

LSIS Supported Provider Collaborative Development projects

LSIS funded Apprenticeship projects

Provider end of project report: July 2012

Project Title: A feasibility study on developing an Apprenticeship framework or individual units in Nano science and Nanotechnology

Section 1: Introduction

Outline of own organisation, provider partners, and the project aims and objectives.

Lead provider

Newham College of Further Education

Participating provider partners and other stakeholder organisations involved, including members of the project-working group.

LSIS

Judith Cohen: LSIS associate

Newham College of Further Education, Host College

Bollam Julia: Head of Centre for Innovation and Partnerships (CIPs)

Pallavi Malhotra: Project Manager, CIPs

Chidi Okolo: STEM Advisor, Stratford Campus

Newham College's Apprenticeship Unit

Lorraine Jones: Partner Officer, Apprenticeships Unit

Sutherland Roderick: Head of Apprenticeships Unit

Institute of Nanotechnology (IoN)

Mark Morrison: CEO

Dr. Richard Moore: Scientist

The Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTA)

Paul Turnbull

David George

The Sector Skills Council for Construction Skills (CITB)

Lourdes Goodman

Tom Gibney

The Sector Skills Council for Energy and Utility (EU Skills)

Terry Robinson:

The Sector Skills Council for Process and Manufacturing (Proskills)

Lisa Williamson

The Sector Skills Council for Chemicals, Nuclear, Oil and Gas, Petroleum and Polymers (Cogent)

James Murdock

Training Providers

Bedford College-Esin Esat

College of North West London- Jim Scivyer, Pat Leavey, Jacques Pietrzak , Vito Martino, Tim Bury, Phil O'Hara and Mark Bolus

Awarding Body

Edexcel-Kath Schiller

The aim of the LSIS project was to bring together providers and key stakeholders, including several Sector Skills Councils (SSCs) and the Institute of Nanotechnology (IoN). The aim was to look into either developing units around nanotechnology that would fit into existing Qualification and Credit Framework (QCF) qualifications, and in particular Apprenticeship frameworks across a range of sectors or create a new Nanotechnology Apprenticeship framework.

We focused on three industry sectors that overlapped in terms of skills and technologies, where the majority of nanotechnology based products were commercially available and rapidly increasing.

- Construction.
- Facilities Management, Housing, Property, Planning, Cleaning and Parking.
- Gas, Power, Waste Management and Water Industries.

The objective of the project was to carry out a feasibility study. Then depending on the outcome of the feasibility study to subsequently develop a new nanotechnology accreditation or units in readiness for submission to an appropriate awarding body. The two options were:

1. develop a new Nanotechnology Apprenticeship framework; or
2. develop new modules/units for embedding into existing Apprenticeships

How and why did the project emerge?

Newham College is at the forefront of emerging technology in the areas of Nanotechnology and Radio Frequency Identification (RFID). The Discovery Lab, established in 2007, has attracted the attention of many employers. Small and medium-sized enterprises (SMEs) have been particularly interested in understanding this technology and its application in their business.

Newham College has worked successfully with the Institute for Nanotechnology (IoN) and received funding through the European Regional Development Fund (ERDF) for a project called 'Showcasing Innovation'. This project supported 120 SMEs across London to understand new commercially available technologies around nano materials and nano coatings, reviewing the potential use of these technologies in their business.

SMEs from across a range of sectors – including Security, Warehousing/ Logistics, Healthcare, Care, Cleaning and Maintenance, Fashion and Design, Retail and Manufacturing - can apply nano coating technologies to reduce maintenance and energy costs, and produce significant environmental benefits. The 'Showcasing Innovation' project recently held a 'Nano Women' exhibition at the Fashion and Textile Museum where SMEs in the creative arts sector exhibited their use of nanotechnology to enhance their products. The College is also in the process of carrying out a feasibility and cost benefit study on the use of nano coatings within the College.

In addition, Newham College had recently received funding from the LSIS Science, Technology, Engineering and Mathematics (STEM) Special Projects Fund to engage teachers and learners with BLOODHOUND SSC activities, with a nano science dimension. The College developed a video case study to show case these activities. The project aims to enthuse young people, encourage their curiosity in science and to help improve teaching and learning across STEM subject areas. The project encouraged teachers to enhance their teaching. It specifically showed examples of how the use of nanotechnology based engine additives and body coatings could improve vehicle performance and efficiency, and reduce fuel consumption and carbon emission.

Newham College noted that the American Government has set up a committee to consider how a nanotechnology education act can be used for STEM disciplines from primary to higher education, as it is a new science of the future.

What was the starting point?

This is to be able to measure progress and impact. Please include data at start of project if relevant.

There were no accredited modules for nanotechnology, outside of graduate and postgraduate courses, apart from one unit at level four. It was deemed to be of benefit to employers, young and adult learners to have an awareness of, and be able to achieve a qualification in this new emerging technology.

Newham College wanted to work with like-minded providers such as IoN and SSCs to contribute to the feasibility and framework for this development.

Section 2: Activities

Who has been involved?

Consider lead organisation departments and/or job roles and partners roles.

How were the Senior Management Team brought into the project, and what was their role, if any?

Were any other stakeholders involved? If so, why, and how did they contribute to the project's success?

Newham College was responsible for all administrative tasks, hosting and leading the workgroup meetings, production of the final feasibility report and development of the draft level 3 Principles of Nanotechnology unit.

The Institute of Nanotechnology assisted with the technology research and input to the feasibility report as well as employers' phone surveys. Dr Richard Moore's role included the following:

- carried out research to identify key nano-based technologies for the listed industry sectors;
- identified skills and training required to enable the use of the identified nano-based technologies within the listed industry sectors;
- listed the directives and regulations related to the manufacturing and handling of nano-based technologies;
- developed a questionnaire for training providers and employers;
- suggested content for the draft level 3 Principles of Nanotechnology unit;
- carried out phone interviews with major employers employing technology based apprentices; and
- contributed to the final feasibility report.

The SSCs provided valuable input for the feasibility report and draft nanotechnology unit as well as providing important contacts and steering the workgroup in the right direction. In particular, Paul Turnbull from SEMTA played a leading role within the working group in advising on the following.

- Linking with other key Sector Skills Councils.
- Providing contacts and making introductions to key members in other SSCs.
- Providing a key contact at Edexcel.
- Advising on the content of the feasibility study and draft level 3 Principles of Nanotechnology unit.
- Providing relevant documentation related to Apprenticeship frameworks.

- Suggesting possible solutions on the way forward.

Edexcel awarding body assisted in the layout and terminology used in writing the level 3 Principles of Nanotechnology unit. **Training providers** contributed to thoughts and ideas at workgroup meetings. The group as a whole assisted and contributed towards the Feasibility Report and draft unit either by attending the meeting in person, telephone conversations with the project manager or electronically by email.

A summary of what has happened so far?

The following has been produced.

- **Nanotechnology Feasibility Study Recommendations Report** of findings and recommendations on the way forward.
- **Draft level 3 Principles in Nanotechnology** unit, suitable for a range of Apprenticeship frameworks and industry sectors.
- Survey questionnaire for training providers and employers.
- Results of survey carried out with training providers and employers.
- Power point presentation to training providers.

Were changes made to plans during the project? If so, why were these necessary?

The project team worked with Newham College's Apprenticeship teams to identify Apprenticeships available for the three identified industry sectors and applicable job roles within these sectors that could work with nanotechnologies. It became apparent that, within the timeframe, the project team should focus on producing a knowledge based unit that could be used across different frameworks since there is no defined "Nanotechnology Technician" role. An NVQ unit cannot be used in more than one framework, but knowledge aspects can be used repeatedly.

Section 3: Working in partnership

How easy was it to establish the partnership?

Whilst there was interest from the Sector Skills Councils and other training providers in the project, it was not possible for all invited partners to attend working groups meetings. The project benefitted from the support of Judith Cohen, LSIS associate working with Newham College. Newham College staff members have developed their experience and expertise of working on nanotechnology based projects over the last five years, and have delivered nanotechnology awareness and application training to small and medium sized businesses and College students. This experience and expertise was key in ensuring the support of the Institute of Nanotechnology, in particular Dr Richard Moore. This was fundamental to the project in terms of development of the feasibility report.

How effectively did the partners work together?

The partners worked effectively together culminating in four members of the project group attending the project dissemination event organised by LSIS, held in Birmingham on 8 July 2012. Working group members were interested and enthusiastic about nano science and nanotechnologies and there was active participation and commitment to delivering the project outcomes. There was regular attendance to working group meeting by key members including the IoN, SEMTA and Edexcel.

Were there any issues to overcome? If so, how was this done?

Our research showed that currently only one level four unit exists in nanotechnology. Some science based subjects at GCSE and A-level briefly mention nanotechnology as part of the main programme. There is no other qualification available in this subject area as a separate and individual qualification or unit. This topic is not covered at QCF levels one, two and three in any other existing UK curriculum, including Apprenticeship frameworks.

Our research identified the need for an optional knowledge based nanotechnology unit that would fit into existing Apprenticeship frameworks for all three identified industry sectors. The decision was taken to develop a level three knowledge based nanotechnology unit. The developed unit covers core knowledge areas in all three listed industry sectors and would also easily fit into Apprenticeship frameworks for other industry sector such as in ICT, Engineering, Mechanics, Electronics, Manufacturing and others.

What advice would you give to providers in future projects, which are new to partnership working?

Up to three key points

- Ensure there is a clear project brief and that the project working group has an agreed terms of reference.
- Assign partners roles and responsibilities and create project sub-groups looking at specific issues in more detail, if necessary.
- Keep meetings focused. Ensure action points are noted and followed up.

Section 4: Impact

What has changed? What difference has the project made?

This feasibility study has been of great value and produced valuable information on the status amongst businesses, training providers and individuals in relation to nano science and nanotechnologies. Because of the emergence of nanotechnology based products and processes in the construction, facilities management and energy/utilities sectors and sector-based skills required to maximize the potential impacts of nanotechnology in

these sectors, there is a need to develop a series of nanotechnology units of assessments for the Apprenticeship framework.

For UK businesses to remain competitive in the national and international market place, and ensure that the UK has established a curriculum to train professionals and students alike in new emerging nano-based technologies, it is essential to close the skills gaps that exist in both the business and education sectors.

The lack of knowledge and skills within the UK has identified a clear need for both informal and formal training for learners and teachers alike.

On the basis of the research carried out for this project, discussion among key stakeholders within the project working group and the survey carried out with training providers, the project working group make the following recommendations.

1. Due to lack of knowledge and continual emergence of new and enhanced nano-based technologies, it is not feasible to develop a completely new Apprenticeship framework in Nanotechnology. It is too early in the technology lifecycle to create a new and specific Nanotechnology Framework.
2. We recommend developing a generic and optional foundation knowledge based level 3 nanotechnology unit for the Apprenticeship framework that can be used in all three identified industry sectors.

Are there any measures that demonstrate the impact the project has had? (e.g. for learners, staff, employers, your organisation)

As part of the feasibility study, a short survey questionnaire was drawn up to support delivery partners working with Newham College's Apprenticeship team. A telephone survey conducted amongst a number of selected stakeholders including companies utilising nanoscale technologies to produce products in the construction, facilities management and energy/utilities sectors, and companies operating in those sectors with a potential interest in employing higher-level apprentices.

The survey examined the current state of knowledge of potential employers in these sectors concerning nanotechnologies and nanotechnology-enabled products. It explored their needs concerning the skill sets of higher-level apprentices and the career opportunities that may be available to suitably qualified apprentices. The survey results indicated the following.

- A lack of awareness and understanding of nano science and nanotechnologies.
- A lack of awareness of commercially available nanotechnologies.
- Delivery partners had an interest in learning about nanotechnology.
- Delivery partners had an interest in delivering nanotechnology training to learners.
- Delivery partners thought it would be desirable to develop a unit in

nanotechnology for the Apprenticeship framework.

- Delivery partners did not know if businesses would be attracted by apprentices trained in nanotechnology.

The results indicate that there is an interest in nanotechnology and the benefits provided by the technologies. However there is a lack of knowledge among training providers of this technology and due to the lack of knowledge training providers have, there is no idea if employers would find the training attractive or of benefit for their apprentices and staff. This also indicates a lack of knowledge within the business sector on the nanotechnologies available, and the benefits that they provide.

This mini survey has indicated a need for educating the business communities as well as training providers.

Were there any unintended outcomes from the project?

Excellent contacts were made with SEMTA and Edexcel, which will be extremely useful for taking forward work in this area.

Section 5: Success and challenges

What have been the key achievements?

- Interest from Sectors Skills Councils.
- Interest from the awarding body, Edexcel.
- Interest from training providers in offering the developed nanotechnology unit.
- Interest from training providers in receiving nanotechnology awareness training.
- Development of a feasibility report with findings and recommendations.
- Development of a draft level 3 Principles of Nanotechnology unit.
- The creation of a survey questionnaire for training providers and employers, with positive responses from training providers that have been analysed in graph format.
- Presentation to a small group of training providers working with Newham College's Apprenticeship team and the completion of the survey with those present.
- Identified nanotechnologies for the listed industry sectors.

What has been critical to the project's success (*up to three things*)?

- Project manager driving forward the work with the support of the LSIS associate.
- Dedicated support from SEMTA and IoN.

What have been the key challenges (*up to three*) and how were they addressed?

The relatively small amount of project funding restricted the amount of research and publicity material that could be produced. This challenge was addressed by producing materials in-house. The timescale for delivering the project was very tight with everything having to be completed by July 2012. We plan to hold a dissemination event in September 2012 after project funding has finished for key stakeholders, training providers and Sector Skills Councils. Invitations will be sent out in the second half of August 2012.

Section 6: Resources produced by the project
What resources have been created to share?

Please list the resources produced.

- **Nanotechnology Feasibility Study Recommendations Report** of findings and recommendations on the way forward
- **Draft level 3 Principles of Nanotechnology unit**, suitable for a range of Apprenticeship frameworks and industry sectors.
- **Survey questionnaire** for training providers and employers (this is included as part of the final report).
- **Results of the survey** carried out with training providers and employers (this is included as part of the final report).

Who are they for?

The resources are suitable for training providers, Sector Skills Councils and employers.

How could they be used?

The level 3 Principles of Nanotechnology unit can be used in appropriate Apprenticeship frameworks. The feasibility report is useful for key stakeholders including training providers, employers, Sector Skills Councils and local authorities.

Section 7: Future planning

What plans do you have for building on the work/outcomes of this project?

We plan to raise awareness among SMEs of the business applications of nanotechnologies and the skills needs arising from these. Newham College CIPs Discovery Lab has undertaken significant work in relation to the use of nanotechnologies in smart homes. This work would be included in the proposed Skills for Climate Change knowledge transfer hub in London.

**What plans, if any, are in place to continue working as a partnership?
How is the work of this project sustainable within the lead organisation and in the partner organisations?**

It is hoped that the partnership can continue working on the ESF funded Skills for Climate Change project. It is anticipated that the awarding body Edexcel will continue to develop the suite of qualifications around nanotechnology.

Section 8: Contact details

Name of lead organisation: Newham College of Further Education

Name of Project Manager: Pallavi Malhotra

Job title: Project Manager

Email Address: pallavi.malhotra@newham.ac.uk

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Yes ☒

No ☐

May we include your contact details in the report for the Excellence Gateway?

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Yes ☒

No ☐