and skills acquired by the student.

For a programme like this to be implemented, it is necessary to give students freedom in interpreting the theme, choosing the technique and, first of all, the form of artistic expression. It is important to select the appropriate subject for classes, so that it is both challenging and interesting for the students (see Figure 1). One such complementary task in relation to the basic educational programme is commemoration of the 700th anniversary of the death of Dante Alighieri, author of the Divine Comedy, which will take place on 14 September 2021.



a) b) c)

Figure 1: Artistic images of the Divine Comedy: Hell - Authors: a) Barbara Habela; b) Maryna Markowicz; and c) Tomasz Polański.

The project called *The Divine Comedy read by Humanity* [8] was started by Ghislaine Avan [9]. It consists of filming people all over the world who are reading an excerpt from the Divine Comedy. So far, 2,000 people have read the excerpt in 40 different languages and dialects in more than 600 locations on four continents.

Since 2006, Ghislaine Avan has been filming people each of whom is reading, in their own language, an excerpt from the poem. Her aim is to create a global installation called the *Divine Babel*, a simultaneous projection of people reading 100 cantos on 100 screens in 100 locations across the world. At the same time, she wants to promote the diversity of people, cultures and languages in the world. The project continues and the acquired documentary material opens a new scope of global understanding in the field of visual arts and social communication, among other things [10].

Images of the Divine Comedy documented in the form of an audio-visual poem have been supplemented with graphic interpretations by the students of FA-CUT [11]. Such a proposal of a class subject, detached from the educational scheme, referring to the selected, extravagant idea of commemorating the ingenious poet, seems to be a challenging and interesting confrontation with contemporary trends in art and culture.

The resulting diversity of the forms of expression, freedom of interpretation and significant involvement apparent in the execution of the projects justify the decision to run classes that give students an opportunity to express their individual views, emotions and creativity in an unrestricted way, as compared to the standard educational programme. At this point, it is worth mentioning the experiences of Robert Špaček, who gives students a free hand in choosing a form of expression, including a sense of humour [12].

CONCLUSIONS

Contemporary education in the field of technical sciences cannot be restricted to mastering the knowledge and professional skills in a particular area. The prevailing model, which favours narrow specialisation and improving professional skills in one job through long-term practice, is no longer valid. Also, forming the skills of self-education, acquiring and supplementing knowledge, for example, through appropriate postgraduate studies, does not rule out the need for broadly understood humanisation of education.

This process requires a strategy enabling its implementation because the mere transfer of a larger body of general knowledge does not give graduates a sense of enjoyment and satisfaction with their studies. In fact, the present socio-economic situation often imposes the necessity of changing employment, which requires a large degree of independent thinking, the ability to assess and take on challenges, not only based on supplementing and broadening knowledge. Under such circumstances, in the course of education, students should not only acquire the ability to effectively use the knowledge contained in databases, they should also develop the awareness of their own psychological predispositions and their own creative abilities.

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