‘Rule of thumb methods no longer suffice’ Development of British Coal Industry education and Training 1900 – 1970: Lessons for present-day education policy makers with regard to funding for apprenticeships and work-based learning.

Abstract
This paper traces the origins and development of coal mining education and training in Britain from 1900 to the 1970s, by which time the coal industry had substantially declined. It looks at the progress from working-class self-help to national policy in support of miners’ education and training. The research makes use of college prospectuses and government inspection reports to identify the kind of courses offered at several former mining and technical colleges located on the former Lancashire and Yorkshire Coalfields, as well as some universities, in support of the industry. Finally, the paper will summarise the findings, including funding, which present-day education policy makers should reflect on with regard post-school education and training.

This paper questions the changes in funding for further education vocational education and training courses in England and Wales which have taken place in recent years. Governments of all political parties have publically voiced support for post-school education and training while at the same time implementing what Simmons (2009) refers to as marketisation policies, brought about with the withdrawal of local education funding and the incorporation of colleges in 1992. Indeed, the government, despite publicising that science, technology, engineering and maths (STEM) subjects and training would support economic recovery there has been the continual decline in funding to support such initiatives, the emphasis for funding being put on the student or apprentice.

This histological study provides the opportunity to examine the funding for vocational education and training during the twentieth century and identify lessons that policy makers should consider in support of the STEM skills agenda. Coal mining education and training in Britain between 1900 and 1970 has been selected as a case study for several reasons. The coal industry offered substantial number of courses in STEM

related subjects on similar lines to modern apprenticeships. Four colleges were selected from several initially researched, including two specialist mining colleges, Barnsley and Wigan, on the Yorkshire and Lancashire coalfields, respectfully, as well, as two general colleges of further education with mining departments, Burnley in Lancashire and Rotherham in Yorkshire. College prospectuses became the main primary source for reference as they included list of courses with main themes covered and qualifications awarded on successful completion. They also explained funding arrangements for those accepted on to courses and often made reference to coal industry legislation with regard to education and training and government policy generally with regard to expansion of further and higher education after the Second World War due to skills shortages.

The Government Inspection Act of 1850 stated that there was ‘an urgent need to foster and establish mining institutes in order to concentrate on finding solutions to unique problems arsing from the mining of coal’ (Strong, 1988, p.6). Technological and scientific advancements in the mining industry required employees to read and write in order for them to be trained to operate machinery correctly and safely. Colliery owners were aware that the expense of replacing misused or poorly maintained machinery could, in any case, have serious financial consequences (p.3). There were legal implications for those entrusted with machines and technology which demanded that operators could read operating instructions. The Malicious Injuries to Property Act of 1861 stated that an individual who damaged property or machinery, even if unintentionally and found guilty, could be imprisoned for life or any term not less than three years with or without hard labour (Malicious Injuries to Property Act, pp. 758 – 9).

These Acts of Parliament were not specific to mining. However, Rose (2001) identifies that miners were in a strong position, having ‘strong traditions of working-class independence’ often establishing ‘their own network of libraries’ as a result of working in isolated pit communities (p.59) There was a very strong desire for self-

education amongst them and their families. Literary and debating societies, as well as mechanics' institutes, had been established in mining communities from the 1880s onwards (Egan, 1987, Annual Reports of Yorkshire Union of Mechanics' Institutes). Indeed, it was common in some areas for miners to agree to deductions from their wages to pay for their children's education and when school fees were abolished in 1891, the money was redirected towards the establishment and maintenance of libraries and miners' institutes for adult learning (Rose, p.237). Coal companies also contributed towards the running of schools and institutes. Will Paynter, General Secretary of the National Union of Mineworkers from 1959 – 1969, described the long-established Institute he attended in 1920 at the Cymmer Collieries, South Wales, as his 'Eton and Cambridge' (www.agor.org.uk)

Between 1860 and 1880, two of the four Royal Commissions set up to inquire into the state of technical education, the Devonshire Commission (1872 - 1875) and Samuelson Commission (1881 – 1884), included mining education in their remit (Roderick and Stephens, 1972, p.105). In 1889, with the passing of the Technical Instruction Act, local authorities in Britain put a levy of 1d on the rates in order to fund adult technical education and the beginnings of twentieth century state funding for further and adult education (Curtis, 1967, p.497).

Twentieth-century developments

The Coal Mines Regulation Act of 1911 stipulated that all miners should have the opportunity to gain relevant qualifications in support of their employment in the industry and that they would be examined by the Government Board of Education. The 1911 Act also demanded 'a high standard of qualification for all colliery officials' which added impetus to mining education with regards to further and higher technical education (Roderick and Stephens, p.110). There was therefore, a need to establish institutions which could deliver mining courses at all levels to be available to employees in the industry. Funding was made available from several sources. Government supported colleges and students who attended them, through the local

authorities, post school education and training in all areas of industry, including mining, and commerce.

One of the findings of the 1919 Royal Commission for Coal was the need to provide financial support for the welfare of miners and their communities. The resulting Mining Industry Act of 1920 (Section 20) stated that a levy of a penny (1d) per ton of coal from every coal mine was to be used in support of welfare. This was managed by the Miners' Welfare Fund (Venables, 1956, p.34). After 1926, an additional levy of five per cent came from coal royalties. Between 1920 and 1952, when all responsibility was handed over the National Coal Board, more than £30 million had already been spent on pithead baths, health, recreation, colliery canteens and, in relation to this research, education institutes, mining and non-mining education, university scholarships and scientific research, particularly into the safety of mines (Annual Reports of the Miners' Welfare Committee (1921 - 1951).

Following nationalisation of the coal industry in 1946, the National Coal Board offered sponsorships to coal mining employees, of which there were nearly half a million by 1965 (*Guide to Courses, Barnsley College of Technology,* 1962, p. 7). The Miners' Welfare Fund continued to be an important source of funding and the levy on a ton of coal was raised from 1d to 3d in support of coalmining communities, education and training (Griffin, 1999, p.263). Nationally, the Ministry of Labour and National Service (1958) *Training for Skill: Recruitment and Training of Young Workers in Industry*, more commonly referred to as the Carr Report, stressed that there should be a fifty per cent increase in students for all advanced courses in many subjects at technical colleges, including students of mining. The Report also

highlighted the need to double the numbers of students needing support from employers in relation to 'low-level part-time courses during the day' (*Guide to Courses,* 1963, p.2). The Carr Committee had identified that the number of 15 year olds were rising from 640,000 in 1956 to 712,000 by 1958 and estimating that the numbers would research 929,000 by 1962. With the end of National Service, the Report also identified that there were also between 200,000 and 250,000 young men who, almost overnight, were available for civilian employment and that training should be a high priority (p.2). Wigan Mining College's general expansion in student numbers rose from 7,000 in 1962 to 9,000 by 1968 (Craig-Smith p.62). The Carr Report resulted in the passing of the 1964 Industrial Training Act which contributed to an expansion in further education through providing substantial increases in funding, via local education authorities, for both part-time and full-time post-school education and training generally and which included employees of the mining industry.

Mining institutions

The well-established and well organised working-class adult learning traditions, supported by mining institutions by the late 1880s, become the foundation on which mining and technical colleges of the Twentieth Century were established. It was not uncommon to find the title 'Mining' incorporated in the names of technical institutions on the coalfields which had a predominant department such as Abersychan Mining and Technical College, Ashington County College and Mining School, Barnsley Mining and Technical College, Cannock Chase Mining and Technical College, Castleford Mining and Technical College, Coalville Mining and Technical College, Chelmsford Mining and Technical Institute near Rotherham, Hemsworth Mining and Technical College and Wigan and District Mining and Technical College. Others

colleges with substantial mining departments included those at Burnley, Canterbury, Chesterfield, Crumlin, Doncaster, Durham, Edinburgh (Heriot-Watt), Leigh, Mansfield, Mexborough, Nottingham, Oakengates, Rotherham, St Helens, Stoke, Sunderland, Swansea, Treforest, Wakefield and Wrexham (Venables, p.34). From the purpose of this paper, four colleges, Barnsley, Burnley, Rotherham and Wigan, have studied in some depth to identify what courses and qualifications were available to those in the industry.

By the end of the nineteenth century, the town of Wigan was one of the most important mining towns in the country. The Wigan School of Mines had been opened in 1857 and by 1893 it was known as the Wigan Mining and Mechanical School. The original accommodation had been hired out by the Mechanics' Institute and classes in mining, geology, chemistry and mechanics were being offered (Craig-Smith, p.2). By 1880, the School was also offering several part-time mining courses (See Table 1 below).

Table 1: 1880 – 1881 Subjects in mining education offered at Wigan

Subject Title	Outline Course
Geology.	Rocks and minerals. Chief mineral and coal mining districts in Britain Methods of searching for minerals and coal. Geological examination of districts and fossils,
Boring.	Selecting of sites for bore holes, records kept during the work, different systems of boring and lining of bore holes, examples of notable borings
Breaking new ground.	Various forms of implements employed. Blasting, using various explosive agents employed; their advantages and disadvantages, precautions to be observed during boring, charging and fire shots. Systems of electronic firing, for example, of heavy charges. Principals of rock boring machines,
Shafts and levels.	Methods of sinking and draining through different classes of ground. Ventilating. Support for the sides of evacuation. Timbering, walling and arching. Wooden, cement and cast iron tubbing,

Circumstances under which water enters mines.	Conditions under which water may be tubbed from shafts. Pumping machinery, the various systems in use, calculations of power required to pump a certain quantity of water from a given depth,
Methods of working coal.	Pillar and stall, long walls. Consideration of safety and economy which has to be studied in laying out and working a mine. Division of the workings into districts,
Ventilation of mines.	Why it is important to have ventilation, components and properties of air, carbonic acid and fire damp. Effects of the combustion on lamps and candles, and effects that breathing of men and horses have on the air underground. Natural ventilation, furnace ventilation. The efficiency of furnaces in the ventilation of mines. Conditions to be observed in guiding, splitting and distributing air currents. Stoppings, air doors, air crossing. Laws of friction. Means of measuring the velocity of the air current. Use of thermometer and barometer. Effects of the efficiency of ventilation of a rise or fall in either. Use of the water gauge. Importance of indicators in relation to ventilation.
Lighting of mines.	Types of lighting

Wigan Mining and Mechanical School Syllabus 1880 – 1881, p.12.

The themes above provided a very broad coverage from the formation of coal to issues of safety in extraction. Science, technology, engineering, mathematics (STEM) underpinned all aspects of mining education and training. These subjects would be inclusive in all qualifications and at all levels until the decline in coal mining by the 1970s at all colleges. In 1902, Wigan and District Mining and Technical College, as it had become known, had moved into a large newly purpose-built construction in the town which enabled it offer more courses and recruit more students (Craig-Smith, p.9).

The town of Burnley, some 35 miles north of Wigan, was internationally renowned for its cotton manufacture. However, being situated at centre of the East Lancashire Coalfield, it was surrounded by several collieries both in the town and in the surrounding districts. The Municipal Technical Institute and School of Art, which

replaced the mechanics' institute, advertised a series of mining classes being held during the academic year 1906 – 1907.2 They were entitled 'Principles of Mining' and the lectures covered the themes of coal, ironstone, fireclay, shale, prospecting, types of roof supports, methods of underground working, haulage, winding, drainage, ventilation, lighting, descent and ascent, surveying, preparation of minerals for market, legislation, accidents and their prevention. Courses were also offered in mining arithmetic, drawing, mechanics, physics and chemistry of mine gases (Poster: Principles of Mining at Burnley 1906).

Rotherham College of Technology and Art, located on the South Yorkshire Coalfield, can trace its history back to the mechanics' institute, which was built in 1853. It was replaced in 1888 by the Technical Institute and School of Art (Rotherham College of Technology Prospectus 1956 – 1957, p.10). In 1906, it offered a variety of courses including metallurgy and mining (*Rotherham Technical Institute and School of Art, 1906 – 1907, p.13*).

With the passing of the Coal Mines Regulation Act in 1911, Burnley was offering various mining courses including those employees wishing to progress into management positions as listed in Table 2 below.

Table 2 Advanced courses offered at Burnley Municipal Institute 1911-1912

Mining Calculations
Mining Science
Mine Drawing
Colliery Practice
Colliery Mathematics
Mining Science
Advanced-level students preparation course for the colliery manager's examinations.

Burnley Municipal Technical Institute and School of Art, Prospectus 1914–1915, p.52.

Science and mathematics were particularly predominant in these courses and miners were expected to have a good understanding of both.

Barnsley Mining College can also trace its origins back to the town's 1831 mechanics' institute and by 1912, it too was responding to the 1911 Act, in offering day-release mining courses. (*The Barnsley Education Committee Annual Distribution of Prizes and Report, 1912*, pp. 1 – 2).

By the end of World War One, students of sixteen years of age were enrolling on full-time mining courses at Wigan, 'gaining qualifications of a university standard' (Craig-Smith, pp.26 – 27). By 1920, with funding from the Miners Welfare, Burnley mining department had a well-established laboratory which was fitted with a 'wide range of apparatus for the analysis of coal, coal dust and mine gases' (*Principal's Report*, 1920 - 1921, p.10). There was much emphasis on science and causes of gas explosions. The Principal at Burnley made reference to this in his report, stating that:

> it is here that a Mining School [department], like that in the College, can render a considerable service by spreading an understanding of the scientific principles lying at the base of the industry, and of the many technical applications of those principles to both ordinary and special problems that arise in their operation (p.11).

During the academic year 1923-1924, a visit was made by Inspectors from the Board of Mining Instruction and their *Report* stated that 'the College stands second only to Wigan in respect of its enrolment of senior students and is doing very good work' (*Principal's Report*, 1923 - 1924, p.8)

The Principal's Report for Wigan in 1937, stated that 'not only does our mining department, both in equipment and in standing, compare favourably with that of any

university in the country, but our long tradition and high reputation in the mining industry gives us standing which is hardly to be rivalled by any other institution in the world' (p.3).3. There were talks between the College and Manchester Victoria University (and its successor) mining department, giving awarding powers for mining degrees to the College. This never happened (Letters exchanged between the College Principal and University Governors, Manchester). However, between 1927 and 1961, over 50 per cent of students who had completed courses at the College went on to graduate in mining through the University of London's external degree programme (p.3) or at Manchester University.

Burnley miners wishing to go into management had to complete the Colliery Manager's Certificate and they sat their examinations at the Wigan and District Mining and Technical College as it was the national centre for mining qualifications (*Principal's Report*, 1930-1931, p.12).

By 1940, Burnley College was aware that the coal industry was going through rapid changes and encouraged local miners to gain higher level qualifications in mining, stating that:

> rule of thumb methods no longer suffice, a higher degree of skill is required by the official, and also by the pivotal men on whom the smooth working of the three shift rota depends. Men in charge of machines and those engaged in moving forward the mechanical and electrical appliances require some knowledge of mechanics and the principles underlying the use of the form of power employed if their work is to be done with safety and efficiency (*Burnley College Prospectus,* 1940–1941, p.72).

The previous year, the *Report of the Royal Commission on Safety in Mines* (1939) stressed the importance of 'education, training and the supervision in the reduction of accidents and for face workers to be certified by the colliery manager as to their ability to test for firedamp' (p.72). The College stated that:

> The first essential of effective supervision is a high standard of competence and character or personality in those to whom the duty of supervision is entrusted; the proper selection, education and training of the mine official and the adequacy of the qualifications required of him are the corner stone of the whole structure (p.72).

The College, like other similar institutions, identified that it had a responsibility in supporting the present and future of mining, through providing courses and qualifications relevant and up-to-date for 'youths and men who desire to know more about their jobs or to prepare themselves for the statutory examinations' (p.72). These courses supported the ever developing mining industry as well as supporting mine workers professional development and promotion opportunities.

There were eleven mining courses available at Burnley for which miners were released from their collieries two or more days a week to complete the qualifications. There was also a course in instruction, which was:

> intended to meet the needs of youths and men engaged in and about the mines, and is so arranged that even adult persons, who have been away from school for many years, need have no difficulty in following the work undertaken in the classes (p.73).

Geology had its own laboratory and museum at Burnley, as was common in mining departments across the Country. There were regular fieldtrips and most mining courses included within them drawing, mechanical science mathematics, mining

regulations, mining technology, electrical science and mine machinery (*Burnley College Prospectus* 1948–1949, pp.22 – 24).

By 1951, Barnsley Mining and Technical College was offering first and second class mining certificates through the National Mining Qualifications Board as well as mine surveyor certificates through the City and Guilds Institute of London (*Barnsley Mining Students' Society Transactions*, 1951 – 1952, p.18). By the mid-1950s, Rotherham was offering thirteen courses as listed in Table 3 below.

Table 3 Courses offered by the Rotherham Mining Department in 1956

Entrants Training Course (Compulsory)
Pre-Senior Mining Course
Shot Firer's Certificate
Deputy's Certificate and Deputy's part time Certificate Courses,
General Craft Courses in mining, colliery electrical engineering and colliery mechanical engineering
Advanced Certificate Course in colliery electrical engineering and colliery mechanical engineering
Ordinary National Certificate (ONC) in mining, mine surveying, mine mechanical engineering, mine electrical engineering
Higher National Certificate (HNC) in mining and mine surveying
Colliery Managers' Certificate
Mining Engineering Course
The Colliery Medical Attendance Course
Colliery Ropemen Course
Mining Legislation Course

Rotherham College of Technology 1956 – 1957, p.70.

The list above highlights not only that the college was offering similar courses to those of other similar institutions but also that the national qualifications of Ordinary and Higher National Certificates had been introduced in the 1950s,

The comprehensive courses offered at Burnley by the Mining Examinations Board, City and Guilds London Institute, professional bodies and London University Extension Scheme between 1940 and 1968 provides insight into what was available

in the town and across all coalfields, to all those who worked in the industry as listed in Table 3 below.

Table 3 Mining courses offered by Burnley Mining Department 1940–1968

Mining Courses, Qualifications and Awarding Bodies
1940
Preliminary Mining Course for young people, minimum age of seventeen and was the first stage to becoming a colliery manager. Mining Examinations Board
Preliminary Mining Course for Adults. Similar course to that above but for adults who often hesitated 'to enter the same class as boys who have recently left school'. Mining Examinations Board
Senior mining course for those who had successfully completed the preparatory mining courses or had attended a secondary school. The course was run over three years. Union of Lancashire and Cheshire Institutes.
Colliery Fireman's Certificate. The course was relevant for those attending and maintaining pumps, electric motors, compressed air engines and other mining machinery. The course was offered in the mornings so that afternoon and evening shift workers could attend. The fees were *7/6* (75 pence). Mining Examinations Board
Shot-firers Course. This course was offered in the mornings so that afternoon and evening shift workers could attend. The fees were *7/6.* Mining Examinations Board
Under manager's course. For those men 'who desire to prepare themselves for positions of responsibility in the mine above fireman'. Mining Examinations Board
Second Class Colliery Under Managers'. Mining Examinations Board
First Class Colliery Mangers' Certificate. Mining Examinations Board
Colliery Surveyors'. Examinations. Mining Examinations Board
Mines Safety Badge Course. Students were given an oral test, supervised by representatives of Colliery Owners and the Miners' Union. They had to achieve 80 per cent attendance and pass the test to receive the Burnley Mines Safety Badge. The colliery companies paid the fee of *1/-* (10 pence) per student
Advanced Mining Course took five years to complete and Included First and Second Class Colliery Managers' Examinations within the course. Mining Examinations Board
Mine Surveying Course which covered drawing, surveying, geology, mechanical engineering, winning and working coal. The National Coal Board gave permission for some of the practical work to be carried out underground in local collieries and locally above ground. Examinations: Mine Surveyors' Examination, City and Guilds London Institute, Royal Charted Instituted of Surveyors Examinations
From 1942
BSc in Surveying (Engineering). London University Extension Scheme
From 1946
Geology Course for Miners. It included practical surveying fieldwork in the park adjoining the College and at a surveying summer camp. Mining Examinations Board
BSc Geology Degree covering engineering, geology for mining engineers, geological mapping and laboratory work. London University Extension Scheme
From 1947
Boiler House Practice. City and Guilds London Institute
Combustion Engineering. City and Guilds London Institute
Fuel technology Course. Included knowledge of the control of combustion, selection and testing of fuels, solid, liquid and gaseous fuels, steam power all in relation to efficient combustion and heat transference.
Mining Electrical Engineering Course. Association of Mining Electrical Engineers Examinations
Advanced Mining Fire Course. Institute of Fire Engineers Examinations
From 1949
Specialised Mining Operations. Mining Examinations Board
BSc Surveying Degree covering theory, practice and problems in surveying and geology for surveyors. London University Extension Scheme

From 1952	
Ordinary National Certificates (ONC) in Mining Mechanical Engineering	
Ordinary National Certificates (ONC) in Mining Electrical Engineering	
From 1953	
Certificate Courses, were introduced for coal mining students, mechanics and electricians. Year One was followed by all mining students and involved calculations and drawing, workshops and mining science. In Year Two. mining, mining mechanics and mining electricians separated and follow their specific subject areas.	Mining Examinations Board
From 1955	
Course in Mining	Ordinary National Certificates (ONC)
Course in Mine Surveying,	Ordinary National Certificates (ONC)
Course in Mining Mechanical Engineering	Ordinary National Certificates (ONC)
Course in Mining Electrical Engineering.	Ordinary National Certificates (ONC)
Mine Surveying	City and Guilds London Institute
Boiler Operator's Qualification.	City and Guilds London Institute
Boiler House Practice.	City and Guilds London Institute
Combustion engineering and Fuel Technology	City and Guilds London Institute
General Certificates in Education 'O' Level in Surveying.	London University
General Certificates in Education 'O' Level in Geology.	London University
BSc. Degree in Surveying.	London University
BSc. Degree in Geology.	London University
A Degree Course for teachers of Geology.	London University
From 1957	
Soil Mechanics and Engineering Geology.	
From 1958	
National Coal Board Apprenticeship in English, mathematics, mining science, workshop and technology (34 weeks).	Union of Lancashire and Cheshire Institutes.
From 1961	
Higher National Certificate (HNC) in Surveying	
Higher National Certificate (HNC) in Colliery Electrical Engineering	
General Certificate of Education 'A' Level Geology.	London University
From 1965	
Coal Mining Technician course was introduced. The course was offered part-time over three years and replaced the part-time two year craft courses.	City and Guilds London Institute

Burnley Municipal College and Municipal School of Art, Prospectus for 1940–1941, pp.72 - 74. 1941 - 1942 pp.50 – 51, 1946-1947 p.34, 1948-1949 p.66, 1949-1950 p.63, 1951 – 1952, p.95 1952 – 1953, p.87, 1953 – 1954, p.89. 1955 – 1956, p.95, 1957 – 1958, pp.98 – 99, 1958 – 1959, p.100, 1961 – 1962, pp.3 – 6, 1965 – 1966, p.2, 1969 – 1970, p.2.

Wigan was a national examinations centre throughout the twentieth century and offered higher level courses for the mining industry both locally and nationally, where local colleges had only a small local catchment area, lack of equipment or the level of staff expertise required was not available for advanced courses. Tom Ellis had been a miner between the 1940s and 1960s, first working at being Gresford Colliery near Wrexham in North Wales. His ambition was to be a colliery manager. He achieved this, first at Bersham colliery at the relatively young age of 33, and later at Wrexham's Haford pit. He then became the Labour MP for Wrexham in 1970 (*The*

Guardian Newspaper, 2010). Ellis recalls his mining education, sitting his examinations at Wigan:

> It will be a surprise to Lancastrians to know that we in the North Wales fraternity had impressions of Wigan which were overwhelmingly if not exclusively academic…when a proud mother said her boy was going to Weegeen, she meant that he was going to sit his colliery manager's certificate (Ellis, 1971, p. 13).

Ellis provides insight into what it was like for miners to receive their colliery manager's certificate:

> I will always remember the thrill I got on the Saturday morning late in January 1953 when I met the postman…with the official envelope from the Ministry of fuel and Power. I had passed the exam…I felt like a man who had received a million pounds…I think I got more satisfaction from obtaining this certificate than I got from any other scholarship achievement (p.57). 4

Wigan offered its own mining diploma, which was recongnised across the country. The list of courses as set out in Table 4 below, show just how many courses and qualifcaitoions were available to those working in the industry.

Table 4 1961 – 1962 Mining courses offered at Wigan and District Mining and Technical College

Courses
Associate Membership Examination for the Institute of Mining Engineers
Wigan District and Mining and Technical College Mining Diploma, Ministry of Power under the Mining and Quarries Act of 1954.
National Diploma in Mining (three year sandwich course),
National Certificate in Mining,
City and Guilds London Institute (City and Guilds) Coal Preparation and Fuel
Colliery Deputies Management Qualification
Shot firers Testing Qualification
Geology, for the mining industry:
Colliery Diploma in Mining
National Diploma in Mining
Higher Nation Certificate in Mine Surveying
Ordinary National Certificate in Mine Surveying
Royal Institution of Charted Surveyors

Institute of Fuel
London University BSc Degrees (general and specialists)
Institute of Civil Engineers
Geology Ordinary ('O' level), Advanced ('A' level) and Degree level
Surveying for the mining industry
National Certificate in Mine Surveying
Royal Institute of Charted Surveyors, GCE 'O' Level
Law for the mining industry
Ownership and development of mineral properties for builders, finance, surveyors and mining engineer
Subsidence and support
Mechanical Engineering for the mining industry:
Colliery Mechanical Engineering
Craft apprentice
Mechanical Mining National Certificate
General Mining Mechanical,
Mining Industry Certificate for Mining Engineers,
City and Guilds in Mining and Mechanical Engineering (Class I and II),
Electrical Engineering for the mining industry:
Colliery Electrical Engineering
Craft Apprentice
City and Guilds Mining Electrical Engineer

Wigan and District Mining and Technical Colleges Mining and Geology Prospectus 1961 – 1962, pp.8-28

In 1962, Barnsley College published a salary table of the coal industry in its prospectus of that year as listed in Table 5 below. This was a recruitment initiative not only to inspire school leavers to apply to work the coal industry but also to encourage miners' into taking qualifications to progress their career.

Table 5 Salaries in the mining industry in relation to qualifications 1962.

Management Post	Annual Salary
Under Manager	£1,125 - £1,500
Manager	£1,400 – 2,100
Agent	£1,750 - £2,400
Group Manager	£2,000 - £2,750
Production Manager	£2,250 - £3,000
Area Manager	£4,000 (up to)
Colliery Engineer	£900 - £1,400
Group Engineer	£1,005 - £1,600
Area Engineer	£1,550 - £2,150
Divisional Engineer	£2,000 - £2,750
The NCB also sponsors scholarships to University	

Guide to Courses available at Barnsley College of Technology (1962), p. 7.

By 1962, the College was offering Ordinary National Certificates (ONCs) and Higher National Certificates (HNCs) in Mining and Surveying as well as a General Management Certificate Course offered through the Yorkshire Mining Examinations Board. It also delivered the Advanced Coal Mining and Coal Preparation Certificates through City and Guilds London Institute (*Barnsley College Prospectus 1962 – 1963*, p.1). In 1964, Mining Qualifications Board First and Second Class Certificates as well as the Mine Surveyors Certificate had been introduced and students were also able to apply to undertake the Royal Institute of Charted Surveyors Intermediate and Final Certificate examinations at the College (*Barnsley Mining Students' Society Transactions*, 1964 – 1965, p.16).

In 1967, both part time day and evening classes were offered at Rotherham in mining qualifications as identified in Table 6 below. Being a general college of further education with a mining department, it was not able to offer as many courses and at different levels as Wigan had been able to.

Table 6 Part-time day and evening classes in mining 1967 - 1968

Mining for Apprentices
General Certificate Course in Mining (compulsory)
Colliery Electrical Engineering
Colliery Mechanical Engineering
Colliery Mechanical Technicians
Colliery Electrical Technicians

Rotherham College of Technology Prospectus 1967 – 1968, p.61.

In 1967, the mining courses at Wigan were rationalised as '111 years of mining connections were coming to end', reflecting the decline in the local mining industry (Craig-Smith, p.71). Much of the mining equipment was sold to Stoke-on-Trent College, which still had a mining department, and to the Camborne School of Mines in Cornwall (p.71). The following year, the geology courses had ceased at Burnley,

as had the BSc and the main courses offered seem to have been colliery deputies qualifications, first-aid, craft courses, coal mining technicians, fuels and surveying (*Burnley Municipal College Prospectus* 1968 - 1969, pp.3-15). The following year, 1969, was the last one that mining courses were being offered at Burnley (*Burnley College Prospectus* 1969 - 1970, p.2). Students wishing to study mining after that date had to travel to Wigan and District Mining and Technical College for what what few courses were still available. However, Barnsley College was still offering several mining qualifications during the 1970s, as identified in Table 7 below.

Table 7 Coal mining qualifications offered at Barnsley Mining College 1973 – 1975

Mining Industry Basic Studies
Coal Preparation Practice,
Colliery Electrical Craft Certificate
Colliery Electrical Technicians Certificate
Honours Certificate in Mechanical Mining
Honours Certificate in Electrical Mining
Coal Ventilation Officer's Certificate
Colliery Deputy's Engineers Certificate
General Commerce in Mining Certificate
Colliery Manager's Engineers
Association of Mining Electrical and Mechanical Engineers Honours Certificate

Barnsley Mining Students' Society Transactions, Vol. 24 1973 – 1974, p.18 and Vol. 26 1974 – 1975, p.14.

In 1971, with declining recruitment due to local pit closures, the mining department was merged with electrical engineering at Rotherham (*Prospectus, 1971 – 1972*, p.37) and in 1980 mining courses had ceased altogether (*Prospectus, 1980 – 1981*). Following the complete demise of the coal industry by the 1980s, the Barnsley Mining and Technical College ceased offering mining courses was re-named Barnsley College of Further Education (Walker, 2009). Mining courses had also ceased by then at Wigan, which became a general college of further education (*The Wigan Observer*, 1991).

Funding for mining qualifications

Wigan College had been given £20,000 in 1918 from the Miners' Welfare Fund 'for providing additional accommodation in supporting mining education' and a further £5,000 for equipment. The new extension for the mining department included a library, science and engineering laboratories and general classrooms. (Craig-Smith p.34).

In 1920, the Miners' Welfare Committee contributed towards the cost of erecting and equipping the Rotherham mining department' (Foundation Stone). Seven years later a new 'fine College was opened' and was financially supported by the Education and Technical Committees of Rotherham Education Authority and the Miners' Welfare Committee which contributed towards the building and equipment (Plaque on the inside wall of the building).

In 1924, the Miners' Welfare Fund gave Burnley £1,400 to purchase new equipment in support of a new diploma course. The College was now a 'self-contained central institution capable of satisfying the 70 square miles of the Burnley Basin with educational requirements of every grade of worker and official in or about the pits' (*Principal's Report*, 1923-1924, p.16). At the start of the academic year 1929-1930, the Miners' Welfare Fund gave Burnley a further grant of £1,500 which was used to set up a mining power laboratory at the College and included electrical and mechanical machinery which was used at collieries, both on the surface and underground (*Principal's Report*, 1929-1930, p.12). With these on-going technological developments in mining, those completing such courses were often rapidly promoted as they had up-to-date knowledge of the principles underlying the

application of electricity and compressed-air which was becoming the main sources of power at the pits (*Principal's Report*, 1930-1931, p.12).

In April 1930, the Foundation Stone was laid for the new Barnsley Mining and Technical College which was opened on 10 October 1932 (*Barnsley Chronicle*, 1930). The building cost £79,660 and furniture and equipment a further £26,000. The Miners' Welfare fund grant provided £10,000 towards the building and £5,000 towards equipment (*Barnsley Independent*, 1932). The remainder of funding came from the County Borough of Barnsley Education Committee (Opening Ceremony Pamphlet, p.3).

In 1934, Burnley received a grant of £1,400 from the Miners' Welfare Fund was used for the purchase a steam turbine, dynamometer and diesel engine for the engines laboratory. Transformers, a compressed air turbine and electrical and telephone equipment were also purchased for the mining power laboratory and electrical furnaces, gas analysis apparatus and modern flame and electric safety lamps for the general mining laboratory. While the laboratories provided the opportunity for younger mining students to have insight into the up-to-date equipment, the local collieries were keen to give students actual work experience (*Principal's Report*, 1933-1934, pp.19 – 20).

Local Education Committees provided scholarships for miners on the part-time courses and the fees for full-time attendance were paid by the collieries themselves. Certification of these courses were approved under Section 15b of the Coal Mines Act of 1911 (*Principal's Report*, 1933-1934, p.75).

Higher Education

By 1900, higher education mining departments in England had been established at Durham University in Newcastle, Firth College in Sheffield, the Yorkshire College of Science at Leeds, Owens College in Manchester, Birmingham and University College Nottingham (Roderick and Stephens, p.111). All these institutions became universities in their own right and it was these and others in Scotland and Wales, that qualified miners up to degree level and who often became lecturers in the mining departments. Most mining staff at the Barnsley Mining College, for example, gained their degrees in mining and mechanical engineering from the University of Sheffield, having worked in the local collieries prior to going into teaching (*Barnsley College Prospectus* 1962 - 1963).

University scholarships were offered through the Miners' Central Welfare Fund. The criteria for receiving scholarships was being employed in the coal industry, a son or daughter of a coal worker and were seventeen years old or over at the time of making an application. Although the fund stipulated that applicants must attend a British university, they did not have to complete a degree in mining unless they worked in the industry. There were also mining scholarships in support of part-time study in advanced mining technology and diploma courses funded by local education committees. The Miners' Welfare Fund also provided support for part-time advanced mining scholarships nationally for fees, books, instruments and travel expenses for locally delivered courses (*Burnley College Prospectus* 1940–1941, pp.75 – 77).

Conclusion

Research carried out for this paper has highlighted historical developments relating to British coal mining education and training from the Nineteenth Century until the late 1970s, by which time the industry was in permanent decline. The paper highlights the synergy between further, adult and higher education which between them offered mining courses from compulsory certificate which all new entrants completed, to advanced and degree level work. There were several factors which necessitated an educated and trained workforce. Technological developments, as mining became deeper and more complex from the mid-nineteenth century, resulted in the need for expensive machines which required careful maintenance and operation. Miners were expected to be able to read the instructions and have a high level of technical knowledge to keep them maintained and efficient. The Malicious Injuries to Property Act of 1861 was also a contributory factor in the urgency of introducing education for all employees in order to prevent them inadvertently breaking the law. The continual need for research and on-going development, such as those relating to finding solutions to gas explosions, roof falls and improvements in coal extraction efficiency, required high levels of training. The design of courses, the building of mining laboratories in technical colleges, as well as nationally recognised qualifications up to degree level, provide evidence that the industry offered all level of courses and continuing professional development required in an ever changing industry.

With regard to funding, many colliery communities had, since the mid-nineteenth century, included places to study; a school, an institute, library or often all three. Costs for building and running these were divided between employers and employees. With the expansion of technical education in the early twentieth century,

government funded local authorities, colleges were established throughout the country including those offering mining qualifications. Contributions towards the establishment and expansion of the mining departments in both existing and new colleges were financially supported by the Miners' Welfare Fund, the local authority and local colliery owners. With nationalisation, the National Coal Board provided sponsorship for education and training on a bigger scale to that offered by the previous private mining companies. Thus, funds were available and from colleges sampled for this research, courses were available for young men entering the industry direct from school to higher level ones for more experienced miners who, with employer backing, had the opportunity to up-skill and develop their careers through achieving advanced technical and managerial qualifications. English and mathematics were embedded in all mining courses, the forerunners of which are offered today within foundation level programmes and modern apprenticeships. Qualifications offered included those in electrical engineering, mechanical engineering, chemistry, mathematics, surveying, railway engineering and science, the present day equivalent to what the government refers to as STEM subjects (science, technology, engineering and mathematics).

On the issue of funding for education and training, contributions were made by the miners, colliery owners and after 1948, the National Coal Board and government funding, through the local authorities. This is in stark contrast to financial support given to students in 2013. In England, 16 -18 qualifications are fully funded by government but those who are 19 to 23 years of age have only half their fees paid, subject to "learning entitlement". Students who are 24 years old or over, receive no public funding at all and employers are not required to provide financial support. At

Level 3 and above, there is both an employer and learner contribution. Companies may, if they wish, offer a placement for the period of course so the trainee may gain the worked-based qualification but without commitment of providing a job at the end of it through an exit interview agreement. Added to this, if a graduate wishes to complete an apprenticeship-based qualification, giving them technical skills and work experience, there is no government funding to support, even though they have previously taken out a student loan to finance their degree. Thus, employer or student must pay the full amount. The solution should be that government funding supports in full, courses meeting employers' needs and that neither age nor previous qualifications are a financial barrier to work-based education and skills(5).

Notes

1. The Coal Industry was nationalised in 1946 and the Miner's Welfare Fund continued to support the workforce until 1952.

2. Originally Burnley Mechanics' Institute, it changed its name to Municipal Technical Institute and School of Art following the passing of the 1902 Education Act with local authority funding. Later it became Burnley Technical College.

3. There had been discussions during the 1960s as to whether the College would either gain its own nationally recognised degree or become a partner institution with the University of Manchester. Nothing came of these initiatives.

4. Tom Ellis had previously gained BSc degrees in Chemistry (Nottingham University) and Mining (University of Wales).

5. I would like to express my thanks to colleagues at Kirklees College, Huddersfield, and Havering College of Further and Higher Education, Essex, for their time in discussing present day funding arrangements for post-school qualifications in support of this research.

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