
An Integrated Strategy for HE Engineering Provision between FE Colleges and Universities within Derbyshire and Nottinghamshire

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Abstract

The paper details how Leap Ahead, the Lifelong Learning Network for Derbyshire and Nottinghamshire has developed an integrated strategy for HE engineering provision. A case study will illustrate how the strategy has been developed and how it has been used to produce a selection of courses provided by a range of partners in engineering.

This paper will also show how the strategy was developed and the thought process behind it, detailing its aims and purpose and how these have been achieved. Through the case study it will show how this strategy has been implemented, highlighting the issues encountered when working with a number of FE college partners to develop the engineering courses that will allow the learner to move between courses and institutions easily. A major element of this work has been the development of clear progression routes between courses enabling learners to progress from Level 3 to Level 7 in a flexible manner which is appropriate to their needs.

The paper highlights the issues encountered in this development work, including the problems, and demonstrates that it is possible to develop and run an integrated set of courses provided by a range of institutions providing benefits for both the institutions and learners involved.

Introduction

Leap Ahead is developing an integrated approach to HE provision following the successful model used for the Rolls Royce PLC FdSc Mechanical and Manufacturing Engineering. This approach closely links provision in both FE colleges and universities allowing the student to benefit from the experience of seamless progression. By taking this approach, there are further benefits that can be gained; these are a greater improvement in retention and an increase in progression onto and through HE courses.

This approach builds on the best practice established in the Rolls Royce PLC FdSc Mechanical and Manufacturing Engineering and develops further into a regional approach which has evolved through the mapping of current provision resulting in a new curriculum and a set of formally agreed Progression Agreements.

Current Best Practice

The current FdSc Mechanical and Manufacturing Engineering for Rolls Royce PLC is run by Derby College and the University of Derby (Barber P 2006). The programme is validated and run under the University of Derby regulations. The programme is primarily offered in a part-time mode of study over 3 academic years; with students studying two years at Derby College and the final year of the Fd at the University of Derby, university lecturers teach at the college and vice versa.

This arrangement means that students have the benefit of a wide range of lecturers allowing the correct people to teach classes and also allowing the students to experience the university style of teaching before they move from the college to the university. This means that the students do not experience any major changes as they move from college to university.

This arrangement has also had beneficial results in the recruitment and progression of students, as the majority of students on the course have been recruited from courses being run by Derby College and so are familiar with the college and its staff. With the Fd being part taught by the college, the college staff have a vested interest in promoting it. Having recruited students in this way means a high percentage, over 60%, progress onto the final year of the Engineering Degree at the University of Derby as the move to the university is made in the final year of the Fd and many see the progression onto the degree as a natural move.

This arrangement has all the elements needed within it to demonstrate how an integrated strategy to HE would work e.g.

- Closer connections between college and university
- Clearer recruitment and progression routes
- Closer links with local employers
- Integrated teaching and learning strategies

These elements work well within this programme but need to be developed and improved in order for this approach to work effectively.

Provision Mapping

The first stage in developing the integrated strategy is the mapping of current provision within the Leap Ahead geographical area of Derbyshire and Nottinghamshire. This mapping process showed the following pattern of provision within the region.

The area can be split roughly north and south, the south of the region having significantly more degree and masters level provision than the north and there being a significant difference in the types of provision provided in each region.

The south of the region is dominated by four universities, these being Nottingham, Nottingham Trent, Derby and the Open University. These universities provide different Levels and types of provision having historically divided up the provision types within the region.

- **The University of Nottingham** is the only Russell Group University within the region and the largest university, with by far the largest engineering provision. This provision is currently exclusively full-time and aimed at 18 year old school leavers and foreign students. The university provides taught post graduate qualifications in engineering, e.g. M.Eng and MSc courses.

- **Nottingham Trent University** has reduced engineering provision with it only offering product design type courses and a limited provision in civil engineering.
- **The University of Derby** has a number of Foundation degrees in engineering which are well regarded. These courses are mainly part-time and are predominantly delivered in partnership with a number of colleges and other organisations. The university also offers a range of engineering degrees, geared to part-time study. It does not currently offer any taught post graduate courses and does not have current plans to develop these.
- **The Open University** has a good representation throughout the region and represents current best practice in flexible delivery and learning methods, with its emphasis on widening participation and flexible learning.

The colleges within the south of the region are large with 10,000 plus students, with the exception of South East Derbyshire, and provide a range of high level courses in partnership with a number of universities.

- **Derby College** has a successful partnership with the **University of Derby** and provides the majority of the resources for the FdSc Mechanical and Manufacturing Engineering. It also offers a range of HNC/D's in both Mechanical and Electrical/Electronic engineering, the college is currently enjoying an increase in student numbers and the majority of this provision is part-time.
- **Castle College** is currently redeveloping its engineering provision. The college currently has provision up to Level 5 and is focused on the apprenticeship market. With HNC/D being offered in Manufacturing/Electrical and Electronic Engineering. Castle College is developing a new engineering facility with Toyota.
- **New College Nottingham** has no engineering provision.
- **South East Derbyshire College** was found in discussions with senior management to be in a difficult position at present as its engineering provision has been reduced and has suffered from a poor inspection. It currently does not provide any engineering HE and is not certain of its future direction.

The north of the Leap Ahead, region consisting of Chesterfield, Worksop, Mansfield and the surrounding area, does not have a university and HE provision is only provided by the colleges. There are also still some structural unemployment issues within the area caused by the decline of the mining industry, which are now translating themselves into skills gaps as new industries develop within the region.

- **Chesterfield College** is one of the largest within the north of the region and a grade one college. The college currently provides a range of HNC/D's in engineering and provides both part-time and full-time modes of study. The college see the development of its HE as a strategic objective and is looking to develop a range of Foundation degrees.
- **West Nottinghamshire College** is also a large college and has, in the author's opinion, the best HE engineering provision within the north of the region. It currently provides a range of Foundation degrees plus HNC/D's in engineering and provides a BSc (Hons) through Leeds Metropolitan University.
- **North Nottinghamshire College** currently has an extensive range of Level 3 courses, with a COVE in fluid power and a COVE in aerospace and provides a range of aircraft maintenance and aerospace programmes

at Level 3. It is the only provider in the region to offer aerospace courses and a specialist fluid power course. The college is currently investigating possible HE provision in engineering.

The colleges within the north of the region operate separately as they are in competition with each other for learners, therefore providing a confusing picture for learners with progression routes often being difficult to identify.

The current state of Engineering provision within the Leap Ahead region is a mixed picture with the south of the region being well provided for, but still with a number of significant gaps in provision. These being in part-time taught post graduate qualifications and in some specialist areas of engineering, including rail and aerospace. The north of the region has a poor range of HE courses and suffers from a lack of co-ordination between the providers in this area.

Currently, the situation is fragmented and confused with a definite split between the north and south of the region. The north being in a much worse position with little university provision and fragmented HE provision, supplied by a range of colleges. The south of the region has 4 universities within it, demonstrating a range of commitments to widening participation and partnering with local FE colleges.

Strategy Development

Having mapped the current engineering provision within the Derbyshire and Nottinghamshire area it is clear that there is provision but it is fragmented and difficult for prospective learners to navigate through. The differences between HNC/D's and Foundation degrees are often difficult to understand for prospective students and employers, plus the relationships between the colleges and universities is unclear meaning that it is often very difficult for prospective learners to see a progression route from their current position.

This lack of clarity and open competition between the colleges, especially in the north of the region, means that it is often very hard to obtain knowledgeable, impartial advice on what courses to take and where these might lead to. This, and the other factors discussed, often means that prospective learners simply did not engage due to the vast anomalies in provision resulting in skills shortages within the area.

Having considered these problems it became clear that the strategy had to promote closer collaboration between the institutions and the development of a simple map of provision within the area and the progression routes open to prospective learners. The first task in the development of the strategy was to engage all the institutions in the process and to identify their relevant strengths as the majority of the institutions had strengths or specialisms in a particular area which was often not utilised to its full potential due to the competition element leading to institutions without that specialism offering competing courses.

Some examples of how this was affecting the area are,

The National Fluid Power Centre of Vocational Excellence (COVE), Worksop, was only providing industrially funded courses for specific companies and it was difficult for anybody else to access the facilities and expertise there. It was proposed that they would provide a range of modules that can be integrated into Foundation Degrees and degrees that are being offered by other institutions as it is an area of expertise which only a small number of prospective students would be interested in, but could be catered for regionally.

The development of a COVE that catered for a specific need in composites, but only operated for a year due to a lack of co-operation between the participating colleges and universities meaning that only a very limited number of students enrolling and a lack of expertise within the COVE.

These examples show the negative effects that can be experienced through a lack of co-operation. These examples were used to demonstrate to the partner institutions how their current mode of operation can have a negative effect on the student experience and the operations of the institutions.

Having demonstrated to the partners how the current situation was not working in an effective manner, a way forward had to be found. Using the FdSc Mechanical and Manufacturing Engineering as an example, it became clear that a more integrated approach was required. It would be a complex development with a high level of resistance to change from the institutions. In order to reduce this resistance it was decided to produce a possible future state map for engineering for the Leap Ahead area. This is shown below:-

Possible Future Part Time Engineering Provision

HEI \ Level	Castle	Chester'ld	West Notts	North Notts	South East	Derby	Unv Derby	Unv Notts	Open Unv	North Notts Modules
Level 2	Yes	Yes	Yes	Yes	Yes	Yes				
Level 3	Yes	Yes	Yes	Yes	Yes	Yes				
Level 4	Fd, Toyota	HNC and Fd, Mec,Man, Elec	HNC, Mec,Man, Elec	Fd Aircraft Maint'ce		HNC, Mec,Man, Elec, Ops, Civils			BSc	Fluid Power
Level 5	Fd, Toyota	Fd, Mec,Man, Elec	HND, Mec,Man, Elec	Fd Aircraft Maint'ce		Fd, Mec,Man, Elec,Ops, Civils			BSc	Fluid Power
Level 6			BSc Technology and Eng Man			B.Eng, Mec,Man, Elec,Ops, Civils			BSc	
Level 7						MSc, Mec,Man, Control, Adv Tech	MSc, Mec,Man, Civils		MSc	

The diagram works like a game of Snakes and Ladders, where you can progress vertically down a column and when you meet an arrow you can follow the path of the arrow or continue vertically downwards if there is provision. The diagram identifies two distinct blocks of collaborative provision, those being Chesterfield and West Nottinghamshire Colleges and Derby College and the University of Derby. These were chosen as the partners involved are close to each other geographically and have traditionally competed with each for students.

Chesterfield and West Nottinghamshire Colleges Curriculum Development

Having developed this strategy and discussed it with the partners, agreement was reached on the proposal and Chesterfield and West Nottinghamshire Colleges agreed to start the first pilot development.

Having agreed to conduct the pilot study the development they were conducting was defined and at this stage expanded to include two feeder colleges, these being North Nottinghamshire College and South East Derbyshire College.

The final development consisted of the four colleges collaborating in the area of engineering as the colleges will provide a range of progression routes from Level 3 to a degree with learners being able to take:-

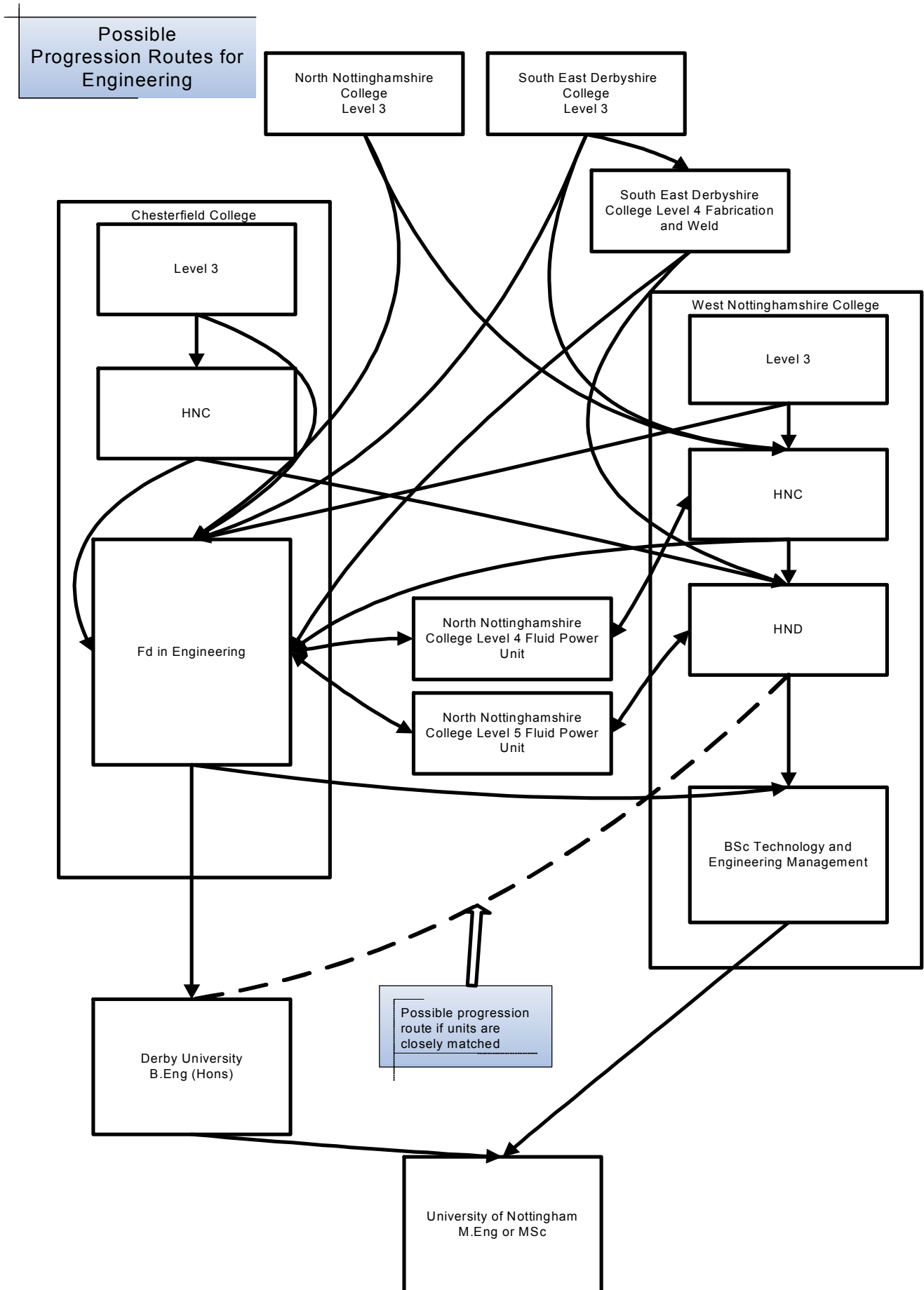
- Fd route
- BSc Technology and Engineering Management
- HNC to Fd route
- Fabrication and Welding Level 4 to Fd or HND route
- HNC/D route

These routes will be made clear by the development of progression routes and progression agreements which will provide a clear set of progression paths to the learners involved.

Involvement of North Nottinghamshire and South East Derbyshire Colleges

It was identified that these colleges within the area do not currently have Level 4 (HNC) or above provision in engineering and so these colleges will form part of the scheme so that their Level 3 learners could feed into the scheme. They will also develop some Level 4 and 5 provision with the help of the other two colleges

The following diagram shows how this arrangement might work in practice with all the possible progression routes mapped out.



The diagram shows a complex arrangement of progression routes that provide the prospective learner with a wide range of possible pathways from a Level 3 qualification to a Level 7 qualification.

The work is being led by Chesterfield College who are project managing the work and are responsible for the majority of the development work. The Foundation degrees and the degree are all being validated by Leeds Metropolitan University (LMU) with the partner colleges conducting their own validations. LMU was selected as a number of the partners had used them before for validations and found them to be flexible and supportive in their approach, unlike a high number of other institutions, as encountered in other work being conducted by Leap Ahead (Dewhurst H 2007)

The qualifications which were identified for development and the reasons for their development are explained below:-

Foundation degree in Engineering Chesterfield College

This qualification is being developed by Chesterfield College as a development and replacement for their HNC and HND provision, as the college feels that Foundation degrees are the way forward as the Foundation degree route provides the college with a much higher Level of control over curriculum content, assessment and delivery methods. The Fd will cover a range of engineering discipline including, Mechanical Manufacturing and Electrical. It will be aimed at learners who are progressing from the Level 3 qualifications offered at the college and will be mainly for part-time learners.

HNC Chesterfield College

Chesterfield College took the decision to keep the HNC as they were not sure about the reaction of some learners and employers to the Foundation degree, but with a direct progression route onto the Fd or if learners required it, the option to progress onto the HND being provided by West Nottinghamshire College.

HNC/D Provision West Nottinghamshire College

West Nottinghamshire College took the decision that their local market was of an extremely conservative nature and that a move to Foundation Degrees would not work, so they decided to refresh and develop their HNC/D provision instead and allow learners wishing to study a Foundation degree to go to Chesterfield College.

BSc Technology and Engineering Management West Nottinghamshire College

The BSc was developed by West Nottinghamshire College as a top up degree for their HND and Chesterfield College's Foundation degree. The BSc is again validated by Leeds Metropolitan University and design specifically to allow progression from West Nottinghamshire College programmes and Chesterfield College programmes.

Fluid Power Modules Levels 4 and 5 North Nottinghamshire College

These modules have been developed to provide specialist modules in fluid power and are provided by North Nottinghamshire Colleges COVE in fluid power. The modules can be combined into the Fd programme or the HNC/D programmes. This arrangement allows these specialist modules to be provided to a wide range of learners.

Other Progression Routes

A progression route has been agreed with the University of Derby which allows learners to progress from the Foundation degree onto the final year of the B.Eng (Hons) Mechanical Engineering or B.Eng (Hons) Manufacturing Engineering. This is

currently only available from the Foundation degree as the HND does not fit the requirements currently.

Having successfully completed the B.Eng at Derby University a progression agreement is being developed to allow learners to progress onto the part-time MSc in Engineering that is being developed by the University of Nottingham. This completes the progression pathway so allowing learners to progress from Level 3 to Level 7.

Feeder Colleges

The diagram shows that there are two additional feeder colleges, these being North Nottinghamshire College and South East Derbyshire College. The arrangements with these two colleges are as follows:-

North Nottinghamshire College

At this College they are going to provide the specialist fluid power modules and their Level 3 learners will be advised that a progression agreement exists that allows them to progress from the college onto the Foundation degree or the HNC being provided by Chesterfield and West Nottinghamshire Colleges through this development. The experience that is gained through the work done developing the fluid power modules will be used in the future to develop a Foundation degree in aircraft maintenance to be delivered at North Nottinghamshire College.

South East Derbyshire College

This college will be feeding students into the Foundation degree and HNC/D, it will also be developing Level 4 welding provision as it has been identified that there is a significant skills gap in the region for high Level skills in welding. There would also be a progression agreement from the Level 4 welding provision onto the Foundation degree and the HNC/D programmes.

The Development Approach

The development of this selection of courses and gaining the integration required to achieve the model represented the most significant challenge in the development process once agreement had been reached on the concept and strategy.

The course development was divided up amongst the participating colleges and a master work schedule was agreed; this schedule had milestone which when the work was completed for that milestone triggered payments from Leap Ahead. The concept being that completed work was paid for so providing an incentive to complete the work.

The project, being a large and complex one, meant that a lead institution was appointed, that being Chesterfield College, who employed a project manager whose role it was to oversee the development and to pay the other partner colleges on completion of their aspects of the work.

In order to make sure that all the courses under development integrated in the manner required a series of consultation and task meetings were organised between the academics writing the modules from the partner institutions. These meetings focused on module content and how the courses would overlap. It was identified at this point that due to the nature of the qualifications being developed a large proportion of the core material remained the same as the maths, science and business elements at Level 4 can be utilised in a generic format for a range of engineering courses.

These meetings also provided a forum for the staff from the partner colleges to meet and share experiences and good practice. This was especially valuable as a larger number of the staff involved in this process had not been involved in the creation of Foundation Degrees before. It also allowed the staff from the partner colleges

networking opportunities which would become useful when learners wished to move from one college to another.

It became clear at these meetings that a high number of staff at the partner colleges had not taught HE courses before and required staff training and development in order for them to deliver the courses effectively. This activity was factored into the project plan with Chesterfield College again taking the lead on this activity as they have the most experience of delivering HE.

Having addressed the development of the courses and the training and development of the staff at the partner colleges the issue of progression onto degree and masters courses at other institutions had to be addressed. For this two institutions were identified, those being the University of Nottingham and the University of Derby providing a part-time B.Eng route in either Mechanical or Manufacturing Engineering and progression onto their MSc course. Nottingham are providing a part-time MSc course which the learners could progress onto from the University of Derby B.Eng. These courses will be subject to a formal set of progression agreements between the partners to ensure that learners can follow these progression routes and that they are made clear to them. Agreement has already been reached in principle for this and the courses are being matched.

These progression routes are important as they provide the learner with the opportunity to progress to an MSc course which is accredited with a professional body so allowing them to gain chartered engineer status which is currently recognised as being very difficult to achieve through a vocational part-time route and this development has been recognised as a means of providing this route and addressing the need for chartered engineers, which within certain sectors is becoming acute.

Conclusion

The development of this range of courses with a set of partner colleges represents a significant step forward as it provides the prospective learner with a clear picture of the courses available and the progression routes that they could follow. The same time being able to provide a range of specialist modules and courses in such areas as fluid power and welding.

The initial work required to achieve this has revolved around identifying the local needs and demands and then developing a strategy that all the partner institutions agree on. The development of this strategy proved critical in allowing the development to progress as it had to benefit all partners involved and be simple enough for it to be easily understood. The strategy development took longer than anticipated and required a neutral broker. This part of the work proved the need for Lifelong Learning Networks as Leap Ahead was able to act as the strategy developer and neutral broker in order to facilitate the development.

The development of the courses and the progression agreements that form a key element of the work progressed well due to the use of a project manager and a lead institution, which had the experience and drive to move the work forward. The work produced a fully integrated set of courses which allow learners from a number of colleges to progress seamlessly from Level 3 to Level 7 through a vocational part-time route which could, if required by the learner, lead to chartered status.

References

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