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**TECHNICAL EDUCATION AND ECONOMY: RELATIONSHIPS AND INTERACTING ROLES (CASE OF VICTORIAN ENGLAND)****ТЕХНІЧНА ОСВІТА ТА ЕКОНОМІКА:  
ХАРАКТЕР ВЗАЄМОВІДНОСИН ТА ВЗАЄМОВПЛИВУ  
(НА ПРИКЛАДІ ВІКТОРІАНСЬКОЇ АНГЛІЇ)****Golovko I.O. / Головка І.О.***Lecturer of Foreign Lang. Dep. / викладач каф. ін. мов**ORCID: 0000-0001-6690-4043**Central-Ukrainian national technical university,**Kropyvnytskyi, University Avenue, 8, 25013**Ukraine**Центральноукраїнський національний технічний університет,**Кропивницький, просп. Університетський, 8, 25013**Україна*

**Abstract.** *The article suggests the review of some scientists' analysis whether the failure of education in the sector of technical instruction was a major contributory factor of Britain's economic decline. It also dwells on the counter-arguments whether the level of technical education development in the late nineteenth – beginning twentieth centuries was so low in Great Britain to make negative impact on the level of the country's economy, and whether the only technical education provision is to be blamed for it.*

**Key words:** *technical education, Victorian England, public schools, civic universities, practical science and manual instruction, relative economic decline*

**Introduction.** The main object of the historians and sociologists' discussion in the sphere of pedagogy concerns with the adequacy of the late Victorian provision of post-elementary technical institutions and the controversial reshaping of secondary education in the 1900s. They also point out the failures of the education reforms in their inability to develop effective systems for vocational education and training from school to university and the neglect of the non-academic working-class teenagers. At the same time, one can cite a whole number of examples reviewing and analyzing the failures of British economy in correlation with drawbacks and underdevelopment of technical and scientific education as the main factor of British economic decline starting in 1870s and bursting out within the second half of the XX<sup>th</sup> century. The researchers also point out the late and stunted growth of technical and scientific education in Britain, the uneven and inadequate provision of facilities for different social groups of population compared with some other European countries beginning with the middle of the XIX<sup>th</sup> century that made harmful effect on labour capital and British economic competitiveness. In this respect, the technical education is viewed as a major contributory factor of Britain's economic decline. Such suggestions need the review both the state of education and economy in their relationships and interacting roles. It matters to dwell on the counter-arguments whether the level of technical education development in the late nineteenth – beginning twentieth centuries England was so low to make negative impact on the level of the country's economy, and whether the only technical education provision is to be blamed for it.

**Main body.** The characteristic feature of the late Victorian economy is that since the 1870s, Britain has been in a state of relative economic decline from its



position as the 'workshop of the world' to that of a low-ranking European power by the middle of the XX<sup>th</sup> century. The parameters of the decline relate both to absolute and relative reasons. At the end of the XIX<sup>th</sup> century Great Britain was losing its leadership on the world market not only in key sectors of the British economy, such as cotton textiles, shipbuilding and steel-production. What was more significant, Britain was displaced from its leading position by its competitors in such new manufacturing spheres as chemistry and electric engineering [1, 231-359; 5; 8, 19-36]. How really deeply do these facts correlate with technical education provision in Victorian England?

For centuries, English system of education was based on the voluntary principle within a laissez-faire framework displayed in all social groups' resistance to state involvement in education of any sort, whether elementary, secondary or technical. In the course of the second part of the XIX<sup>th</sup> century, empirical knowledge, inventiveness and rule of thumb methods were no longer adequate for the success of Britain's industrial expansion. It became rather evident the importance of scientific skills and theoretical knowledge. Changing economic circumstances and the agitation of famous personalities like L. Playfair, H. Cole, S. Russel, S. Thompson, T. Huxley and many others claimed for considerable reforms in the sector of education. Individual private initiative for the development of technical skills training was not already enough in industrial society. Rapid industrial growth of the middle Britain's economy urged the development of vocational institutions in technical education, new facilities in popular education with state involvement, the creation of post-elementary technical institutions and new approaches with theoretical bias in technical education of the late-nineteenth century England. The country could not ignore the challenges and demands of new time.

Some considerable cases of state intervention in popular education beginning with the last three decades of the XIX<sup>th</sup> century took place in England. W. Richardson and S. Wiborg pointed out two most important dynamics followed the adoption of Education Act 1870 in England, which greatly influenced the development of school-based technical and vocational education. The first one deals with the establishment of the local School Boards from 1872. The Boards had the duty to compel the attendance of children between the ages of 5 and 12 with the option of part-time attendance from 11. The second dynamic was that after 1872 many School Boards also established higher grade schools [3; 3-6, 14]. They generally provided education with technical bias to the pupils aged fourteen or fifteen and were seen as recruiting elementary school students from the lower classes who would be going into jobs as soon as they left school but wanted more training and education than the elementary school could provide [6, 18]. In addition, some improvements in the development of technical education in 1880-90s were evident in the publicly provided higher grade schools that such subjects as practical science and manual instruction were positively booming [7, 55-60].

The system of technical education evolved through the 1870 – 1890s into a satisfactory one. Considerable changes touched upon not only the elementary level of popular education, but also secondary and higher levels of the system of education: the public schools and ancient universities. One of the arguments to explain the



underdevelopment of technical education in the country relates to the neglect of sciences in grammar schools. Nevertheless, the statement like this supposes to take into consideration the character and aim of study at schools of this type. The curriculum of the public schools was traditionally focused on the arts and they were reluctant to business and industry. Consequently, the public schools did not attract sons of businessmen nor did they produce boys for such careers. However, from the middle of the XIX<sup>th</sup> century some of them got closer towards new trends in study. Following the reports of the Clarendon Royal Commission on the public schools (1864), Samuelson's Select Committee (1868) to investigate the educational background to England's relative lack of success in sciences, technology, and Matthew Arnold's Report on Prussian education (1868), they were urged to teach science at schools. They also had to pay attention to entrance examinations at Sandhurst, which required two science subjects from the mid-1850s. Similarly, headmasters were aided by the new Natural Sciences Tripos at Cambridge (1848) and the Honours School of Natural Science at Oxford (1852) which both provided science graduates who were Anglican and gentlemen and hence suitable as public school masters who in turn could prepare boys for the new science degrees at the ancient universities. Accordingly, as M. Sanderson asserts, the public schools were either irrelevant to England's industrial competitiveness or positively harmful to it [4, 155].

Some changes towards science disciplines also took place in the ancient universities. Oxford had been good at science in the mid-nineteenth century and remained so in medicine. However, it became backward in late Victorian times to Cambridge. In particular, its chemistry and physics were much poor and its engineering was missing until 1908. Cambridge by contrast was excellent in science and subjects of potential use to industry. At Cambridge, the university taxed the colleges and could spend the money on science without reference to the colleges and it could finance new appointments from the Common University Fund. Cambridge disposed its finances better and more to science, for Cambridge was a stronger, richer, more centralized university and science benefited from this.

One more positive dynamics in higher technical education sector marked with the creation of a number of colleges in industrial provincial cities in last quarter of the XIX<sup>th</sup> century. They gradually grew into civic universities at the beginning of the XX<sup>th</sup> century: Owens College Manchester in 1873 was followed by the Yorkshire College of Science in Leeds (1874), then Firth College Sheffield (1879), Mason College Birmingham (1880), Liverpool University College (1881), and before 1914 they were joined by lesser colleges in Southampton (1862), Exeter (1865), Newcastle (1871), Bristol (1876), Nottingham (1881) and Reading (1893). The curricula and research of the civics were closely linked with national and regional industrial needs. The creation or development of bearing lubrication, colliery pumps, vanadium steel, chrome leather, gas fires, beer, soap, the quadruple expansion engine, marine radio and much else all benefited from the work of civic university researchers. A high proportion of students came from industrial and business backgrounds and about one-third to one-half of students from Birmingham, Newcastle, Bristol and Manchester took up careers in industry [1, 116-122; 4, 159].

A lower level of technical education for adults was presented with polytechnics



and the creation of the City and Guilds of London. Polytechnics provided classes for London artisans and clerks in a whole range of technical subjects combined with an active sporting life. Starting with Regent Street in 1882, these spread in the 1890s to eleven by 1898. Also in London, the livery companies formed the City and Guilds of London in 1879 as contemporary equivalent of technical education. They set up Finsbury Technical College in 1883 and a large Central Technical College in South Kensington in 1884. More importantly, they ran a national system of technical examinations, previously initiated by the Royal Society of Arts. The annual growth of participants in technical examinations run by this corporation is largely explained by the development of the municipal technical colleges in the 1890s following the Technical Instruction Act of 1889. The last allowed the new county councils and county borough councils to levy a rate to build colleges and from 1890 the annual dividend of 'whisky money' helped to run them. Some 160 colleges were created in this way by 1898, much of their instruction being evening class work. Finally, the colleges spawned Junior Technical Schools, full time technical education at school level for schoolchildren aged 13+. By 1913 there were 37 schools with 2,900 pupils [5; 6, 3-25; 7, 55-76].

School education became compulsory from 1891. In the 1900s the secondary system was structured with a scholarship ladder from the elementary school to the grammar school and onward to university. Central schools and Junior Technical Schools (JTS), which appeared in the national educational system of England in the early twentieth century, provided the commercial and technical bias. The elevation of civic university colleges into full-scale degree-giving universities, with state grants from 1889, the spread of activity of polytechnics, City and Guilds and the creation of technical colleges proved that English education was getting shape in the wide scope range, with a proper structure of universities, state and local government finance, technical colleges, free and compulsory elementary education or popular secondary education.

The period 1870 – 1890 was the last phase when Britain had modestly good growth rates (1.2 per cent GDP per man-year) compared with its competitors while still running a poor educational system. After 1890 the situation in the economy of the country has changed. Britain's share in the world trade in manufactures was 40.7% in 1890 and declined to 29.9% in 1913 [4, 5-7; 8, 19-36]. Though Britain was the richest country in the world in 1900, its economy felt the hints of threaten from its major competitive countries as the declining level of its economy compared with those of Prussia and the USA marked in losing its world superiority in spite of the reforms in the sector of education, particularly in technical education.

If the education expanded in the way as it was noticed above, then which way was it responsible for declines in the economy of the country, what was it to be blamed for? These controversies were analyzed by such historians and sociologists as P. Summerfield, E.J. Evans, M. Dintenfass, M. Sanderson, D.S. Landes and others. They put forward some arguments, which demonstrate effectively that education has been far from the sole cause of decline but the deficiencies of the education system have certainly played a part.

The first argument, they point out, that education could hardly be blamed for



some industries and their entrepreneurs were performing badly. It is proved by the revisionism in a range of studies dealing with cotton, steel, coal and machine tools has found that rates of technical change and productivity growth in Britain compared well with the competition [4, 164].

Secondly, it should be taken into consideration that uncertain position of the technical education in the national system of education reflected the poor administrative policy to this sector of education; so that technical education itself suffered from inefficient educational management provided by the administrative politicians in the course of that time [4, 165].

Thirdly, it was self-evident at the time that there was no any close connection between the success of certain industries and the extent of their educational support. After reviewing the economists' analysis in successful industries — shipbuilding, metal mining and cotton, M. Sanderson noticed that entrepreneurs were reluctant to deal with technical education or be interested in providing their workers with technical education. They generally gave preference to the job training and neglected the new university departments at Glasgow, Newcastle and Liverpool. Only one-fifth of apprentices in the north-east took any technical college evening class examinations. In spite of this, shipbuilding was the British industry inviolate from foreign competition. The controversial situation was in coal industry with good output, profits and exports though criticized for its poor productivity and technical change, though it was best educated industries of all. It had many excellent university and college departments of mining (Birmingham, Newcastle, Leeds, Cardiff, Manchester, Nottingham and Wigan Technical College). It was thus an unusual industry with a considerable gap between well-educated managers and an ill-educated labour force, producing in quantity but inefficiently [4, 166].

The fourth argument, the scientists put forward in favour of technical education, touches upon the specific character of the traditional approach to the role of apprenticeship on the job. It was hard to resolve the adequacy between education and training at that time without exaggerating the role of the formal academic institutions. This was not only so for the working class but also for upper class entrants to engineering who served as premium paying apprentices in the offices of leading engineers whether university graduates or not. Thus to deplore the fact that England did not adopt extensive systems of publically financed college training is to overlook the role of the workplace as a place of education [4, 167].

**Conclusion.** Though, for many years, British technical and scientific education was regarded poor and lagging behind Britain's competitors as Prussia, France, the USA, it has successfully evolved in the period of 1880 – 1914 on all the levels of the national system of education. Whatever the weaknesses in management education and industrial training by 1914, however, there was no general sense of failure or crisis. Exports had reached record levels and industry and business were able to obtain their personnel needs. The demand for managerial and technical staff was easily met and labour skills fulfilled the needs of the economy. The arguments of the researchers, analyzed in the article, demonstrate effectively that education has been far from the sole cause of decline but the deficiencies of the education system have certainly played a part.



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**Анотація.** Розглянуто аспекти впливу економічних факторів розвитку промислового суспільства на підходи до навчання спеціалістів технічного профілю. Висвітлено характерні риси педагогічних підходів до створення профільних закладів у Англії кінця XIX – початку XX ст.ст. згідно до нових економічних умов. Досліджено ступінь залежності економічного спаду економіки Британії через уповільнений розвиток технічної освіти наприкінці XIX – початку ст.ст.

**Ключові слова:** технічна освіта, Вікторіанська Англія, професійне навчання, відносний спад економіки Британії, уповільнений розвиток технічної освіти, публічні школи, муніципальні університети, природничі дисципліни, трудове навчання.

Рецензент: канд. пед наук, доцент Миценко В. І.

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