OUTSTANDING TEACHING, LEARNING AND ASSESSMENT TECHNICAL SKILLS NATIONAL PROGRAMME

Created by: Lakes College West Cumbria
Date: January 2019
Case study by: Chris Fairclough – Curriculum Team Leader (Nuclear)

Managed by: Association of Colleges
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTSTANDING TEACHING, LEARNING AND ASSESSMENT</td>
<td>1</td>
</tr>
<tr>
<td>CONTENTS</td>
<td>1</td>
</tr>
<tr>
<td>PROJECT OVERVIEW</td>
<td>2</td>
</tr>
<tr>
<td>Direct Audiences for the NCfN ELM</td>
<td>2</td>
</tr>
<tr>
<td>Full List of Project Partners</td>
<td>3</td>
</tr>
<tr>
<td>What is the NCfN ELM?</td>
<td>3</td>
</tr>
<tr>
<td>The Aims of the Project</td>
<td>4</td>
</tr>
<tr>
<td>PROJECT METHODOLOGY</td>
<td>5</td>
</tr>
<tr>
<td>WORK READINESS</td>
<td>9</td>
</tr>
<tr>
<td>PROJECT IMPACT AND SUSTAINABILITY</td>
<td>11</td>
</tr>
<tr>
<td>Short-term</td>
<td>11</td>
</tr>
<tr>
<td>Long-term</td>
<td>12</td>
</tr>
<tr>
<td>Good News Stories</td>
<td>13</td>
</tr>
<tr>
<td>How has TLA changed</td>
<td>15</td>
</tr>
<tr>
<td>ANALYSIS AND CONCLUSIONS</td>
<td>18</td>
</tr>
<tr>
<td>Functional Skills Maths</td>
<td>18</td>
</tr>
</tbody>
</table>

- Level 3 Students Feedback: 21
- Barriers to Learning: 24
- Lessons Learned: 25
- Future Work Streams: 26

---

**TAKEAWAY MESSAGE** 26

**PROJECT OUTPUTS** 27

OTLA case study led by Lakes College
January 2019
Education & Training Foundation
PROJECT OVERVIEW

This project was an extension project based on the development and application of the Experiential Learning Model (ELM) which was designed and introduced in late 2017 and early 2018 via the previous Phase 2 project. The project scope has evolved over the project period in relation to the inclusion of additional previously unidentified partners with different focuses on the application, focus and impact of the ELM and the project divergence from previously identified partners. The aim of the extension project was to test the new National College for Nuclear Experiential Learning Model (NCfN ELM) in a range of different scenarios to ensure that it is a robust learning model that can be used in different curriculum areas.

The National College for Nuclear was one of a number of National Colleges set up by government, to focus on developing the technical skills, knowledge and behaviours required for the UK nuclear industry. NCfN was to focus predominantly on technical education from Level 3 to Level 6. This project has enabled Lakes College (Delivery partner of the NCfN and host of the northern hub building) to develop a new learning model, which allows the full embedding of Knowledge, Skills and Behaviours into the Curriculum. This has led to full engagement with the nuclear supply chain and their input into curriculum design has been critical.

The project has introduced the ELM to a range of audiences who have not previously considered this approach to learning and delivery. These include:

Direct Audiences for the NCfN ELM

- Functional Skills (Maths) Team at Lakes College
- Lancaster & Morecambe College – now embedded in their teaching & learning strategy for the next OFSTED visit
- Sellafield Training Department – objects of learning development and integral to the curriculum delivery of behavioural development of their apprentices and new entrants
- Energus Training and the Nuclear Decommissioning Authority – objects of learning development and embedding behaviours & communications with direct entry apprentices and graduates
- Bridgwater & Taunton College – development of objects of learning relating to the skill development of new entrant apprentices
- Lakes College West Cumbria – extension of the development of nuclear behaviours with full time study course students.

The NCfN ELM has been rolled out across LMC for January 2019 as a clear expectation, further embedding an effective, experiential, learner centred approach.

This is now seen as a key component of good or better teaching at LMC, as judged by their own observation team.

WES JOHNSON
PRINCIPAL
LANCASTER AND MORECAMBE COLLEGE
Full List of Project Partners

- Lakes College West Cumbria
- Derby College
- Bridgewater and Taunton College
- Lancaster and Morecambe College
- University of Cumbria
- Energus Training
- Sellafield Ltd.
- Electricite De France
- Centre for Leadership and Management
- National Nuclear Laboratory
- Atkins
- Jacobs
- Morgan Sindall
- West Cumbria Works

What is the NCfN ELM?

Experiential learning is not a new concept and has been seen in many different forms. These iterations are usually based around Kolb’s learning model and the National College for Nuclear Experiential Learning Model (NCfN ELM) is no different, as can be seen below. It still encompasses Kolb’s model, but expands on the pedagogical approach of Experiential Learning. For more information on what each section of the model entails, visit the following website: https://padlet.com/chrisf1/NCfNELM
Lakes College, as a primary delivery partner of the National College for Nuclear (NCfN), have been utilising the NCfN ELM alongside the new NCfN Northern Hub building to deliver a curriculum that has been designed to meet the requirements of the Nuclear Industry.

The ethos of NCfN is to utilise the NCfN ELM to enhance the employability skills of the learners on NCfN programmes (Levels 3 to 6). Therefore EL must be embedded within all areas of the NCfN Curriculum.

The aim of the project was to deepen the ELM approach in Nuclear and STEM, enhancing a model for putting EL at the heart of TLA and apprenticeship delivery. With this in mind, the project has been successful and widened the experience to additional providers who have demonstrated that the approach can have a significant impact on the student in terms of learning, relevance, results and behaviours.

The Aims of the Project

- Deepen the approach in Nuclear and STEM, enhancing a model for putting EL at the heart of higher level technical TLAS
- Engage a greater range of employers to broaden use and uptake
- Develop more OLs for wider use
- Strengthen tentative conclusions from our previous project; increasing rigor and extending the evidence-base
- Engage a wider range of teachers and students in using the EL approach with wider geographical reach in the NW, NE and Midlands, across technical and academic pathways
The table below shows the audiences that the project wanted to engage with as well as the number of people involved. As can be seen below, during the length of the project, the number of people who have been involved both directly and indirectly with this project is 368% higher than originally targeted.

<table>
<thead>
<tr>
<th>Audience</th>
<th>Target Direct</th>
<th>Target Indirect</th>
<th>Actual Direct</th>
<th>Actual Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>3</td>
<td>3</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Practitioners</td>
<td>5</td>
<td>15</td>
<td>31</td>
<td>174</td>
</tr>
<tr>
<td>Learners</td>
<td>120</td>
<td>0</td>
<td>282</td>
<td>0</td>
</tr>
<tr>
<td>Providers</td>
<td>3</td>
<td>0</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Employers</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

**PROJECT METHODOLOGY**

The project aims were devised into a list of Outcomes and this list was then developed into a list of Project Objectives. These objectives were then assigned to members of the project team. The outcomes are identified below:

**Outcomes:**

1. Provide a strategy for designing and implementing an experiential delivery model
2. Enhance the student and employer experience through the use of experiential delivery methods
3. Improve sector staff awareness of the benefits of experiential learning
4. Provide sector staff with a template for developing experiential learning
5. Provide a strategy for embedding experiential learning as the recognised and main method of delivery within an organisation e.g. the NCfN

These outcomes were identified based on the previous phase of the project which explored Experiential Learning and the formulation of the NCfN ELM. The outcomes reflect the requirement to explore the NCfN within different curriculum areas and improving the sector awareness of the NCfN ELM and its ability to improve student engagement. From these outcomes, the following project outputs were identified:

1. Enhance, refine and extend the transferrable model of EL

This was identified to test the model in a non NCfN setting. This testing was to be done by the Lakes College Maths team, Lancaster and

PAUL FAIRCLOUGH
DIRECTOR FOR NUCLEAR
LAKES COLLEGE
Morecambe College and Bridgewater and Taunton College. The output from this would be a model that is transferable across Curriculum areas. This would be completed by taking the learning from all of the areas of activity.

2. Create and test three further OLs: VR; maths FS; Nuclear Behaviours

This was identified as a way of testing and creating 3 Objects of Learning (OL) that utilises the NCfN ELM. The VR OL was to be created by the Nuclear Team at Lakes College. The Functional Skills Maths OL was to be created by the Maths Team at Lakes College and the Nuclear Behaviours OL would be created by the Nuclear Team at Lakes College. This was to further test the NCfN ELM in a number of settings and environments, that wouldn’t usually be identified as areas for radical change.

3. EL planning documentation for Degree Apprenticeships

This was included by the Project Manager before the project started. Lakes College have designed a range of Foundation and Bachelor’s Degrees, which embed the Competencies from the Level 5 Nuclear Technician and the Level 6 Nuclear Engineer/Scientist Apprenticeship Standards. Although this is Higher Education and the OTLA projects have been focusing on Further Education, the Project team believe that the ideology behind the embedding of these competencies could be utilised for the T Levels. If a number of relevant competencies (Knowledge, Skills and Behaviours) can be identified for each of the T Levels, then these could become embedded into the qualification utilising the model we have proposed or something similar.

4. Create bespoke CPD packages in support of the EL methodology

This was identified as being a way of being able to share the Project Teams experience of utilising the ELM to a wider audience. Various Continued Professional Development sessions were organised, which allowed the Project Team to test a spotlighting activity of their design on some unsuspecting delivery staff.

5. Link EL approach to PBL approach

This Objective was initially going to look at Lakes College and Derby College testing each other’s model. However, both parties couldn’t come to an agreement on what would work best for the models in their respective Colleges, so the decision was taken to convene a meeting towards the end of each other’s project to discuss the similarities, differences and learning points from both models.

Our focus at Lakes College has been promoting an active learning approach which we have called (LC)2 - Learner Centred Lakes College. The Experiential Learning Model has supported this methodology and encouraged our learners to be reflective practitioners through experimentation, evaluating and planning for future learning.

SANDY HARRISON
TEACHING ACADEMY CO-ORDINATOR
LAKES COLLEGE
The project was complex, with many different work streams and project partners involved. The project continued to evolve right until the end of the project. Due to this ever-changing environment, new project partners were appearing and there have now been a number of work streams identified for future work streams, which fall outside of the scope of this project, however these will be identified later in this report. They help to show the impact that the NCfN ELM has had on the Project Team, Lakes College and other interested parties.

The diagrams below identify those work streams and who was accountable for each:

- **VR OL**
  - Designed to test the use of VR within a learning environment.
  - Please see VR OL Report for more information.

- **Behaviours OL**
  - Designed to test the embedding of sector specific behaviours into the Curriculum.
  - This was not restricted to the classroom, but also to the NCfN Northern Hub Building.
  - Please see Behaviours OL report for more information.

- **Functional Skills Maths OL**
  - Designed to test the functionality of the model with lower level students.
  - Please see Maths OL report for more information.

- **Embedding Behaviours into Curriculum (Degree Apprenticeships)**
  - Designed to prove that embedding competencies into qualifications can be of benefit.
  - Please see Degree Apprenticeship report for more information.

- **Create and Online Transferable Model**
  - Create an Online transferable model that can be accessed.
  - Please see the following link: https://padlet.com/chrisf1/NCfN_ELM

---

The NCfN’s Experiential Learning model is being promoted by Teacher Education as a metacognitive approach, which supports learners on their journey to becoming autonomous, critical practitioners through reflective practice.

**DR FIONA DIXON**
PGCE LECTURER
LAKEs COLLEGE
I will continue to use this model in Maths and develop this financial topic in the future for all learners and believe it pays dividends both socially and in their math education and learners agree that these are valuable skills in life to learn and more interesting than standard Math.

SARAH GRAHAM
MATHS AND ENGLISH
LECTURER
LAKES COLLEGE

• Derby College were to test their PBL model and along with Lakes College, review both models and create a joint academic poster, discussing the key differences and similarities between the models.
• Please see Academic Poster for more information.

• The partnership between Lakes College West Cumbria and Lancaster & Morecambe College (LMC). A number of collaborative activities took place including CPD delivery by the project manager to over 80 LMC lecturers and trainers. This has led to the embedding of the ELM model into curriculum design within engineering & mathematics. This was supported by the Project Manager undertaking a series of formal observations of LMC classroom and workshop activities followed by individual and group feedback sessions on the application of ELM. This has now been embedded into the LMC quality improvement plan and the teaching, learning and assessment strategy for the next LMC OFSTED visit. Over 100 students have been exposed to the ELM approach.
• Please see letter from the Principal of L&M for more information.

• The partnership between Lakes College and the University of Cumbria was set up before the OTLA project. As part of the National College for Nuclear, both Colleges, host have a link to the local University. The University of Cumbria have established the criteria that prospective approved providers must produce evidence against prior to becoming an approved provider. They have also created an application form for providers to use to apply for approved provider status.
• Please see NCIN Approved Provider Framework Report for more information.

• The partnership between Lakes College and B&TC was set up before the OTLA project. As part of the National College for Nuclear, both Colleges, hold the Northern hub and B&TC host the Soutehrnhub. Being an approved delivery partner of the National College for Nuclear, B&TC must embed the NCIN ELM into their Nuclear curriculum. This is a stipulation on all future approved providers. Their learning has been embedded into the reports written by Lakes College.

• The partnership between Lakes College and B&TC was set up before the OTLA project. As part of the National College for Nuclear, both Colleges, host have a link to the local University. The University of Cumbria have established the criteria that prospective approved providers must produce evidence against prior to becoming an approved provider. They have also created an application form for providers to use to apply for approved provider status.
• Please see NCIN Approved Provider Framework Report for more information.
WORK READINESS

One of the major benefits of utilising the NCfN ELM is the ability to easily embed in work-based elements into the curriculum. The ethos of the National College for Nuclear, is to ensure that when students complete their studies, they are ready to enter the Nuclear industry with the relevant Knowledge, Skills and Behaviours required by the industry.

This is not restricted to the Nuclear industry. The NCfN ELM could be used by any industry/curriculum area to further embed the soft skills that employers want the students to develop prior to entering the workplace.

Within Lakes College and the National College for Nuclear Northern Hub building, the Project Team have been embedding Nuclear Behaviours into the building. This means that students studying within the building must adhere to strict nuclear related behaviours. Please see the Nuclear Behaviours Report, which can be found on the NCfN ELM Padlet page - https://padlet.com/chrisf1/NCfNELM

I feel I have gained more of an appreciation of the complexities of decommissioning work, especially in how the timescale and cost of even a simple task in an active area can quickly rack up. The team-working element, and particularly the people management element after the apprentices joined us was really good and will help support my future CEng application in leadership and management.
The NCfN ELM is versatile as it can be adapted to be used in any scenario. If a student already has experience in the subject being taught, then they may not need the spotlighting activities. They may be able to enter the ELM at the Rationalisation phase. At this stage of the model, they are learning the theory behind the subject being taught. The student may then realise that they don’t necessarily understand what they need to do be able to be at the rationalisation phase. They can either go to the spotlighting phase or they may even go to the sensing and experimentation phase.

For the model to be used as effectively as possible, the practitioners are required to identify relevant and informative Spotlighting activities. These spotlighting activities are pivotal in highlighting to the students why they are learning the subject area being taught. These activities should peak the interest of the students and ensure that they have an inquisitive attitude. This is a perfect opportunity to embed sector specific behaviours into the lessons. This will ensure that the students are being prepared for the workplace environment relevant to their sector.

The ELM has been shared within Lakes College at an internal FE conference as well as the internal HE conference. The Project Team have also delivered CPD sessions for Lancaster and Morecambe delivery staff and to a company called West Cumbria Works, which will be explained later in this report.

This project has enabled Lakes College and its partners to understand how work-based Knowledge, Skills and Behaviours can be embedded within the Curriculum. The NCfN ELM can be used as an effective vehicle to help drive change within Curriculum design. Embedding work-based skills directly into the curriculum structure, as well writing the course specification around the sector specific skills can enhance the student’s and the practitioner’s experiences. By adapting the curriculum from being purely academic in nature, to a course that highlights and builds upon the work-based skills required, this can increase student participation, engagement, enjoyment and therefore grades.
The NCfN ELM has already proven itself to be an effective learning model for embedding work-based skills within curriculum. There are both short and long term impacts as well as some good news stories and these are identified below:

**Short-term**

Additional business has been generated for Lakes College as a direct result of this project. A pilot scheme for a week long CPD course was delivered in June 2018. Please see the VR and Nuclear Behaviour reports for more information on the pilot scheme. A schedule is now in place for the delivery of additional ELM based courses totalling 80 learners. The first cohort takes place on the 4th February. The success of the ELM has been the main driver for this schedule and consequently sustainable process. These additional courses will provide Lakes College with a boost to income and has proven that employing teaching staff directly from the Industry can benefit an educational organisation.

The Lancaster and Morecambe Engineering and Maths teams have delivered curriculum utilising the ELM and observations that have been undertaken by the Project Team. 55 observations took place with positive feedback on the implementation of the ELM approach. Please see the good news stories section for more details about the short term impact the NCfN ELM has had on Lancaster and Morecambe College and the potential long-term impact it could have on their philosophy with regards to their approach to Teaching, Learning and Assessment.

The Functional Maths team have decided that they would like to continue to utilise the NCfN ELM for the foreseeable future. The OTLA lead from the functional Maths team has stated that she has really enjoyed utilising the model and that it has rejuvenated the functional maths curriculum. An increase of achievement rates with functional skills Maths was recorded for those participating in the ELM approach compared to none ELM, this amounted to a 2.2% increase in achievement. Please see the Maths report for more information.

The ELM is now also being implemented for engagement with the unemployed by a company called West Cumbria Works. They have devised a CPD course that is designed to give unemployed people the opportunity to develop their engineering and communication skills to boost their employability. The CPD course is called Fundamentals and the delivery staff are Engineers from the Nuclear supply chain. The Project team at Lakes College briefed the Fundamentals delivery team with regards to the use of the NCfN ELM and how they could utilise this model to increase the soft skills required by employers. The delivery team were impressed and had then planned their first CPD session around the use of the NCfN ELM. This was successful and the Lakes College Project Team were also involved in the delivery phase, by delivering a VR demonstration including the benefits of using VR in engineering.

A 28% increase (2018/2019 academic year from 2017/2018 academic
year) in female enrolment for the Level 3 ECITB Nuclear Engineering and Science course as well as the NCfN Degree programmes has occurred which is particularly significant as the new course designs follow ELM. The number of females enrolling on Engineering/Science courses is bucking the nationwide trend, as is the enrolment on to Degree Level Apprenticeships.

Long-term

The Maths team in Lakes College have now delivered Functional Skills Maths to Levels 1 and 2 students, which total 102 students. A 2.2% increase in achievement has been recorded. This modest increase has come over a short period of time. The ELM is now going to be integrated as a key delivery method for functional skills within the college delivery strategy. The Project Team believe that if an increase of 2.2% can be shown over a 7-week period then there is a possibility of showing a larger increase in achievement over the course of the whole academic year. The potential to increase achievement in what is usually a difficult subject to engage students, could be a major step forward for Lakes College in terms of student engagement. The feedback from the delivery team is very positive and they believe that it has had a significant impact on the way Maths is taught in to students who have previously had difficulty with Mathematics. This will have an impact on future students moving through the college curriculum, particularly ESOL learners.

The Project and Maths Team are excited about the possibilities that this brings, not only for the current students, but for future students.

One of the other positives from utilising the NCfN ELM for the functional skills maths, is the increased ability of the teaching staff to identify new
problematic areas for the students and thus increasing the support mechanisms that can be put in place. Such as a number of students being more confident to say that they can’t tell the time. This has enabled the College to put on extra support sessions for these students.

Lancaster & Morecambe College are implementing the ELM model within their QIP and SAR. The model will be utilised as a mechanism for enhancing TLA across the college. Please see the good news section for more information.

It was good to get a hands-on experience of the rig - we were able to dress up in full PPE as one would in a real decommissioning scenario. The virtual reality demonstration of the rig was also useful in training the apprentice in our team before experiencing the rig for themselves. I also learnt a lot about planning and safety cases - something I haven't had much exposure to in this secondment.

NUCLEAR GRADUATE
NDA

Good News Stories

- **Lancaster and Morecambe College** - Lancaster & Morecambe College’s (LMC) Principal approached Lakes College to share best practice and support and challenge, which has subsequently evolved to be a strong peer to peer collaboration. This collaboration has become a part of LMC’s journey back to ‘good’ and it was recognized that the Lakes College model for experiential learning would be valuable for developing a greater emphasis on learner centered, experiential activity. Lakes College staff have undertaken 52 paired walkthrough lesson observations as part of the peer to peer support and challenge arrangements. A key focus of these observations was to measure the extent that learning sessions were learner centered, with experiential leaning embedded into appropriate sessions across all curriculum areas. This is now
seen as a key component of good or better teaching at LMC, as judged by their own observation team. This will be further triangulated in February with the return of Lakes College colleagues to provide an objective measure of impact thus far. The Project Team have noted that LMC are utilizing the model as a way of improving their own TLA and have seen the NCfN ELM as a way to drive towards their next OFSTED inspection, as being one of the best news stories from this project.

- **The success within Functional Maths** - Lakes College West Cumbria (Functional Skills Mathematics). The ELM was integrated into the SOW and lesson plans of 8 control groups within the functional skills delivery totalling 102 students. A case study has been provided to demonstrate further detail. This exercise provided some very favourable results including the following highlights:
  . At this early stage in the academic year, an increase in pass rate of 2.2% has already occurred based on the previous annual total pass rate.
  . 97% of students within the control groups described an increased interest in Mathematics for real life experience.
  . Significant improvement in attendance
  . There is a statutory requirement for all KS3/4 students to be able to manage their money on a day to day basis and plan for future financial needs. The ELM provided a means to embed this into the curriculum and provided an interesting result from a poll. When asked ‘do you feel financially that you are in a position to study or live away from the parental home?’, the response was that after the ELM intervention, 66.8% of those who previously thought it was viable had changed their mind.
  . 19 ESOL (mainly Arabic speaking) students also engaged as an ELM control group with very high pass rates. Feedback from the students described how the nature of the delivery approach relating to life experience provided an opportunity to embed English and bring the Mathematics to life.

- **Embedding Nuclear Behaviours** – The Project Team feel that by embedding the Nuclear specific behaviors into different aspects of the project, this has been of benefit to the students. The staff within the Nuclear team have Industrial experience within the Nuclear Industry and have utilized their experience to naturally embed these behaviors in to their curriculum. The behaviors have also been successfully embedded into the day by day running of the NCfN Northern Hub Building. There have been two Level 6 Dissertations identified, which have now been started by Lakes College students. These projects will look at commissioning the Radiological Laboratory and also look at the further embedding of the relevant behaviors and security access arrangement for the NCfN Northern Hub building to best replicate the Nuclear Industry. This project has enabled a full range of further opportunities for staff and students alike.
How has TLA changed

The Project team defined Outstanding Teaching, Learning and Assessment utilising the NCfN ELM, from 3 different viewpoints. These are the Teacher, The Student and the Employers.

Teacher
Outstanding TLA should be seen as a target by all teachers. The NCfN ELM should enable the teachers to seamlessly incorporate work-based skills into their curriculum, without the need to fully change their delivery style.

Student
Outstanding TLA should enable us, as students, to pass the qualification without any fuss. The curriculum should be engaging and the teacher should feel comfortable with delivering the material utilising a number of effective delivery models.

Employer
Outstanding TLA should include the sector specific knowledge, skills and behaviours that the students require prior to entering their relevant industry. They should be delivered in line with the curriculum in a seamless fashion with minimal disruption to the students.

Within the different Project Partners, there have been a number of changes that have naturally occurred due to this project.

Lakes College

The NCfN ELM has already had a positive impact within both the Nuclear Team and the Functional Skills Maths Team. The Project Manager will be delivering a CPD session to the Teaching and Learning Practice committee to discuss the delivery of this project, the outcomes and to discuss the use of the new Lesson Plan format which has been generated for us with the NCfN ELM. It has been seen as a benefit within the Maths department and success stories are to be shared across the College.

It is hopeful that the TLP committee will sanction the use of the new lesson plan format across the college to allow other departments the ability to fully utilise the NCfN ELM. With the new inspection framework from OFSTED identifying the requirements for work-based skills to be developed within the curriculum, this utilisation of the NCfN ELM College wide will provide the other curriculum areas the opportunity to easily embed the relevant sector specific Skills, Knowledge and Behaviours. This use of the NCfN ELM will be embedded into departmental Quality Improvement Plans in the areas in which the Senior Management team feel the NCfN ELM could have a positive impact on the learners.
Lancaster and Morecambe College

The following impact statement was submitted by Wes Johnson, Principal of L&MC:

Lakes College Support – Experiential Learning

Lancaster & Morecambe College’s (LMC) Principal had first seen the Lakes College model of experiential learning demonstrated, highly effectively, during a ‘break-out’ session at the 2017 Association of Colleges Conference. He quickly recognized the transferability of this easily digested and effective model to his own situation. This prompted an approach to Lakes College which has subsequently evolved to be a strong peer to peer collaboration, based on sharing best practice and support and challenge.

LMC were delighted to welcome colleagues from Lakes College to deliver cross college staff development sessions in late August 2018. As part of LMC’s journey back to ‘good’ it was recognised that the Lakes College model for experiential learning would be valuable.

The staff development sessions in late August and subsequent peer lesson observations in November 2018 were intended to have whole college impact. 86 LMC staff attended the staff development sessions and were challenged to embed this into their own practice as appropriate, but with high expectations around a greater emphasis on learner centered, experiential activity.

Colleagues from Lakes College returned to LMC in November 2018 and undertook 52 paired walkthrough lesson observations as part of the peer to peer support and challenge arrangements. A key focus of these observations was to measure the extent that learning sessions were learner centered, with experiential leaning embedded into appropriate sessions across all curriculum areas.

Lakes College provided detailed feedback which has been embedded into LMC’s Quality Improvement Plan, prompting the introduction of a more structured lesson planning approach, with detailed guidance to support staff. This has been rolled across LMC for January 2019 as a clear expectation, further embedding an effective, experiential, learner centered approach.

This is now seen as a key component of good or better teaching at LMC, as judged by their own observation team. This will be further triangulated in February with the return of Lakes College colleagues to provide an objective measure of impact thus far.

Although the long-term impact of this new approach is continuing to emerge, the Lakes College support and their model for experiential, learner centered learning is a key element of LMC’s plans to drive up standards in all curriculum areas.

‘I have really enjoyed producing a different reflective journal each week. I have found that it helps me to distinguish where I need extra help and focus more on certain subjects. The new learning model helps to highlight to us the work-based skills required by the nuclear industry’

LEVEL 3 STUDENT
LAKES COLLEGE
Bridgewater and Taunton College

Working with employers, Bridgewater & Taunton College have recognised that new vocational routes in to nuclear skills are imperative, but ‘learning by doing’ in a live nuclear environment is impossible. Therefore, this project has become an important component in making students ready for the sector when progressing from their respective training programmes.

The College’s use of scaled industrial models and integrated technologies such as Virtual Reality (VR) simulation to develop a practical, project-based curriculum, that allows unskilled and unqualified personnel to discover, experiment - and even fail - in a risk-free nuclear environment. The learning environments closely replicate the nuclear workplace and enables learners, as if at first hand, to experience, understand, assimilate and acclimatize to the workplace culture.

These simulated environments enhance their employability, creating career progression opportunities and facilitating transition between sectors. Crucially, it also minimizes their induction time in the workplace.

The practical project/object-based pedagogy also offers opportunities for young people from a wide range of backgrounds who are considering a nuclear career to assess career suitability, access specialist skills training and gain the necessary protocols and behaviors for licensed sites.

In addition, to enhancing the pedagogy, the learning environments have been created in which interdisciplinary groups (mechanical, electrical, nuclear physics, scientists and project managers, at Levels ranging from 3 to 6) work together on multiple projects, as would happen in the workplace.

The project-based, teamwork approach facilitates a deep understanding of differing and sometimes conflicting priorities. Pitching learners from SMEs alongside those from vast multinationals, creating an environment in which mentoring, networking and knowledge exchange can thrive will aid in the facilitation of career progression and career transition, which will become necessary as new skills shortages and training priorities emerge.
ANALYSIS AND CONCLUSIONS

The main area of analysis will be from the Maths OL report from the Lakes College Maths department. There is also some data that has been collected from the NCfN Level 3 students who are currently on programme.

Functional Skills Maths

There were 102 students who completed the 7-week Functional Skills Maths programme. It was decided by the tutor at this point not to tell the groups that they would be part of a controlled project. The growth mindset was set from the start with expectations and the scheme of work for the half term briefly. In most cases – students were puzzled by the topics but were almost relieved that it was something different from the “same old math”- that 88% did not like at all.

After undertaking the Initial assessment, the report showed that only 3 learners were currently reaching level 1 math. The cohort broke down as follows:

Math history profiles of learners became extremely valuable all learners have failed in math exams – some many times. Their confidence is rock bottom. The following questions were asked and the students’ responses are also charted below:

"Report writing is usually a boring subject, however, when the NCfN ELM was used it became more of a practical based lesson. We were constantly developing our skills by writing "report like" things, for example the reflective journal, so we are always improving on our techniques.

However, in other lessons like chemistry and maths, where it is more theory based, and more specialised, the NCfN ELM came into its own. Rather than being hit with theory straight away, the ELM allowed the tutor to utilise more practicals to highlight why we were learning a particular skill. The way I have been taught has been helpful to me as it was presented in a way that was easy to understand, with the tutor ready to answer any queries or questions we had. Some of the informal parts of lessons were also good, I feel, as it made us more relaxed and made it easier to ask for help. As someone who struggles often with anxiety I found this aspect of report writing very comforting as it allowed me to be comfortable with the tutor, thus encouraging me to ask for further explanation if I needed it.

LEVEL 3 STUDENT
LAKES COLLEGE
The students were asked about their previous experiences of maths. Their responses are as below:

1. Commented on a mix of teachers and styles.
2. Were put in front of a textbook or non-math specialist.
3. Admitted to behaving badly just to be thrown out of class.
4. Were anxious about being in a classroom because they were homeschooled or attended a PRU.
5. Said they were bad at maths and thought they would fail again.
6. Thought that Maths was not relevant to life or them.

Some learners did have good teaching and just struggled but the majority had a very negative view of a beautiful subject.

After completing the initial assessments all learners undertook a diagnostic assessment at the level they needed to achieve.

Please see the Maths OL report for more information on what each of the 7 weeks entails.

During programme 2 over 19, Level 2 apprentices passed after the intervention in the first exam sitting and 9 full time learners passed at the last stage of the intervention. Another 16 learners are due to sit in the new year.

The achievement rate at present, after this intervention is currently 28.8% which is 2.2% higher than last year already. Learners from the uncontrolled groups are not included in this data, as they were not ready to sit an examination at this stage. This statement alone says a lot.

Cohort D gave the most positive feedback and enjoyed the ELM more than any other group, especially the art vocational area. Every learner had excellent attendance and completed the independent work – interestingly, this cohort had the learners that struggle academically.
Cohort E gave the least positive feedback and enjoyed it the least, probably because this cohort had extreme behaviour problems and SEN issues – the cohort completed the project but not all learners completed the tasks. Although attendance was good, progress for the most of this group was not as high as the rest of the groups. I believe this is because there was maybe too much challenge causing engagement to drop and cease.

Cohort A has progressed academically faster than any others – this is the only group with over 19 learners in and although ESOL learners present a different challenge in math learning, in this learning process it supported the learners and paid dividends in many ways for them. The group have a tight bond, their English speaking has progressed and half of the achievement rates so far have come from this cohort.

Lastly, Cohort B had the poorest attendance, which was almost 35% lower than other cohorts. This was because of a lot of social and emotional problems within the Hair & Beauty area. The learners engaged in the project but made progress still had confidence issues with Math in many cases.

The uncontrolled groups had poorer attendance overall than the controlled groups.

The purpose of study in the Mathematics programme clearly states that it is necessary to prepare students to be financially literate. The curriculum for Mathematics aims, states that “students should apply their knowledge, interpret and solve problems in financial contexts”

Beyond the math syllabus there is a statutory citizenship programmed that all KS3/4 students should be able to manage their money on a day to day basis and plan for future financial needs.

97% of my cohort said that they gained significant knowledge from this intervention/project. 66.8% of them no longer want to leave home as they realize the cost of living.

As a contraindication of this experiential learning, it is known that 31.2% of Math learning have difficulty telling the time, this has enabled a time intervention workshop to be set up for these learners.

Pass rates are already increased by 2.2% from 26.6% last year in FS Math. This experiential learning without a doubt has had a big impact on this increase. All learners attempted the assessment and working out and problem solving has improved by using this model, although not always correct. In most cases students maintained interest, learned successfully and completed their tasks.

The decision to keep the learners from knowing that they are part of a project was as significant as “When interest is internal, as opposed to being forced, students become both emotionally and intellectually invested in the learning process”

I will continue to use this model in maths and develop this financial topic in the future for all learners and believe it pays dividends both socially and in their math education and learners agree, that these are valuable skills in life to learn and more interesting than standard math.
**Level 3 Students Feedback**

The Project Manager utilised the NCfN ELM for their Action Research paper as part of their PGCE qualification. The research focused on the utilisation of Spotlighting activities in particular and whether they increase the student’s ability to understand why they are learning about a particular subject. The findings were positive and the students reacted well to the research.

In essence, the Project Manager utilised TED Talks to highlight skills that the students studying on the L3 ECITB Nuclear Engineering and Science course, require for their Study, Presentation and Report Writing Skills module. Each video was specifically identified by the Project Manager, to showcase a particular skill. These videos were used as spotlighting activities to help the students understand why they are studying the module content.

Solo Taxonomy was used in each lesson to help evaluate each intervention. The students were asked to mark where they think they are in terms of their understanding a particular subject on the solo taxonomy scale. They were then asked to mark themselves again after the spotlighting activities. The results are tabled below:

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Start/End of session assessment</th>
<th>Average response</th>
<th>Change in Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication in the workplace</td>
<td>Start</td>
<td>2.42</td>
<td>+1.42</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>3.83</td>
<td></td>
</tr>
<tr>
<td>What do top students do differently?</td>
<td>Start</td>
<td>1.92</td>
<td>+1.00</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>2.92</td>
<td></td>
</tr>
<tr>
<td>How to avoid death by powerpoint</td>
<td>Start</td>
<td>2.42</td>
<td>+0.83</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>3.25</td>
<td></td>
</tr>
<tr>
<td>The Super Mario effect (why not to be worried about failure)</td>
<td>Start</td>
<td>1.42</td>
<td>+0.83</td>
</tr>
<tr>
<td></td>
<td>End</td>
<td>2.25</td>
<td></td>
</tr>
</tbody>
</table>
It is clear to see that the students understanding of the particular subject being covered increased over the course of the lesson. This shows that by utilising spotlighting activities, the students can increase their understanding of a subject in a rather short space of time.

The students were also asked to keep a reflective journal over the course of the module. Being reflective plays a major part within the NCfN ELM. The students should keep a critical account of their learning whilst studying within the NCfN ELM. This allows them to look back at work completed under some of the sections of the ELM and allows them to connect their learning together. This can also highlight any opportunities to adapt and change their learning and highlight if they need to return to a specific section of the model. When asked to reflect on their studies and the utilisation of reflection, the following feedback was received:

‘I have really enjoyed producing a different reflective journal each week. I have found that it helps me to distinguish where I need extra help and where to focus more on certain subjects. The new learning model helps to highlight to us the work-based skills required by the nuclear industry’

‘The thing I enjoyed the most was the fact that I didn't get given a plan to work with, I got to make my own which made me more determined to follow it.’

‘Reflecting has helped me as it allows me to go back and look at weeks previous and see what I have done better or worse in the current week, this allows me to keep on improving and finding better ways to achieve the goals set out in front of me. It also acts like a form of personal planner, where I can see what sort of work I have been up to in the previous week, and remind me of anything I need to work on or study for if I have forgotten.’

It is clear from the responses above that the students enjoyed reflecting on their experiences on a weekly basis. This allowed the students to then set themselves SMART targets to focus on weaker areas and potentially return to specific areas of the model.

The students were also asked other related questions and their responses are as below:
<table>
<thead>
<tr>
<th>How did you find the lecturers anecdotes regarding the Nuclear Industry?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Useful</td>
</tr>
<tr>
<td>Not Very Useful</td>
</tr>
<tr>
<td>Somewhat Useful</td>
</tr>
<tr>
<td>Useful</td>
</tr>
<tr>
<td>Very Useful</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How much does your teacher encourage students to think for themselves?</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>A Little</td>
</tr>
<tr>
<td>Moderately</td>
</tr>
<tr>
<td>A Lot</td>
</tr>
<tr>
<td>A Great Deal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How was the speed at which the tutor presented the course material?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Much Too Fast</td>
</tr>
<tr>
<td>Too Fast</td>
</tr>
<tr>
<td>Just Right</td>
</tr>
<tr>
<td>Too Slow</td>
</tr>
<tr>
<td>Much Too Slow</td>
</tr>
</tbody>
</table>
Barriers to Learning

There have been some barriers to learning identified with the NCfN ELM. These are as follows:

- **Scaffolding for students to be able to develop their ability to learn in a more instructed participative approach where they discover the learning and are not passively receiving information. This takes time and requires a curriculum that has been designed with the NCfN Curriculum in mind.**
- **Support for staff to develop the ability and confidence to develop these delivery approaches. This also takes time and would require industrial knowledge from the lecturer to better embed the sector specific Knowledge, Skills and Behaviours.**
- **Time & Cost - in order for staff to have the space to develop these delivery strategies and time to build a curriculum around these pedagogies requires time and associated costs both of which are in short supply in the FE Sector.**
- **Early engagement with employers is absolutely key to ensuring that they buy in to the curriculum that is being designed.**
- **Difficulties arose with communication between some partners. This was due to misconceptions of the project requirements of each partner and the geographic distance.**
- **At points within the project, considerable work load pressures were experienced by partners which created delays in report generation.**
- **FE teaching loads impeded progress particularly within the Lakes College Nuclear team relating to the implementation of new programme designs. This is counter intuitive in some ways as the programmes contributed to the project outcomes.**
- **Requests for data from partners proved to be difficult. This was primarily due to the nature of the project and the manifestation of implicit metrics which made data collection difficult.**
- **Initially ample time was allocated to the project team but through the implementation of the ELM, the NCfN department has grown rapidly with a 100% increase in student numbers and an additional three programmes coming on line. This in itself can be seen as a success of the ELM approach but it has had a significant negative impact on the project timelines.**
Lessons Learned

There have been a number of lessons learned with this project:

- This has been a difficult but rewarding introduction to the world of FE for the Project Manager. Having only been in FE/HE for 6 months prior to managing this project, the Project Manager has found it a challenge to manage the balance of time between the project and their day to day responsibilities. However, they feel that this project has enabled them to grow as an FE/HE lecturer and they have now been promoted to Curriculum Team Leader (Nuclear). Without managing this project, they feel they would not have been in a position to apply for that position.

- The scope of the project objectives were challenging given the number of project partners involved, the budget and external pressures.

- The NCfN ELM is an effective delivery model for embedding sector specific Knowledge, Skills and Behaviours into the curriculum seamlessly.

- Students and delivery staff have enjoyed utilising the NCfN ELM and have proven that it has real benefit in the learning environment.

- Lancaster and Morecambe College have identified the NCfN ELM as a delivery model that can help drive positive change to their TLA processes.

- The NCfN ELM can be used to increase student engagement as well as their attainment in Functional Skills Maths in what is usually a difficult subject to engage students.
Future Work Streams

- Ongoing embedding of NCfN ELM into NCfN Curriculum
- Lakes College Maths department will continue to utilise the NCfN ELM.
- West Cumbria Works are utilising the NCfN ELM for their CPD courses for the unemployed and will be supported by the Nuclear Team at Lakes College.
- Future CPD courses for graduates and apprentices have been organised and are being delivered utilising the NCfN ELM.
- Bridgewater and Taunton College will be continuing to utilise the NCfN ELM in their nuclear curriculum.
- Lancaster and Morecambe College will continue to embed the NCfN ELM into their curriculum to help drive positive change to their TLA and will be working closely with Lakes College in collaborative partnership.

TAKEAWAY MESSAGE

This extension project has enabled the NCfN ELM to be part of a drive for positive change in a number of training providers and employers. This project has given the NCfN ELM the level of exposure that we, as a Project Team, believe it should have. The Team believe that this model should be utilised in T level delivery as it can have a positive impact on student attainment and enjoyment, but it also allows the seamless incorporation of sector specific work-based Knowledge, Skills and Behaviours. T Levels are going to be vital for the future of technical education in the UK and the NCfN ELM should be a part of that story.
PROJECT OUTPUTS

The full list of project outputs from both Phase 2 and Phase 3 of the OTLA project can be found at the following link:

https://padlet.com/chrisf1/NCfNELM

The following is a list of what can be found on the Padlet:

- NCfN ELM Diagram (Phase 2)
- Rationale for the NCfN ELM (Phase 2)
- Literature Review (Phase 2)
- New Lesson Plan Format (Phase 2)
- Lesson Plan Case Study (Phase 2)
- Electronic Version of NCfN ELM (Phase 2 and 3)
- NCfN Approved Provider Framework (Phase 3)
- VR OL Report (Phase 3)
- Nuclear Behaviours OL Report (Phase 3)
- Degree Apprenticeship OL Report (Phase 3)
- Academic Poster (Phase 3)
- Functional Maths OL Report (Phase 3)
- Project Case Study (Phase 3)