

ENTREPRENEURSHIP AND ERGONOMICS IN TECHNICAL-IT EDUCATION

Iwona Korcz, Bogusław Pietrulewicz

Institute of Engineering and Computer Education
University of Zielona Góra

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A b s t r a c t

Modern times force regular, consistent changes in the process of vocational preparation of employees. The changes in vocational preparation of Crafts/Technology and IT teachers define new education standards. Further increase in the possibilities of vocational development and employment of graduates of the Technical-IT Field of Study may lead to extending the teaching content by entrepreneurship and ergonomics. Including the discussed content to the curriculum minimum or specialization it is possible to significantly improve the profile of graduates of this field of study, and consequently increase their job opportunities on the market.

The specificity of the interdisciplinary field of study, its humanistic-technical character, offers great opportunities as for the development of graduate profiles. The basis is provided by the particular role played by the human factor in the working environment. Such an attitude is important both for the employee and the employer.

The creation, development and improvement of entrepreneurship behaviours is related to the increased self-responsibility and activity, which also makes the person responsible for potential activities in the working environment, etc.

The ability to organize one's own working place and life according to ergonomic rules seems to be another requirement to be fulfilled by graduates of the above field of study. Shaping the working conditions, working environment, place of residence, relax is also a challenge for a competent and creative employee.

The submitted content and organisational modifications in technical-IT education enable to face the challenges of the present time in both individual and social dimension.

**PRZEDSIĘBIORCZOŚĆ I ERGONOMIA W EDUKACJI
TECHNICZNO-INFORMACYJNEJ**

Iwona Korcz, Bogusław Pietrulewicz
Instytut Edukacji Techniczno-Informatycznej
Uniwersytet Zielonogórki

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Streszczenie

Współczesność wymusza systematyczne, konsekwentne przemiany w procesie przygotowania zawodowego pracowników. Dokonane już zmiany w przygotowaniu zawodowym nauczycieli techniki i informatyki określają nowe standardy kształcenia. Dalsze zwiększenie możliwości rozwoju zawodowego i zatrudnienia absolwentów kierunku edukacja techniczno-informatyczna może wprowadzić rozszerzenie treści kształcenia o zagadnienia przedsiębiorczości i ergonomii. Włączenie omawianych treści do minimów programowych lub w ramach specjalności może istotnie wzbogacić sylwetkę absolwenta tego kierunku, a tym samym zwiększyć jego szanse na rynku pracy.

Specyfika interdyscyplinarnego kierunku studiów, jego techniczno-humanistyczny charakter daje znaczne możliwości kształtowania sylwetek absolwentów. Wychodzimy z przesłanek o szczególnej roli czynnika ludzkiego w środowisku pracy. Takie podejście ma znaczenie zarówno dla pracownika, jak i pracodawcy.

Kształtowanie, rozwój i doskonalenie zachowań przedsiębiorczych wiąże się ze wzrostem odpowiedzialności za siebie i własną aktywność oraz czyni odpowiedzialnym za sferę potencjalnych działań w środowisku, miejscu pracy itp. Umiejętność kreowania swojego miejsca pracy i życia zgodnie z zasadami ergonomii to kolejna powinność absolwenta tego kierunku. Kształtowanie warunków pracy, środowiska pracy, miejsca zamieszkania, wypoczynku, to także wyzwanie dla nowoczesnego, kompetentnego, kreatywnego pracownika.

Przedłożone propozycje treściowe i organizacyjne modyfikacji kształcenia na kierunku edukacja techniczno-informatyczna dają możliwości sprostania wyzwaniom współczesności w wymiarze indywidualnym i społecznym.

Entrepreneurship in education

Since the 1990s it has been possible to observe a dynamic increase in the significance of entrepreneurship in the social-economic development of Poland, resulting mainly from extensive system transformation changes in our country. Therefore the problem of entrepreneurship has become the subject of key interest of representatives of many domains of science, in particular: Andragogics, Anthropology, Economics, Ethics, Philosophy, Human Resources Management, Communication, Organization and Management, Pedagogy, Praxeology, Psychology or Sociology. However, individual scientific disciplines consider it from some selected points of view, analysing its different aspects and scientific areas mainly for the purposes and competence of these subjects. Consequently there is no interdisciplinary attitude and

integrated reflective-empirical perspective, including the complex and holistic phenomenon of entrepreneurship, always referring – and we should not forget about that – to the human activity. It is worth emphasising that entrepreneurship is one of many possible forms of human activity, and this activity – understood as intentional activity (specific to *Homo sapiens*) – provides a basis for our functioning at the level of awareness, i.e. the highest of all, preceding the level of inborn dispositions (motivation, temperament and instrumental) and the level of habits (content and formal).

Currently entrepreneurship seems to be almost universal, really existing in all spheres of our life, both in different areas of human activity as well as in new and very important areas of personal activity of the 21st century. It appears to be a crucial ideological postulate, an important determinant of turbulent transformations, and an elementary educational requirement. Yet, not accidentally we include entrepreneurship education among the main future education arrears that have already started and are consciously formed in the present time. From the point of view of humanistic pedagogy, according to H. Dauber, the educational area of the individual includes (DAUBER): a – developmental attitude (future of the individual as well as the humankind is considered a global developmental program), b – "one world" orientation (global learning by intercultural education) c – ecological education (ecological: thinking-learning-behaviour-life) and d – peaceful steering (learning among new social movements). We think that we have entered the shaping, development and improvement of entrepreneurship behaviours in the appropriate context of education struggles, involving a not easy context of self-education challenges. This fact is strictly related to increased human responsibility for the future generations, covering two components, in particular: responsibility "after action" and responsibility "before action" (the scope of our influence, the scope of potential actions), i.e. resulting from rejecting some actions or neglecting own obligations regarding the creation, care and support of entrepreneurship behaviours.

Nowadays it is possible to distinguish three main varieties (types) of entrepreneurship in literature. They are as follows (STAŃDA, WIERZBOWSKA 2002): firstly – lively entrepreneurship related to individual personality features and necessary competence of the enterprising person, secondly – educational entrepreneurship, considered a result of the development of the form of entrepreneurship activities for further improved ventures, and thirdly – system entrepreneurship referring to the general system attitude, when the entrepreneurship is analysed in the categories of a subsystem driving the whole social-economic system.

On the other hand, and from the analytical point of view, entrepreneurship can be discussed in terms of three rudimentary aspects: I – normative, defining its models, standards and required features; II – descriptive, analysing its different manifestations in individual areas of human activity and following the personality mechanisms influencing entrepreneurship behaviours and their consequences; III – functional by functions fulfilled in organi-

sation development, progression of local communities and the whole society, as well as in economic growth and civilisational progress.

Besides, entrepreneurship is perceived in two dimensions, i.e. as an individual and group phenomenon, independently of the presented level (individual or group) should be based on the process not on the phenomenon only (PIETRULEWICZ, KORCZ 2002).

A certain kind of novum in modern entrepreneurship, apart from the global range tendency, is its form defined as intraentrepreneurship, or corporation entrepreneurship (Polish term: internal entrepreneurship was not adopted). It means that "entrepreneurship activity is conducted inside the existing organisation" (STAŃDA, WIERZBOWSKA 2002), and usually refers to big or very big companies.

The above mentioned aspects fostered including entrepreneurship into the educational process at the secondary school level and higher. Technical-IT education as a specific field of study offers the possibility to introduce the suggested problems to the study curriculum adjusting the vocational profile of graduates to market needs and the labour market.

Employee's ergonomic preparation

Another important problem in the educational process is health and safety at work.

Labour processes and people's life have to fulfil certain safety requirements, including comfort at work, and cannot threaten human life and health. It seems that the fundamental moral order still remains as unreachable objective.

Modern working conditions and their consequences confirm that the problem of establishing appropriate labour systems of the individual-technology-environment type must find its social dimension, first of all in educational processes. There is no social knowledge about health and safety regulations. Moreover, working methods have changed. Tele-work, working as a freelancer, temporary work, odd jobs have become more and more popular. New technologies foster greater globalisation of work.

According to an analysis of the working conditions, employees in the following sectors are most exposed to danger: production industry (40.3% of all accidents at work), mining, (14.7%) and construction industry (19.8%). Very bad working safety conditions were reported in agriculture. In 1998 accidents among farmers were recorded twice as often as in other working places. Also fatality was reported four times more often.

An analysis of the causes of accidents shows that the reasons and circumstances of accidents at work were consequences of inappropriate behaviour of employees (in agriculture about 80%).

Inappropriate behaviour of employees includes first of all:

- inappropriate, self overrating working preparation of employees (recklessness, overrating oneself, etc.),
- not adapting the devices to human physical and psychological features,
- bad technical condition of machines and devices,
- inadequate organisation of the working places (OLSZEWSKI 1997).

The above problems related to the working conditions do not refer to Poland only. The research conducted on the European markets shows that such problems also exist there, to a different extent.

If the human factor is the main cause of inappropriate working conditions, posing danger to life and health, the consequence will be finding reasons in the system of vocational preparation and improvement of employees.

It is especially important that in the vocational preparation of employees the problems of ergonomics do not constitute a key element of the employee profile.

In the technical world ergonomic knowledge is necessary to adjust the working conditions to individual needs. Developing the ergonomic attitude should be the objective of ergonomic education, both regarding vocational requirements as well as individual personal life (CHARATYNOWICZ 1997). Therefore, ergonomic education should be analysed as a process and as a result:

- a) as a process – a set of procedures and didactic education tasks leading to the acquisition by the individual of certain vocation components providing safety and efficiency of the human being-work environment system, and guarantee high vocational efficiency.
- b) as a result – a group of features characteristic of the employee (graduate) personality, including in particular:
 - A system of mental and practical skills based on relevant composition of theoretical and practical knowledge regarding ergonomics, health and safety at work, and adopting relevant methods for problem solving.
 - Elements of the motivation system aimed at making work safe and adjusted to the possibilities and psychophysical needs of a given person.

The meaning of ergonomic preparation as significant vocational preparation can be found in the Labour Code, obliging the Minister of Education to include the content of ergonomics and health and safety at work to the school curriculum. Moreover, the Labour Code states that the employee is not entitled to work if he/she has no required qualifications or necessary skills, satisfactory knowledge of regulations and safety at work.

However, teaching ergonomics was marginal in the educational system. Only at the beginning of 1997 the Ministry of Education recommended including ergonomics into the school curriculum (PIETRULEWICZ 2002). Research

regarding the ergonomic education of young people within vocational education showed many significant conditions¹. They include the following:

1. The condition of ergonomic education of young people and teachers do not provide relevant vocational preparation of young people to fulfill vocational roles.
2. The safety of the working environment proves that it should be better prepared in terms of human vocational preparation regarding ergonomics and safety at work.
3. Significant individual and social costs of young people vocational preparation require appropriate and urgent system changes:
 - regarding vocational preparation and improvement of employees
 - legal-organisation solutions motivating employees to invest in themselves and working conditions.

An analysis regarding the ergonomic preparation of young people to fulfill (efficient, satisfactory and safe) vocational roles clearly proves that ergonomic education is necessary.

Final comments

Focusing on two essential problems of vocational education of employees seems to be a present and future challenge. This concerns especially the field of study known as technical-IT education, which due to its specific character should include these elements in the process of developing the graduate profile. Education Manager, Human Resources Manager, Working Conditions Manager are mainly responsible for vocational development and shaping the working environment. Including entrepreneurship problems and ergonomic preparation in the educational process within the technical-IT field of study is required because of the graduate profile and the need to

¹The research was carried out by the Higher Teacher Education School and University of Zielona Góra in Zielona Góra between 1994–2000 in some provinces of Western Poland, under the supervision of Pietrulewicz and Janiga. The results of the research were published, among other, in: Vocational Education – moving from health and safety at work regulations to ergonomic education. J. Janiga, B. Pietrulewicz [in] Problems of education preparation and vocational improvement of employees. Education problems of vocational preparation and improvement of employees (ed.) D. Frejman, B. Pietrulewicz, Zielona Góra 2002, s. 81–96; Factors determining ergonomic preparation of employees, B. Pietrulewicz, U. Pietrulewicz [in] Factors determining vocational activity of employees, Zielona Góra 2000, s. 273–276; B. Pietrulewicz, Ergonomic education and human vocational development in working environment [in] Vocational development problems of employees, Zielona Góra 1998, s. 163–166; Ergonomic education of employees - need or necessity. Pietrulewicz [in] Pro-vocational and vocational education in the context of European integration, Bydgoszcz 2000, s. 235–242; B. Pietrulewicz, Ergonomic education in the process of establishing the system person-technology-environment [in] Knowledge and quality of life, Wilno 1998, s. 95–96; and other.

adjust this field of study to the current economic needs and requirements. The experiences of the Zielona Góra environment provides a basis for such conclusions.

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