Does structured questioning and active learning stretch and challenge learners thinking?

QUEST - a new taxonomy for learning

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August 2014

City of Bath College

SUNCETT
University of Sunderland Centre for Excellence in Teacher Training

Contents

1. Acknowledgements

The lecturers and learners within City of Bath College have contributed enormously to the project with enthusiasm, giving thoughtful and insightful feedback which was much appreciated.

Significant support was gained from an inspiring College Senior Management team when the Sports learners (Harry, Michael, Charlotte and Jacob) presented the findings of the project to them at the end of Phase 1. The learners became the voice of the project with their overt enthusiasm.

The work of Pam Hook and Chris Biffle led us to having very healthy debates on teaching and learning in view of what is currently happening abroad. Pam was very kind to point us in the right direction. Chris was kind enough to give us permission to reference his work.

Sarah and Jenny, who were kind enough to give direction when needed.

2. Abstract

In the past some learners have been overheard asking lecturers to help them complete assessments. The perennial issue has been that some teachers have found themselves spoon-feeding their learners to complete assessments. This prevented some learners from becoming autonomous thinkers.

The purpose of this action research was to establish whether structured questioning and active learning could stretch and challenge learners. The researchers, based at the City of Bath College as Learning Development Coaches, used action research to ascertain whether structured questioning and active learning could stretch and challenge learners thinking. Data was sourced and collated from teaching observation reports (from 2011-13) and qualitative/quantitative data from 350 learners and 50 lecturers over a period of three phases during one academic year (2013-4). Each phase of the project involved different lecturers and learners using resources that developed during use. This enabled us to gage impact and implement changes at each phase.

The scope of the research was to engage learners through peer questioning formulating questions within a hierarchical structure with a range of verbs from the cognitive, affective and psychomotor domains. The verbs and questions needed to be flexible in order to use the hierarchical structures so that the resources could then be adapted for Entry 3 level programmes to Degree levels 5 to 7.

Initial research into the use of SOLO taxonomy (Structure of Observed Learning Outcomes) used in the New Zealand Curriculum (Biggs and Collis,1982) and active learning (Whole Brain Teaching) used in California (Biffle, 2013) gave us the confidence to explore other taxonomies in developing a new concept.

The results were varied depending on the “mindset” of the lecturer when using the resources. However, there was strength of evidence from qualitative feedback from learners in support of using the structure to “stretch and challenge” their thinking.

An enthusiastic Harry Lee, a level 3 Sports student who has experienced using the cards consistently for this academic year quotes:

> *“I really don’t think I would have achieved the outstanding grades and been offered my first choice University without QUEST. I would like to thank you.”*

3. Introduction

As a part of the coaching and development team in City of Bath College, the researchers decided to invest their time in active research into a perennial issue of how lecturers were stretching and challenging learners through questioning. This aligned with the College's mission statement (2013) enabling learners to be autonomous thinkers ready for progression into employment or Higher Education.

The rationale for selecting the topic of questioning was based on the results taken from observation reports from 2011 to 2013 which highlighted the need to develop teaching strategies for stretching and challenging learners during formative assessment.

3.1 What is Stretch and Challenge?

In the Ofsted Handbook (2013), Inspectors are asked to consider aspects of stretch and challenge relating to the quality of how well lecturers inspire and challenge learners whilst developing independent learning through setting high but realistic expectations.

Within this body of work the researchers have defined 'stretch and challenge' as

> *"The ability of a learner to become autonomous in thinking and be able to conceptualise their learning."*

3.2 Working with Taxonomies as a framework for stretch and Challenge

The researchers explored a variety of taxonomies which encompassed the three domains: affective, cognitive and psychomotor with the idea of supportively challenging learners to develop their thinking. SOLO (Structure of Observed Learning Outcomes) taxonomy in New Zealand developed by Pam Hook (2011) and Whole Brain Teaching in United States developed by Chris Biffle (2013), provided a platform for the exploration and the development of active learning resources. Whilst Bloom's and SOLO taxonomies were hierarchical, Dee Fink's taxonomy covered a cross section of the cognitive and affective domains (Dee Fink, 2003). Dee Fink bears a similarity to Anderson's (Anderson, 2001) taxonomy with an emphasis on learning to learn (metacognition) but also embraces a 'human dimension' in socialising learners.

3.3 Developing questioning and peer-to-peer focus to implement stretch and challenge

The researchers posited the question, if and when the focus of learning was on the learner, could peer teaching and assessment through questioning really make them think? Evidence from Biffle's work suggested that learners engaging in peer teaching and assessment, through verbalising and internalising their thoughts, improved their ability to write and scaffold their thinking in a logical format. The researchers developed a method of scaffolding verbs using a range of learning domains and stem questions to develop the use of language that would encourage autonomous and higher levels of learning.

3.4 The evolution of our research

In response to the research and desire to stretch and challenge learners, the project was designed in three distinct phases:

- Phase One using question cards
- Phase Two using revised interactive cards
- Phase Three on line resources with interactive cards/games/tests/trails

4. Literature Review

In order to develop a valid line of enquiry using Action Research, Metcalf argued that action research should be open-ended and was fluid in development. Metcalf's approach was referred to in the guidance of the initial research, as this resonated with the developmental theme being pursued.

> *"It begins with an idea that you develop. The research process is the developmental process of following through the idea, seeing how it goes, and continually checking whether it is in line with what you wish to happen" (Metcalf, 2002 p.3)*

Whilst proposing open-ended research, there needed be a plan to ensure an impact was made within the college; giving lecturers a framework on which to build questioning techniques where they had immediate access to resources and could then measure the impact.

4.1 Developmental Process

The research stemmed from the concern noted in observation report which comments on 'Stretch and Challenge' of learning through questioning. This led to research on taxonomies notably Bloom's, Anderson, SOLO and Dee Fink in how hierarchical structuring of active verbs can be used in stimulating questions through active learning strategies.

This exploration was important to learners and to lecturers as previous interventions through coaching had not made any significant impact on improvements in questioning or 'stretching and challenging' the learners.

4.2 Taxonomies from Bloom to Fink via SOLO

It was discovered that some lecturers were using evaluative listening which did not 'stretch and challenge' the learners. The decision was made to change the emphasis on learning in line with Ofsted observation criteria. This is supported by Wiliam,

> *"What such teachers seek to learn from the learners responses is not, "Did they get it?" but rather, "What can I learn about the learners' thinking by attending carefully to what they say?" (Wiliam, D. 2011 p.85)*

A framework was built which supported ‘stretch and challenge’ through active learning using questioning. Taxonomies by Bloom (1956), Anderson and Krathwohl (2001) provided the ‘bones’ of developing a resource for questioning. The cognitive domain had the hierarchy of categories that captured the learning process and the six key stems gave a basic framework on which to build questions. Cards and posters were developed during 2011, (fig.2 and fig.4 page 17) targeting key verbs for reminding lecturers to use challenging questions and for writing objectives.
This was effective in guiding lecturers when writing objectives, however it was limiting when engaging learners in asking questions as the resource were lecturer led. The cognitive domain was predominantly used in questioning and this lacked the ‘stretch and challenge’ for learners, as they were not internalising (valuing) or contextualising their learning. It was difficult to measure the true impact of the use of these resources as no measures were in place, just limited feedback from lecturers. The cards represented a “bare bones” structure for learning, more exploration was needed on how the use of questions by learners could develop their own ‘stretch and challenge’ thus ensuring the increase of autonomous thinking.

An alternative taxonomy was reviewed, Structure of Observed Learning Outcomes (SOLO) which was devised by John Biggs and Kevin Collis in the 1970’s and 1980’s. Biggs classifies SOLO as:

> *“a means of classifying learning outcomes in terms of their complexity, enabling us to assess learners’ work in terms of its quality not of how many bits of this and of that they got right” (Biggs, 2013)*

What was found to be of interest was the way learners were able to self-assess progress and peers performance through teaching and assessing each other. SOLO has been successfully embedded into the New Zealand National Curriculum by Pam Hook.

The SOLO model of learning describes levels of thinking that can be observed in the classroom and is learner focused. Hook reports that learners are:

> *"Able and motivated to monitor their own progress in a learning task and to make smart decisions on their next steps. Schools using SOLO, report improvements in student learning outcomes; a raise in student confidence and increases in student engagement in learning." Hook (2013)*

Bloom's and SOLO taxonomies are in their own rights powerful tools to adopt for structure and cognitive development. The decision was made to explore new taxonomies in action which could give breadth to the project development. Whilst Dee Fink is associated with curriculum design, he advocates learning outcomes in terms of a six part taxonomy. The notion that knowledge, understanding, remembering information and ideas, by being critically creative and practical in thinking were key to developing learning. The sharing of ideas with peers and the community meant that the development of the human dimension of learning about oneself lead to caring and developing new interests and learning how to learn. The inclusion of discussion by Dee Fink would give balance by incorporating key social factors which would impact upon the 'stretch and challenge' concept within the classroom.

4.3 Ideas for creatively implementing questions

4.3.1 Whole Brain Teaching

The research into different taxonomies directly linked into the work of Chris Biffle, who has developed a technique that directly impacts on how learners learn, called Whole Brain Teaching (WBT). The technique uses a combination of direct instruction and co-operative learning wherein the lesson is structured and split into concepts to be learnt delivered by the lecturer. Learners then practice verbalising the concept with each other, followed by checking of comprehension by the lecturer. Biffle cites Macias and Macias (2013) that the problem solving and verbalising technique developed by the learners through co-operative learning is supported by Thousand, Villa, and Nevin (1994) and is described by five key elements to co-operative learning:

- *Clearly perceived positive interdependence*
- *Considerable promotive (face to face) interaction*

- *Clearly perceived individual accountability and personal responsibility to achieve the group's goal*
- *Frequent use of the relevant interpersonal and small group skills*
- *Frequent and regular group processing of current functioning to improve the group's future effectiveness. Biffle, C. (2013 pg.179)*

The pace of WBT engages the learners as it uses the five key elements and has the lecturer in control of the process. There are opportunities for learners social skills to be developed as learners are interacting with each other on an individual, paired and group basis.

4.3.2 Social Learning Theory and Communities of Practice

Biffle cites Macias and Macias directly linking the theory underpinning WBT to:

> *"Vygotsky's Social Learning Theory and Wengers's (2006) framework Community of Practice" Biffle C. (2013 pg.179)*

The theory behind WBT resonated strongly with the structure and ethos of the project aims which were focused on 'stretching and challenging' learners; enabling learners to become autonomous. However, the structure of WBT didn't assimilate more fluid and flexible structure of using questions as a tool for 'stretching and challenging' learners.

According to Biffle (2013) Vygotsky's Social Learning Theory contended that there must be a more knowledgeable other (MKO generally the teacher) whose given understanding of a topic is at higher level. The MKO facilitates the learners learning through social interaction. This amounts to being aware of the Zone of Proximal Development which:

> *"Is the gap between a student's ability to solve a problem with guidance and his or her ability to solve a problem independently" (Biffle C. 2013 pg.180)*

There was a need to take into consideration the zone of proximal development in the research, as this could enable learners to become autonomous learners through the use of a structure which had flexibility in the verbs and stem questions used.

Wenger's framework of Community Practice (2013) has three domains which reflect upon the development of shared interests in the vocational subject, the community classroom activities and the shared practice.

Biffle's, Vygotsky's and Wenger's theories and frameworks enabled the researchers to develop the resources, when considering 'stretching and challenging' learning as the interaction of learners in a motivated and autonomous way would change the learning behaviours.

Critical to the development of the project was the belief that learners needed to make sense of learning by actively constructing their knowledge, using scaffolding in support of the process.

4.3.3 Active Learning Theories

The constraints of solely using Bloom's taxonomy did not take into account the psychomotor and affective domains of learning. This proved to be a factor in limiting the range of participants within the research. On reflection, it was agreed that there was a flaw in the base concept of just using Bloom's taxonomy. A wider scope in using a range of active learning theories was considered as a positive way of forward.

McLeod (2008) cites Bruner's work suggesting that a learner even of a young age is capable of learning any material so long as the instruction is organized appropriately; this involves scaffolding learning to build confidence and skills through a social and active learning environment. It also gives opportunities for the learner to revisit concepts and ideas over a period of time in order to extend and develop those concepts and ideas thus challenging and motivating the learner. With this in mind, development of a modified compilation of taxonomies was used in development of verbs and stem questions in the resources.

The training of lecturers and learners needed to be directly linked into active learning pedagogy combined with resources that could be used immediately and with confidence. Active learning has received considerable attention and has attracted strong advocates such as Petty (2009) and Biffle (2013). It has proved problematical to accept a definition for all of the vocabulary surrounding active learning. Prince (2004) has produced a comprehensive review of the research on active learning,

highlighting that whilst empirical support for active learning is extensive, there may be confusion of labelling the methods of active learning.

Bonwell and Eison (1991) cites evidence from McKeachie on one form of active learning which was *discussion*. McKeachie commented that discussion surpassed traditional lectures for retention of material, motivating learners for further study and developing thinking skills.

This is further supported by Schroeder who Silberman cited:

> *"learners prefer learning activity that is concrete active to activity that is abstract reflective by a ratio of five to one.. Learners adapt quite well to group activities and collaborative learning" (Silberman 1996 pg 5)*

This being the case then development on the project needed to be aware of the learning preferences preferred by learners when developing resources.

The research into active learning and taxonomies provided the confidence to develop the concept "Does structured questioning and active learning stretch and challenge learners?

4.3.4 The importance of Motivation

Theories of motivation were taken into consideration when dealing with a variety of lecturers who were working with over 350 learners. Carol Dweck (2013) posited that,

> *"A fixed mindset, people believe their basic qualities, like their intelligence or talent, are simply fixed traits. In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work" http://mindsetonline.com/whatisit/about/index.html accessed 12.06.13*

This being the case, using a growth mindset, lecturers would be able to enhance relationships, increase productivity and motivation. We recognised that the project may encounter barriers to using active learning strategies; the real breakthrough would be changing that mindset by trying a new strategy. Paradoxically, failure is a key part of achieving excellence. The question that needed to be asked was, could training and support from peers who are outstanding improve performance and change mindset?

4.3.5 Linking theories to research

The chart found below demonstrates how the theories referred link into the research.

5. Methodology

An investigation was required to find out whether or not the uses of the cards and on line resources were making an impact on learning, particularly 'stretch and challenge'.

The same methodology for each phase of the project i.e. a mixture of learner and lecturer questionnaires, practical trials of learning resources designed in response to the exploration of creative implementation (Cards and Quest) and feedback sessions.

Identifying the problem July 2011

Initial research using data from observation reports *questioning* identified as needing development

"Stretch and challenge" became the focus for the coaching team in college

Random use by lecturers using of cognitive domain verb cards

Training of the use of cognitive verbs to write objectives

Phase 1 July 2013 –January 2014
Initial pre-test of knowledge of verbs
Active use of cards with verbs and questions: 10 lecturers 163 learners
Verbal and written feedback from lecturers and learners using QUEST and lecturers who would not use the resources
Action: Development of interactive resources / training & further research into taxonomies; exploration of barriers from staff to using student centred active learning

Phase 2 January 2014 – April 2014
Active use of new cards with verbs and open stem questions: 8 new staff and 200 new learners; 2 staff and 50 learners from Phase One; senior management of college
Active learning activities given to staff to experiment using resources
Verbal and written feedback from staff and students
Action: Development of online resources; expansion of verbs using affective and psychomotor domains; research into motivation to overcome barriers and changing mindset

Phase 3 April 2014 – September 2014
Review the observation feedback for staff using QUEST
Promote active use of on line trail with 10 staff who teach from Entry level to higher education courses
Explore the development of a website with resources on line to be shared by learners and staff
Train at least 70 staff in the use of the on line resources
Train 25 learners from Phase one to design their own QUEST trails
Develop discussion groups to overcome barriers (change of mindset) via on line discussion and group meetings
Develop relationship with BET (Bath Educational Trust) which comprises of Bath University, Bath Spa University and secondary schools in Bath with a view to submitting a bid for further development
Develop relationship with Chris Biffle in sharing resources

The decision to use qualitative feedback meant that there was access to reliable, valid and practical feedback from the learners and lecturers during each phase. Whilst some criticism of using qualitative research lies in the use of small and not necessarily representative samples, it was felt that we had a captive audience within

the college and therefore access to the valid “learner voice” and lecturer feedback. There was a lack of true rigor of this action research as it lacked the link from qualitative data to quantitative data, which could question the biased view of the team.

6. Ethical Considerations

Within the context of this research consideration is given to the participants, both learners and colleagues from the City of Bath College and the organisational policies which ensured that all were treated within the scope of the Equality Act 2010.

During the research, verbal voluntary informed consent was gained from all participants. Particular attention was paid to the use of multimedia & social networking activities and an “opt out” or “right to withdraw” clause was made available for those who did not wish to participate in the use of video or activities.

It was ensured that participants understood the nature of the research and were invited to take part in feedback sessions at the end of each phase to the research team and Senior Management.

Participants were debriefed at the end of each phase and feedback from them was taken into account in the development of QUEST.

Participants were referred to in their full name and subsequently by first name and initial. However, pseudonym first names were used for those participants who wished to remain anonymous.

The organisation referred to in this research is City of Bath College. The Principal of the College has endorsed this research and currently holds the Intellectual Property Rights of the resources that have been developed, whilst acknowledging the funding and support from the Education & Training Foundation.

The project adhered to the Ethical Guidelines for Educational research (BERA 2011) that has been provided and endorsed by the sponsor of the research SUNCETT.

7. Identifying the initial problem July 2011

Areas for improvement	No. of	%
Learning checks	15	25%
Attendance/lateness	14	23%
Management of learning	14	23%
Differentiation	10	16%
Planning	8	13%

Fig.1 Areas for Improvement

Observation summary 2011-12

The core issues of 'stretch and challenge' through *questioning* was framed within the context of a consistent theme arising from observations during 2010-11. The key areas highlighted were assessment of learning; differentiation; checking of learning; independent learning; assessment for learning (fig. 1). This accounted for 39% of improvement notes made.

Fig.2 Bloom's verbs used for extending discussion in groups 2011

One solution was developed by training the lecturers in writing *"Blooming good objectives"* using Bloom's taxonomy of hierarchical verbs and cue cards (fig.2). The cards were given to lecturers as an aide memoir when asking learners questions or for the learners to use to ask questions. This focused primarily on the lecturer, using active verbs to start each objective and question. This was limiting in terms of developing questioning and was lecturer focused. It did not employ the "scaffolding" supported by SOLO and Biffle's active learning approaches.

Fig.3 application for writing verbs

The second solution centred on using a structured approach to writing verbs using an application (fig 3).

Fig.4 cue cards

This was supplemented with the use of cue cards (fig.4), which used a selection of Bloom's verbs with questions for the lecturer and learners to use. There was no monitoring of the success of the use of these resources therefore no comment can be made as to the effectiveness of these resources. The resources continued developing with the belief that learners could 'stretch and challenge' their own learning by engaging with peers through questioning.

Area for improvement	No.	%
Attendance/lateness	13	19%
Assessment OF learning	2	3%
Differentiation	8	11%
Checking of learning	11	16%
Classroom management	2	3%
Independent learning	4	6%
Planning	11	16%
Assessment FOR learning	5	7%
Resources	5	7%
Links to work	0	0%
E&D	8	11%
ILT	1	1%

Fig. 5 Areas for improvement

Observation summary 2012-13

The main criteria for observations changed significantly in 2012-13 to focus on the learning taking place. The results of the observation report 2012-13 (fig.5) provided some data in support of the view that there was an improvement in the checking of learning by 9% and differentiation by 5%. There were still areas that were highlighted as in need of improvements notably*: independent learning; assessment for and of learning* in total 16%. This indicated that the learners really did need to become actively involved in their learning process.

8. Phase 1: July 2013 –January 2014

Research into Biffle (Whole Brain Teaching): Hook (SOLO taxonomy): Anderson and Krathwohl (Bloom's taxonomy revisited) initiated the concept of using a range of hierarchical verbs and structured questioning to elicit the 'stretch and challenge'. Laminated cards were designed and issued to ten lecturers. The lecturers had been selected on the results of observation feedback – they were either a grade 1 or 2 lecturer, with an eye for using innovative strategies in the classroom. Lecturers were asked to use the cards in activities of their choosing and timing.

Cue cards were designed using the College's design of Structure of Observed Learning Outcomes (SOLO) taxonomy as a base structure (fig. 6). The verbs were used as stimuli for learners to create a range of questions. Questions were used to supplement the list of verbs which the learner could then develop questions on any given topic.

An initial online test with 163 learners tested the knowledge of what verbs meant and which hierarchical order they should be placed in. The draft cue cards and design were shared with Pam Hook, who developed and promoted a unique classroom based approach to SOLO Taxonomy in New Zealand.

8.1 Qualitative findings for Phase 1

- The majority of learners were unable to recognise the hierarchical order and meaning of the verbs. Limitations may have been due to a number of factors: the design of the test: the initial test conditions: language used in the test questions

- 40% of lecturers were successful in creating active learning strategies when using the cards

- 60% of lecturers identified barriers to using the cards effectively citing: lack of time to plan to use them in lessons: more resources needed to supplement the cards: needed breadth in the verbs used for psychomotor vocational areas (see appendix 3)

- Learners who used the cards throughout this phase reported: positive impact on confidence in speaking and in written work (see appendix 4)

- Lecturers who used the cards said that after giving written and verbal feedback on assignments relating it to the hierarchical levels assisted their learners to improve their grades

- Pam Hook provided feedback via email on the design and content of the initial College SOLO cards. Hook stated that the cards were not in alignment with original Biggs and Collis SOLO taxonomy (see appendix 2).

- However, 40 % of the lecturers had a mixture of success with using SOLO (see appendix 3)

Case study 1: Ceri a lecturer used the cards in Phase1 with a group of level 3 year 2 sport learners - 2 learners and Ceri were filmed giving feedback.

"How has the use of the cards impacted on your learning?"

Ceri felt that the SOLO cards needed to be used in most lessons and through a range of activities in order to embed the use of the cards. This impacted on the attitude of the learners in using the cards.
Ceri used the cards in assessment activities, actual feedback on assignments guiding students to review their work using the cards, during lessons to question peers, construction of projects."

Ceri: *I used them with my second years, mainly used it for our research project. Utilized it in all of our theory sessions. I've uploaded it onto Moodle so they have access to it wherever they are.*
Gwyn: *Can you tell me how Joe's work has changed since using SOLO?*
Ceri: *The progression with Joe is significant, he is very analytical anyway but what he has done now is explored more in depth issues. His English skills have significantly improved as he is using a range of verbs in his work now.*
Gwyn: *Can you tell me how Harry's work has changed since using SOLO?*
Ceri: *Harry's use of Solo is encouraging him to think outside the box. He likes to stretch himself but this has given him the scaffolding he needs to move forward quickly.*

Harry's response – "*Personally level 1 and 2 haven't affected me that much. Definitely the level 3 and 4 made me think and add onto projects"*

Joe's response –*"Trickier words allows you to ask your own questions about your work. I can explain why I recommended it before the question is asked."*
See appendix 4

Case study 2: Hollie, a lecturer used the cards in Phase1 with a group of level 3 year 1 sports learners – 3 learners, Charlotte, Michael and Jacob were filmed with Hollie giving feedback

"How has the use of the cards impacted on your learning?"

Hollie commented that the cards needed to be embedded into the lesson in order for the students to get used to scaffolding their answers.
Hollie used the cards in "Speed SOLO", peer assessment, group work, paired work, presentations.

Charlotte's response – *"it helped me structure my writing, my assignments – helps me to write more structured answers, helps me answer in greater detail from the prompt words"*

Michael's response – *"the cards have helped me quite a lot as its widened my thinking span so I test how much I can actually explain my knowledge…. because of the prompt cards and questions they offer you actually do riddle your brain and allows you to really widen the way you are thinking."*

Jacob's response - *"the asker of the question has to think and create their own answer to the question they are asking."*

See appendix 4

In both case studies 1 and 2 the responses from learners indicated that significant learning had occurred and that they were 'stretched and challenged' in their thinking. The impact was not only in verbal communication but also in the development of listening skills. The scaffolding was supportive in giving learners structure.

Fig 7 business developed cards

Case study 3

A surprising result came from CB who was completing a basic teacher training course in the college. The SOLO cards were used to stimulate group discussion and peer check learning. CB who is an outside trainer redesigned the cards to fit the vocational context, used them and had very positive feedback from trainees. (Fig. 7)

Case study 3 gave us insight of the potential transferability of the use of verbs and stem questions in a variety of vocational context.

8.1.1 Phase 1 action which informed Phase 2

- *Feedback from Hook (See appendix 2)* The researchers agreed with Hook in that the College SOLO design was closer to Bloom's categories of cognitive hierarchical domain than that of the SOLO framework, as there was misalignment of the verbs used. Despite the misalignment of the College SOLO concept, the decision was made to develop the college "SOLO" cards further. Whilst part of the constructive alignment approach does mould into the concept, the principal of devising learning activities and assessment tasks in such a structured format led the researchers to continue with their own design. Consideration of the depth of past research into taxonomies was taken into account and it was decided to develop the project using a variety of domains of taxonomies which would enhance the range of active verbs available for practical vocational areas. This would then 'stretch and challenge' the learners in all vocational areas
- Lecturers requested more training and resources in support of SOLO (see appendix 3). The use of SOLO by lecturers could not be predicted by the teaching observation grades that Phase One lecturers had. The use of SOLO within the classroom had to be regular and valued by the lecturers and learners (see appendix 3). This also brought into question the "growth mindset" suggested by Dweck that some lecturers who felt they did not "have the time" within their delivery to use the cards. It was decided that in the future to "buddy up" lecturers so that they could support each other in teams. The next cohort taking part in the research would be selected by targeting teams to work cooperatively together in using cards, instead of individual lecturers.
- Learners from the Sports department were used in presenting the project to Senior Management which proved a very powerful tool in informing them how successful they had been using the cards.

9. Phase 2: February – April 2014

Following the valued feedback from Pam Hook, it was decided to rebrand the cards and subsequent resources **QUEST**, this meant that fluidity in development could continue (appendix 2). **QUEST** was selected as the acronym for **Q**uestioning of **U**nderstanding by **E**ngaging **S**tretching your **T**hinking. The cue cards were redesigned to use a range of verbs and modified stem questions from the original SOLO cards.

Two teams within college comprising of 8 lecturers and 196 learners were selected on the basis that they could then share their experiences within the staff rooms and develop their own ideas. Prepared active learning activities were given to lecturers to experiment with. A PDF format, power point with 8 activities, a short video, and a "make you own QUEST template" were made available to the lecturers and learners. On line interactive QUEST trails were designed for learners and lecturers to use. Electronic and hard copy of QUEST cards which had *changeable* verbs and stem questions were used.

Further research into Dee Fink's taxonomy was made due to the significant evidence of positive social interaction in Phase1, which was 'stretching and challenging' learners. The interactive nature of Dee Fink's Significant Learning noted that if a:

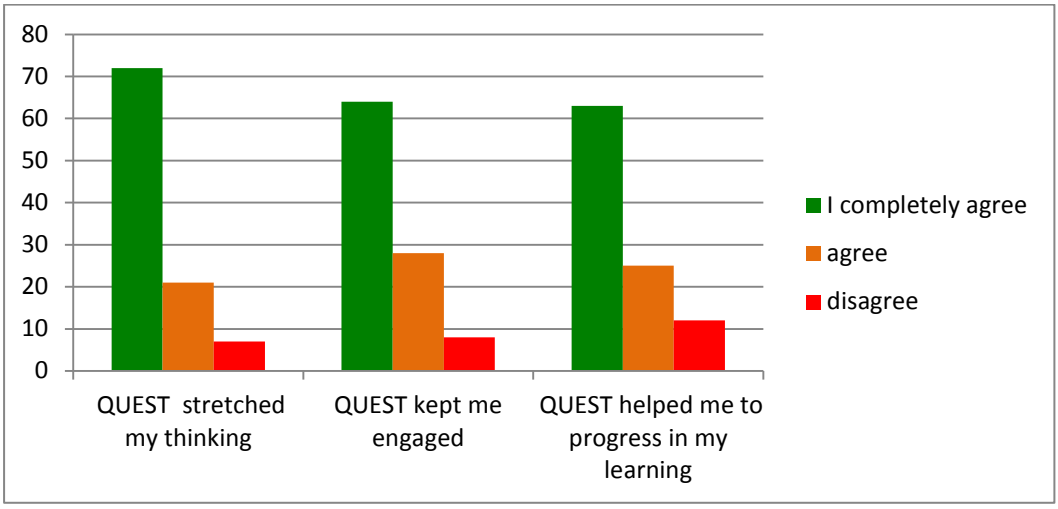
> *"Learning experience is able to promote all six kinds of learning; one has had a learning experience that truly can be deemed significant." (Dee Fink L. 2013 pg.38).*

The results indicated that a significant amount of learning was occurring in Phase 1 as the social, emotional interaction of learners had a positive impact on the group's learning behaviours (see appendix 4)

The evidence of the findings enabled the further development of on line resources where the verbs and stem questions could be refined to suit the needs of the vocational context.

9.1 Qualitative and Quantitative findings for Phase 2

- 6 lecturers successful used QUEST cards and Trails to 'stretch and challenge' their learners
- A total of 196 learners gave feedback on 'stretch and challenge' via online application - (see appendix 15 and below). These results were a clear indication that the use of questions were indeed stretching and challenging the learners to think. The lecturers who used the questions and QUEST trails were enthusiastic about the time they had in a lesson to facilitate and guide learner's.



- Some barriers from lecturers cited: the implementation was at the wrong time of the year; learners were focused on assignment completion
- Positive feedback from senior managers and middle managers was given after using QUEST cards after meetings

Case Study 4
Feedback from senior college managers after using the QUEST cards at the end of their strategic training day was extremely positive. Two questions were asked:
Describe how you felt after asking the QUEST? – referred to question 1
Describe how you after answering the QUEST? – referred to as question 2

Manager 9
Question 1 *"Challenging to think of appropriate and relevant questions. Challenging my thinking and experience by not necessarily only asking question I know the answer to. Challenge to not interrupt person answering questions or finish off their sentences"*

Question 2 *"needed to think quickly about the most appropriate answer to the question being asked and not answer the question I wanted to ask then. Needed to develop increasingly complex answers as the complexity / challenge of the question increase. Required me to deepen my answers by thinking."*
See appendix 6

Case study 5 feedback from level 3 day release accountancy learners

Scenario: Accounting level 3 - day release mature students used the QUEST cards which were printed out on A4 paper. Donna W. (lecturer) distributed these to the class and asked them to engage in peer assessment on a topic.

"How did you feel about using QUEST and what did it enable you to do?"

Answers noted:

"Really makes you think! Why aren't we using this in other courses in College?"
"Like the way it gives you a voice – especially if you are shy. Gave me confidence in what I am learning."

"Our managers would benefit from using this at work."

"Need time to think about the answer – so you can't rush."

See appendix 7

The learners' feedback from using QUEST was reflecting the development of their learning in a wider context not just 'stretch and challenge'. Exploration of Fink's taxonomy of Significant Learning (2013), encapsulated this and so a comparison was drawn using the feedback from learners and lecturers. The comparison enabled the researchers to reflect on the impact using QUEST was having on the learning environment in enabling learners to be metacognitive whilst developing their emotional intelligence. Daniel Goleman's model of emotional intelligence of the four generic domains: self-awareness, self-management, social awareness and relationship management suggests that QUEST was making a significant impact on the development of generic domains.

Utilising Dee Finks taxonomy, it became apparent that the six areas of significant learning matched the experiences of some of the learners in this research (please refer to table below).

Fink's Significant Learning taxonomy	Overview of some feedback from learners (see appendices 3 to 11)
Foundational knowledge	*Increased the knowledge and depth of learning* *Made them "think outside the box" on a topic*
Application	*Improved thinking skills by considering different options* *Ability to complete complex tasks more independently* *Enabled independent control and review of major projects* *Improved grades by expanding the use of active verbs*
Integration	*Ability to willingly share ideas and learning experiences*
Human Dimension	*Ability engage and learn with others in the class who they may not usually engage with*
Caring	*Sense of self-worth and confidence in communication* *Listening to what others actually have to say and valuing it*
Learning How to Learn	*Becoming self-directed learners and more vocationally focused*

*Please note that comments from the appendices are generalised and may contain researchers biased views.

9.1.1 Phase 2 actions which informed Phase 3

- Resources need to be introduced at the beginning of the year or at the beginning of a new unit delivery
- Allocate more coaching time for supporting lecturers in class when introducing and using QUEST resources
- Revisit the reasons of "barriers" to using of new resources. Consider the growth mindset of individuals and the need for professional discussion on developing own practice
- Develop a professional website that learners and lecturers can share

10. Phase 3: May to September 2014

QUEST Cards and Trails were introduced to 5 new lecturers who were teaching across different levels of the curriculum. An invitation was sent to a select group of lecturers who were teaching:

- Entry level – Foundation
- Level one – PET programme
- Level two – Italian
- Level five – Chemistry
- Across levels- GCSE maths

A professional web designer was employed to develop the new QUEST website that that would enable learners and lecturers to share resources across the curriculum. The sharing would support Fink's holistic view of active learning based on having access to resources which would enable learners to have rich learning experiences, reflect on what they were learning by themselves and with others and have access them at any time of the day/evening online. The rich learning would include on line discussion to stimulate debate and project learning.

Feedback was sought on the design and information that learners wanted and what lecturers required. As a result of this verbal feedback the following actions were taken:

- Presented a 15 minute seminar to the Foundation for Education and Training supported by an academic poster (see appendix 16)

- Introduced QUEST to over 250 lecturers during a forum on lecturers' development day. Training then followed on how to use the resources.

- Introduced QUEST to Bath Educational Trust, comprising of representatives from Bath University, Bath Spa University and Head teachers from secondary schools in Bath.

- Invited two interpreters to translate the resources: one into Chinese and the other using Sign Language

10.1 Qualitative findings for Phase 3

The findings are listed below:

- A Foundation teacher created a Trail using the adaptable application for changing verbs and stem questions suitable for the language needs of the learners. The learners will be using this in September therefore we have no feedback from learners. However this did prove that the resources were flexible and adaptable for Foundation learners

- A PET (Level 1) teacher created resources again to use in September citing that the learner's needed to be used to using the system from the start of the course.

- An Italian teacher created and used QUEST resources with an adult community learning group.

Case Study 6 – Scenario: an adult evening class were given the cards in Italian to encourage dialogue. Feedback was given on post it notes.

Learner 1: *Could they be business card size? The layout is very clear. It is easy to use and combine the 2 elements. It is attractive and bright. The verbs aren't necessarily the best choices for our needs e.g. dimonstrare. The questions in there were very good. It was helpful to revise.*

Learner 4: *The term dimonstrare wasn't very relevant. Identificare and elencare seemed too similar. I think the first 3 verbs were helpful elencare, descrivere and ricordare in encouraging us to elaborate and extend our vocabulary*

See appendix 11

Comments on the choice of verbs selected by the Italian lecturer proved difficult as the researchers did not have access to linguists in this specialist area. However, the verbal feedback from the learners did find the cards a useful resource. It must be said that the resource was created swiftly which brings into question the amount of time needed to consider the correct selection of verbs and possibly stem questions. The extension of vocabulary and revision was considered to be effective.

- A Chemistry lecturer who teaches on the University of Bath course in college has devised a QUEST trail and will use this in September to encourage his learners how to create effective scientific reports.

- Two maths GCSE lecturers considered how to adapt the QUEST trail into a maths session. The feedback indicated that time may be an issue within the class but benefits could be seen using it as an online resource for revision.

- Feedback from learners on the design of resources were invaluable

Case study 7 – Scenario: learners were asked to feedback on the design post use of a QUEST Trail using an interactive PDF

Darcy: *There's two things regarding feedback for QUEST. Firstly there should be a box when it actually come up that explain what the terms mean. Some of the students struggle with the word "justify" and "analyse" so a box with what it means on the page to guide what to do or say. Secondly is that the arrows could show which level you go up to and down. Cos if you struggle you know you can go down a level.*

Shamone: *A full screen version will help like a web page*

See appendix 9

The comments of participants was taken on board and passed onto the web designer.

- 63 lecturers either created or began to create QUEST resources to use during the next academic year. Very positive comments were received on the flexible and adaptable way in which the verbs and stem questions could be changed to suit any vocational context.
  One lecturer commented on the need to have a wider range of vocationally relevant verbs on the application to choose from which enable them to create the Trail quickly.
  The majority of the lecturers worked in pairs (from the same vocational area) and created Trails using unit specifications. Lecturers and Heads of Department have made requests requested more training at the end of August and the beginning of September 2014.

- A presentation was made to the Bath Educational Trust and all parties have agreed to take the project forward by bidding for money to extend the

development. Bath Spa University have agreed to take part in the research on the extended project into schools.
A further meeting has been requested to consolidate the plan for implementation of QUEST in the Secondary Schools in Bath. Bath University are keen to use QUEST within their Widening Participation programme.

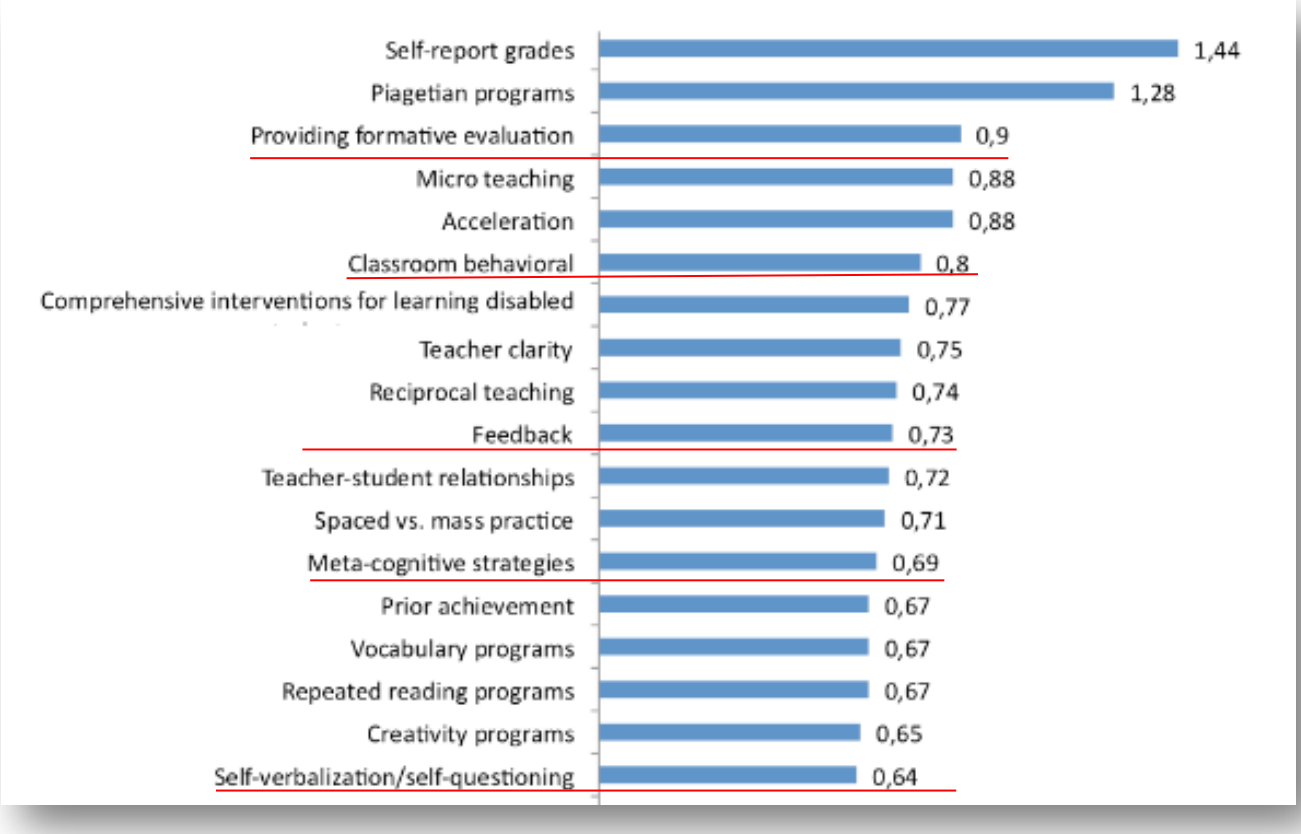
- Contact has been made with Cate Cassidy an experienced interpreter for the deaf community in Liverpool. She has agreed to make a series of short videos to accompany the QUEST Trail during August 2014.

- Contact has been made with a Chinese translator who has looked at the QUEST cards and is currently adapting them for a Chinese audience. These should be ready in September 2014.

- A QUEST trail has been created, to support learners across the whole of the College, in the implementation of the new Student Code of Conduct. This will be introduced during this year's induction period with over 2,500 learners using the resource.

- Further research into Hattie's effect size table indicated that the use of the resources may not just have the initial 0.64 Self- verbalisation/self-questioning impact but also as highlighted in the table below. Further research is required to validate the impact.

Hattie (2012) – Effect size and how the research is making impact in areas



11. Conclusion and Recommendations

In summary, this research has identified that **structured questioning** and **active learning does stretch and challenge** learners. The use of a range of taxonomies and stem questions has enabled learners to become metacognitive as they become more autonomous in their learning. With reference to a variety of taxonomies now, a new taxonomy has been created for consideration based upon a hierarchical structure, the use of verbs from the cognitive, affective and psychomotor domains and a choice of stem questions to elicit 'stretch and challenge of thinking. The verbalisation of thoughts does have an impact on the foundational knowledge learners have and enables them to internalise this before putting pen to paper, making them more reflective in their work. The evidence suggests that 'significant learning' (Dee Fink) may be occurring within and outside the classroom particularly as the social interaction has a positive impact on the dynamics within the learning environment.

This is achieved through using the questions to challenge knowledge either that they already know or need to know. Accessing the QUEST on line enables the learners to review the questions and links to resources on a given topic at any time. Print out versions are available for learners who prefer the use of hard copy.

The learners have extended their vocabulary in a structured methodical way and this impacts on the written quality their work. Their work becomes more analytical and measured, as the learners know what the next level is in developing an argument or viewpoint. This may also create a "safety blanket" for less confident learners. It may also raise concern for the less motivated learner who may prefer to stay at a level.

The use of the resources (either online line or in paper format) ensures that all learners are engaged at their own level, therefore making the learning environment inclusive. It has encouraged the learners to have conversations with a range of their peers they may not be used to working with. This may have a positive impact on group behaviours. Listening skills have been sharpened and honed by the use of structured questioning by peers.

Furthermore, learners and lecturers have measured progress more easily as they know which level they are achieving and what levels to develop.

The limitations of the research lie in not addressing the barriers to using the resources by some lecturers. Discussion on mindset highlighted other issues that were not related to active learning within their classroom.

Other limitations lie in the lack of consistent quantitative data to support the qualitative data. There is an opportunity in September 2014 to rectify this with liaison with a colleague from Bath Spa University. Further limitations may lie in the initial use of QUEST resources and then lack of consistency of use.

Successful lecturers have emphasised the consistent use as it enables the scaffolding of knowledge to be owned by the learners.

An ending note from Harry Lee, a level 3 Sports student, who has experience of using the cards consistently for this academic year.

> *"I really don't think I would have achieved the outstanding grades and get into my first choice University without QUEST. I would like to thank you."*

12. Appendix 1 Feedback from Matt Finch Phase one

Feedback from Matt Finch Quality Manager

Scenario: Gwyn used the SOLO cards to question Matt on exploring what makes a grade one teacher using a report of teaching observations from the college July 25/09/ 2012

http://video.citybathcoll.ac.uk/View.aspx?ID=7035~4p~QhzuupJt

Gwyn: *Matt, how did that feel for you?*

Matt: *It started nicely and simply, I had the evidence in front of me and as you took me through I started to compare, contrast, think deeper and by the end the last question did make me consider something that I hadn't actually an areas for improvement for all of these teachers is simply ILT.*

Gwyn: *Would you recommend using SOLO taxonomy?*

Matt: *Absolutely how hard was it for you as the questioner to get the information from me?*

Gwyn: *As I was going through the different levels I had to really think about the questions I was asking you. This guides you to the best questions you can ask because it's got the active verbs there.*

13. Appendix 2 Feedback from Pam Hook (New Zealand) Phase one

Email from Pam Hook regarding college designed SOLO cards.

Scenario: Gwyn emailed Pam Hook in New Zealand the initial college designed SOLO cards which were used in Phase 1 of the project.

On Mon, Sep 9, 2013 at 10:24 AM, Pam Hook <pam.hook@gmail.com> wrote:

Great idea Gwyn and thanks for sharing - this has the potential to be very useful for learners. We have developed an interactive form of this - the HookED question generator app which will sit alongside the other SOLO apps on the website - with mobile phone versions of them all. However, first in the queue to go up is the Te Reo Maori versions (and then Japanese, Chinese and French) of the functioning and declarative knowledge app - along with SOLO posters. I work with a number of full immersion schools who are hanging out for the Te Reo apps - have used Dr Ngaire Roberts to do all the translation work so is going to be stunning. Will let you know as soon as the question generator app is up. In terms of feedback I think there is some more work needed to align the prompts with SOLO Levels - both in the suggested verbs and the sentence starter prompts - There are several places where they seem closer to Bloom's categories than the SOLO framework - e.g the inclusion of predict and compare in the multistructural level, when in SOLO to predict is an extended abstract term only capable of being attempted once learners have pulled in many loose ideas and linked these in different ways. Comparison involves making links between ideas - so is a relational task - you are making links by finding similarities. Explain sitting on the same slide - is a relational task - giving reasons assumes linking of ideas - there is a link between the idea and the reason. I refer to the misalignment of Bloom's verbs in the paper I wrote for Rowan and Bigum's Transformative Approaches to New Technologies and Student Diversity by Futures Oriented Classrooms. You can also get some idea about this in Biggs and Tang p80 -have included a scan so you can see what I am referring to .

I have also noted some misalignment between the tasks on the left and the prompts on the right. For example - "What conclusions can you make from ..." is sitting at the relational level - when in SOLO it would be an extended abstract prompt - a sitting outside and trying to form an overall impression - make a generalisation kind of task.

So in summary - great start - will be very useful for learners - but needs a little more work if you want to align it to SOLO levels rather than Blooms categories

Will you show SOLO levels on your slides - with symbols or terms? I like the use of bricks but think it would help to have a more explicit reference to SOLO.

Hope this is helpful

Regards

Pam

14. Appendix 3 Feedback from lecturers Phase one

Scenario: Feedback from ten lecturers in Phase one of the project – January 2014 - discussion

S1 and S2 both agreed that the cards were more suited to theory sessions for more academic courses. They would however be interested in the cards if they had a more vocational bent and used language that their learners would understand. (Grade 1 and Grade 2 teacher observation)

A1 and A2 felt that the language of SOLO was challenging for the groups and that time was needed for the development of activities to enable SOLO to be embedded. (Grade 1 observation)

D1. Felt that more training was needed in how to embed the use of the cards. The language in the questions was difficult for the learners to comprehend and needed to be simplified (Grade 2 observation)

M. felt they did not have time to use the cards and that the learners did not understand the language. (Grade 2 observation)

G. developed a matrix for level one learners but felt that the language used was not vocationally relevant to learners on a carpentry course. The learners struggled with the terminology (learners in the group having a range of English skills form Entry 1 to level 2. (Grade 2 observation)

E. used the cards to develop the language skills of learners but wanted a range of activities and resources to use (Grade 1 observation)

Hollie and Ceri felt that the SOLO cards needed to be used in most lessons and through a range of activities in order to embed the use of the cards. This impacted on the attitude of the learners in using the cards. (Grade 1's observation)

Hollie used the cards in "Speed SOLO", peer assessment, group work, paired work, presentations.

Ceri used the cards in assessment activities, actual feedback on assignments guiding learners to review their work using the cards, during lessons to question peers, construction of projects.

15. Appendix 4 Feedback from 4 Sport learners and lecturers Phase one

Feedback from four sports learners in Phase 1 (level 3 year 2) - videoed and questioned by Gwyn 15th February 2014

Charlotte and Michael, Jacob with lecturer Hollie Greenaway and Joe and Harry with lecturer Ceri Hughes

Scenario: demonstration followed by question
http://video.citybathcoll.ac.uk/View.aspx?ID=8729~4A~COLIdQaP

Gwyn: *How has the use of the cards impacted on your learning?*

Charlotte's response – *it helped me structure my writing, my assignments – helps me to write more structured answers, helps me answer in greater detail from the prompt words*

Michaels' response – *the cards have helped me quite a lot as its widened my thinking span so I test how much I can actually explain my knowledge…. because of the prompt cards and questions they offer you actually do riddle your brain and allows you to really widen the way you are thinking. It's not just here's a question answer it. It's what does that question actually mean and how can you answer it in a correct manner. When you get to level 4 questions it really does demonstrate how well you can answer that question. You can distinguish between you basic answer and your good answer. So the cards help us widen our thinking span.*

Gwyn: *When have you used the cards?*

Hollie: *Firstly at the end of a lesson just o check knowledge and understanding and also to stretch and challenge them. Been using them at the beginning to check homework and getting them to peer assess each other. Been using them assessing their knowledge on psychology. Benefits of using them for me are that I can promote autonomous learners and learning. It makes my job a lot easier as it is like having more teachers in the room.*

Jacob: *the asker of the question has to think and create their own answer to the question they are asking.*

Gwyn: *Harry and Joe how has the cards impacted on learning and thinking?*

Harry: *Personally level 1 and 2 haven't affected me that much. Definitely the level 3 and 4 made me think and add onto projects*

Joe – *trickier words allows you to ask your own questions about your work. I can explain why I recommended it before the question is asked.*

Gwyn: *Ceri how have you used the cards?*

Ceri: *Used them with my second years, mainly used it for our research project. Utilized it in all of our theory sessions. I've up loaded it onto Moodle so they have access to it where ever they are.*

Gwyn: *Can you tell me how Joe's work has changed since using SOLO?*

Ceri: *The progression with Joe is significant, he is very analytical anyway but what he has done now is explored more in depth issues. His English skills have significantly improved as he is using a range of verbs in his work now.*

Gwyn: *Joe do you agree with Ceri?*

Joe: *yes definitely it's just another route I can take*

Ceri: *Harry's use of Solo is encouraging him to think outside the box. He likes to stretch himself but this has given him the scaffolding he needs to move forward quickly.*

16. Appendix 5 Feedback from Public Services and lecturer Phase one

Feedback from Public Services M. (lecturers) and learners on using SOLO – February 3rd 2014

No name: *It's really hard to understand how this can help me get a distinction.*

No name: *I don't really need this – it's wasting my time*

No name: *It's difficult when the teacher cannot explain how this works*

No name: *I can see some sense in using them but more in the first year of a course*

M. (lecturers) *I just need more time to plan activities, the learners don't see the sense in using them or understand the terminology used*

17. Appendix 6 Feedback from Senior and Middle Managers

Feedback from Managers 1 – 8 (10th March 2014) and Managers A - F (14th March 2014) on using QUEST after having training days to summarise their thoughts.

Two questions asked

Describe how you felt after asking the QUEST? – referred to question 1

Describe how you after answering the QUEST? – referred to as question 2

Feedback from Senior managers training

Manager 1

Question 1 *The system is organised in a way that moves from obtaining the basics to move in depth information. the answers also enabled questioning to develop and twice I went backwards to obtain other information*

Question 2 *Good questioning that did not necessarily follow the 1 -4 plan but ended up there in the end. The questions challenged my current thinking on the subject which answered some of my concerns or thoughts.*

Manager 2

Question 1 *less aware of my intentions – A bit unsure about my direction - what was I trying to find out? Rather fractured and unrelated questions?*

Question 2 *I felt very comfortable . a clear idea of what I was talking about. My answers were thought provoking, sensible and well delivered*

Manager 3

Question 1 *fine/ comfortable/at ease/ confident/ could see the next step/partner confident therefore facilitated the next question*

Question 2 *Fine/ comfortable. Good to make you think quickly. Possible to predict next question*

Manager 4

Question 1 *Good, more comfortable than answering!. Too focused on the questions, not on …. Agenda. Made me try to listen more but still looking for the next question not on summary*

Question 2 *Very challenging. On the spot. My response didn't seem to matter. Expected to know the answer. Needed more time on listening to responses*

Manager 5

Question 1 *asked a number of level 4 questions – allowed me to elicit more detailed from – than she thought she knew. Moved from general to more specific discussion on strategies*

Question2 *Happy that I had given comprehensive answers. That I had been ready to think carefully about the response that had allowed me to think outside the box. We need this in the classroom – the more you use it the easier it becomes.*

Manager 6

Question 1 *Little unsure at first. It became easier. Enjoyed 2asking2 rather than answering*

Question 2 *Pressurised. Pleased at some the responses. Needed to think faster and a good tool for checking my understanding*

Manager 7

Question1 *quite tricky formulating the 2nd subsequent questions as had to link to the previous response – responses showed wider thinking that the original question might have intended.*

Question 2 *made me really have to clarify my thinking and justify my responses to myself to make sure they were coherent . Challenging more for the questioner than the answerer. Would very interesting to see the development of learners peer questioning skills.*

Manager 8

Question 1 *initially trying to think of the next question – referring to card. Towards end questions were a bit more joined up, felt I could have listened more intently.*

Question 2 *quick fire questions. Think answers quickly. Felt I had to give a response. Pressure of time. Noted that some responses may need more time* in thinking about

Manager 9

Question 1 *challenging to think of appropriate and relevant questions. Challenging my thinking and experience by not necessarily only asking question I know the answer to. Challenge to not interrupt person answering questions or finish off their sentences*

Question2 *needed to think quickly about the most appropriate answer to the question being asked and not answer the question I wanted to ask then. Needed to develop increasingly complex answers as the complexity / challenge of the question increase. Required me to deepen my answers by thinking.*

Manager A

Question 1 *Good opening question which gave way to open dialogue, felt engaged in conversation*

Question 2 *Focused my thinking and explored things I hadn't thought of before*

N. B. *Didn't feel as pressured this time as had experienced this before*

Manager B

Question 1 *I felt rushed to ask the questions and was conscious of the lack of continuity of some the questions that I asked*

Question 2 *It felt natural answering the questions and left me surprised at how quickly themes were developed*

Manager C

Question 1 *Bit concerned about whether it was appropriate to the topic, but pretty happy that I'd asked a well-structured question. Wasn't always sue what I was asking – the question changed in the middle as I read more the card. Amused*

Question 2 *Okay, I felt a bit unsure how to justify an idea that wasn't mine (that was because of the topic we were talking about though). Had to think quick in order to answer some of them*

Manager D

Question 1 *Confident. Set up to enable someone "less able" to answer well.*

Question 2 *More pressured. Person was more interested made me think more about my answers. Answers less generic. Have seen this in practice and think this fabulous.*

Manager E

Question 1 *I found the subject was too new foe me to feel ready to explore; but the questioning technique itself made sense.*

Question 2 *put on the spot with a new environment and manage as I've only been here since Monday.*

Manager F

Question 1 *second time of doing the questioning – found it lightly easier and less challenging to formulate the questions than the first time around. This time I was able to respond more quickly to the first responses in formulating higher order questioning.*

Question 2 *Very useful opportunity to rehearse and explore some thinking, linking with prior answers from partner.*

18. Appendix 7 Feedback from day release AAT learners and lecturer

Feedback from AAT level 3–02/04/14 11.50

Scenario: Accounting day release mature learners used the QUEST cards which were printed out on A4 paper – Donna W. passed these to the class and asked them to engage in peer assessment on a topic.

Gwyn: *"How did you feel about using QUEST and what did it enable you to do?"*

Answers noted

Really makes you think! Why aren't we using this in other courses in College?

Like the way it gives you a voice – especially if you are shy. Gave me confidence in what I am learning.

Our managers would benefit from using this at work.

Need time to think about the answer – so you can't rush.

Feedback from AAT level 3 lecturer Donna W. –07/05/14 11.50

Scenario: Donna W. (lecturer) had written a QUEST on a unit for AAT and asked the learners to either use a phone/tablet/computer to down load QUEST and work in pairs to complete the entire QUEST.

Good revision tool which stretches your thinking

Donna W. (lecturer) *Hope it was useful today. The quest PDF was used by adult learners, it was accessed from Moodle and used on smart phones and PC's in pairs. I would suggest this would work well as a revision of a whole topic and engage learners in deeper thinking or stretching. Learners seem to be happy to try it and afterwards some mentioned they really enjoyed that style of learning some learners did not like it. I did however notice engagement with all groups and the use of IT worked well as an alternative resource.*

Thanks for all your help.

Donna Wed 07/05/2014 18:42

19. Appendix 8 Feedback from Social Care learners and lecturer

Feedback from Social Care learners and Chris Simpson using QUEST trail 19/06/14

Hannah: *It's really good cos it got you to think about things in a different way. Only annoying thing was going back on the questions – needed numbers to distinguish the line of questions.*

Alfred: *Well it sure makes me want to think more critically on understanding the topic of learning. I just look at the terms assess, identify, evaluate and it goes in deeper learning and not shallow learning*

Issy: *I think it's good to get individuals to learn who usually wouldn't necessarily take part in group discussions. But it is an app or PDF that wasn't interesting – didn't captivate you*

Daniel: *Needs to be of an application instead of a PDF document – it made me think a lot outside of the box*

Tara: *Kinda of good as you can research on things you wouldn't normally look at – such as really using the text book to help you answer instead of a web page.*

Chris Simpson feedback - lecturer

I can straight away see two applications of QUEST . Depending upon what topic I am teaching – if the initial understand didn't have to be too great then I could throw the learners straight into it to explore the topic, so they do the initial research work and develop initial concepts and I would build on that learning.

One of my other areas is biomedical science where the initial concepts are complex. So I would turn it around. I could spend the first part of the lesson explaining the concepts. They could then use the QUEST trail to reinforce their learning and understanding of the topic. This would allow them to expand and develop their own understanding. It would give me the time to see which learners may need that extra individual support.

20. Appendix 9 Feedback from Travel and Tourism year 1 learners

Feedback from Travel and Tourism learners level 3 year 1 – tutor: Donna Mitchell

Date: 14/05/14

Scenario: learners had been on a visit to the Hilton Hotel and had a talk from management, student took notes for their assignment. Donna M. designed QUEST with assistance and then introduced the QUEST to the learners for discussion and note taking in college.

Student preferred not to have themselves videoed however they were happy to provide their first names for research purposes.

Darcy: *There's two things regarding feedback for QUEST. Firstly there should be a box when it actually come up that explain what the terms mean. Some of the learners struggle with the word "justify" and "analyse" so a box with what it means on the page to guide what to do or say.*

Secondly is that the arrows could show which level you go up to and down. Cos if you struggle you know you can go down a level.

Lucy: *I think it makes you think about it more as if you are answering your friend's questions you want get it right. You can put it in your own words, if an adult says it you sometimes don't understand, but if you are talking with your friends then you can understand it more. It makes your assure yourself when you are doing it*

Shamone: *A full screen version will help like a web page*

No name: *Think harder. I guess it makes you think about the whole question instead of just rambling on.*

Hannah: *Well I thought it makes you test your knowledge when you read the questions it shows actually how much you did learn. So when it says expand you can actually go into detail*

21. Appendix 10 Feedback from Business year 1 learners

Feedback from 2 level 3 Business learners – verbally in discussion

Bradley Milton – *I find it easier to structure my work so I know how to start it off and develop and experiment with each paragraph as I go along. It's clearer for me and the people marking it.*

George Watchford Smith – *Quest has helped me reflecting on past work – anything you haven't understood properly – gives you a chance to get other peoples view. Also helps differentiate in assignment tasks P to M. It helps you properly achieve that grade.*

22. Appendix 11 Feedback from Italian learners

Adult evening class learning Italian feedback 17/06/14 after using cue cards written in Italian. Feedback written on post it notes.

Student 1: *Could they be business card size? The layout is very clear. It is easy to use and combine the 2 elements. It is attractive and bright. The verbs aren't necessarily the best choices for our needs e.g. dimonstrare. The questions in the were very good. It was helpful to revise*

Student 2.: *An interesting exercise but some of the words were not appropriate. However, I enjoyed doing the tasks*

Student 3: *It was good to be forced to think and head in a different direction with the conversation. Dimonstrare was difficult and elencare was boring.*

Student 4: *The term dimonstrare wasn't very relevant. Identificare and elencare seemed to similar. I think the first 3 verbs were helpful elencare, descrivere and ricordare in encouraging us to elaborate and extend our vocabulary*

Student 5: *It was quite difficult. Some of the words used didn't seem particularly relevant but having said that it was useful and fun and showed use where we needed to revise our vocab.*

23. Appendix 12 Feedback from year 1 Sports learners

Feedback from Sports – year one June 12th 2014

Minnie Wilson: *It helped with my range of vocabulary when talking to people and it helped me elaborate on my answers more*.

Ashley Torrs: *It's helped me widen my vocabulary in my assignment work. Instead of using simple words I can use more complex words. The terminology I use has become wider. Its helped me make more sense of the assignment – when asked questions from the QUEST cards it has made more sense because I am saying what I think.*

Shia Williams: *It helps me elaborate how I explain information. it also helps me remember key point so information*

Paul Wood: *QUEST has helped me assess what grade I am working towards in my unit. I can answer the first stage of the questions which shows I am working towards a pass grade and then using the second stage I know I am working at least a merit.*

Cassidy Mills: *It's helped me justify my answers – to get a distinction I need to justify further. By using the cards I learnt more from my peers and this really helped me think about what I was learning.*

Zoe Hurley: *it's helped me think in a different perspective, think outside the box. If I was going to a pass I would use different connective verbs so if I was analysing my work for distinction I would use more elaborate words. It helps you go back over your work and then expand it.*

Sophie John: *QUEST has helped me this year definitely with the vocabulary in my assignments. I had more of a wide range to use as I felt I wasn't repeating myself in assignments. I was able to use more complex words to get better marks. Presentation wise, as I was put on the spot, I had the wide range of vocabulary to answer the questions which helped me understand . It's a great way of revising as you can talk about it and expand what you know.*

24. Appendix 13 Feedback from AET candidates introduction to QUEST

Feedback from Award in Education and Training – 22/04/14 19:30

Scenario: The group were given a very brief introduction to QUEST and told that the arrows would take them on a learning journey. They just had to answer to questions to move forward or return to the home page if they became stuck. IPads were used by 12 learners to access a whole QUEST designed about initial, formative and summative assessment. Some of the learners have some prior knowledge whilst the majority of the group, 75%, had no previous knowledge. The question poised to the group on assessment prior to starting the unit was:

"How did you feel about using QUEST and what did it enable you to do?"

Answers on post it notes:

QUEST was linear and focused discussion. Wording of questions needs to be clearer

Encouraged working in pairs, sharing ideas, questioning helps with forming essays e.g. gathering information

QUEST interesting focus

From a student perspective – interesting

From a teaching perspective seems like a lot of work to set up. I like it but may be shy of using it myself. Could be good (not being lazy just realistic)

Followed a logical sequence – scaffolding the learning

Encouraged debate and agreement with partner

Not sure of how long it was how many questions?

Felt quite intimidated initially by the words and needed to spend a long time reading up on the question, as I'm a perfectionist and it takes me a long time to read

Makes you think in depth about niche issues and answer questions in a variety of ways – liked the summarising

Liked working in pairs and generating ideas from each other

Not clear how the 'routes' differed – effect of choosing one arrow or the other. Use of closed question leads to assume one arrow is right and one wrong

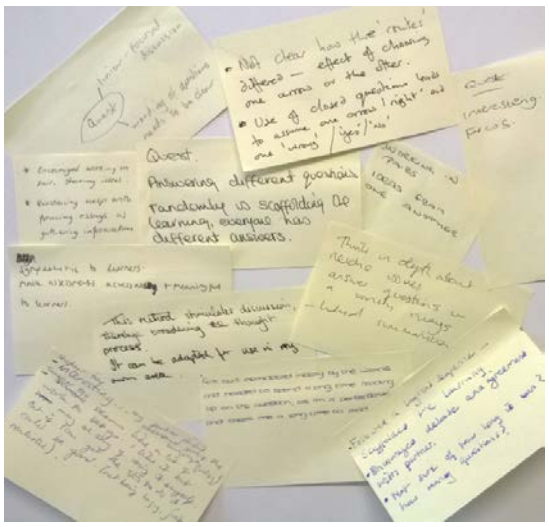
This method stimulates discussion therefore broadening the thought process. It can be adapted for use in my own area

Sympathetic to learners, makes assessment accessible and meaningful

QUEST – answering different questions randomly is scaffolding the learning, everyone has different answers

11 green comments – positive experience of using QUEST

5 red comments – negative experience of using QUEST



Feedback from Award in Education and Training – 22/04/14 19:30

25. Appendix 14 Feedback from AET candidates end of unit review using QUEST

Feedback from Award in Education and Training –07/05/14 19:30

Scenario: iPads were used by 12 learners to access a whole QUEST designed about initial, formative and summative assessment. QUEST was used to review the learning from unit 306 in the Award in Education and Training after 3 deliveries and homework.

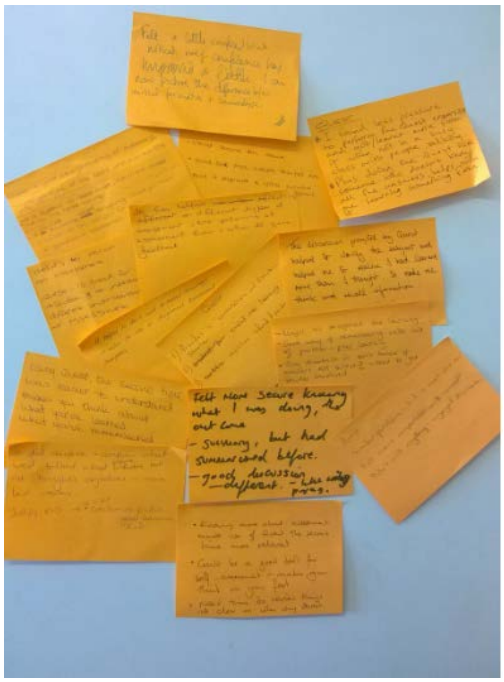
The question poised to the group on assessment prior to starting the unit was:

"How did you feel about using QUEST and what did it enable you to do?"

Answers on post it notes:

- Felt a little confused but noticed my confidence had improved a little. I can now picture the difference between initial. Formative and summative
- I found less pressure to perform the QUEST exercise and got/learnt more from it when not in a busy class with people talking. Plus doing the QUEST with someone who doesn't know all of the answers helps with me learning something from it
- Knowing more about assessment made use of QUEST the second time more relevant. Could be a good tool for self-assessment- makes you think on your feet. Need time to review things not clear on using QUEST
- Similar questions – did it move me on? Felt more comfortable with concept. Didn't write anything – enjoyed the discussion
- It did reinforce and confirm what we'd talked about before but not tonight's objectives- more last weeks.
- Useful as reinforced the learning. Good way of remembering with aid of partner – peer learning. Only drawback is don't know if answers are correct? Need to get teacher involved?
- Felt more secure knowing what I was doing the outcome – summary, but had summarised before- good discussion- different – like writing
- The discussion prompted by QUEST helped to clarify the subject and helped me to realise I had learned more than I thought. It made me think and recall information.

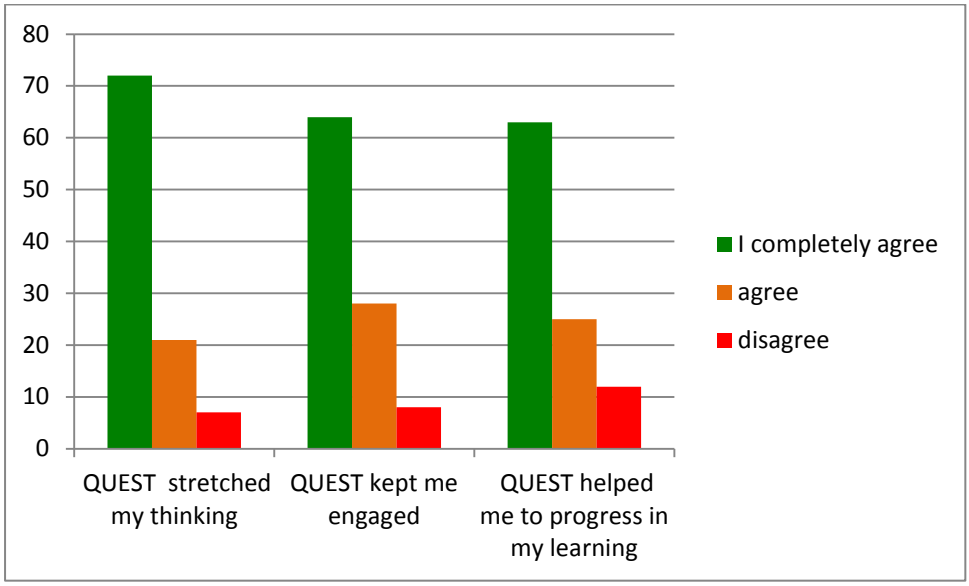
- Clearer second time around; could talk more in-depth than first time; found it difficult to criticise summative assessment
- Using QUEST the second time was easier to understand. Makes you think about what you've learned; what you remembered.
- QUEST – provides a conversation and discussion start; enabled peer learning; repetition reinforced points
- It helped to share and remember knowledge in order embed in assignment assessment purposes.
- It has helped reflecting on different types of assessment, the planning of assessment; how and when to give feedback
- Helps to recap on assessment; QUEST is great for discussion to understand different understandings of assessment
- QUEST is good as a promoting of questions makes you think of the topic and pull out the information from your brain As a dyslexic I need quiet, not in the class due to the noise volume. If the two learners were struggling could you have a button at the bottom for help?


Qualitative data

Feedback from Award in Education and Training –07/05/14

26. Appendix 15 Data from Phase 2 participants

N:196



27. Appendix 16 – Academic poster

28. References

Biffle C. (2013) Whole Brain Teaching for challenging kids. Whole Brain Teaching. USA. Chris Biffle.

Biggs J. SOLO taxonomy. http://www.johnbiggs.com.au/academic/solo-taxonomy/ accessed 05/09/13

Biggs J.& Collis, K. (1982). Evaluating the Quality of Learning: the SOLO taxonomy New York: Academic Press.

Bloom J. (ed.) (1956) Taxonomy of Educational Objectives, the classification of educational goals – handbook 1: Cognitive Damian New York: McKay.

Bonwell, Charles C. & Eison,James A. (1991) Active Learning: Creating Excitement in the Classroom. 1991.ASHE-ERIC Higher Education Reports.

Bruner, J.S. (1960) The Process of Education: A Landmark in Educational Theory. U.S.A. Harvard University Press.

DfES (2013) Ofsted Handbook for the Inspector of Further Education and Skills. DfES.

Dweck C. (2006) Mindset: The New Psychology of Success: New York. Random House Publishing Group

Dweck,C.(2013) The Mindset. *http://mindsetonline.com/whatisit/about/index.html accessed 12.06.13*

Fink L. (2013) Creating significant learning experiences: San Francisco. Jossey-Bass a Wiley Brand.

Goleman D. (2011) The Brain and Emotional Intelligence: New Insights Enhanced Edition:1st Enhanced Digital Edition: Northampton, Maine. More than Sound LLC.

Hattie J.(2012) Visible Learning for Teachers: Maximising Impact on Learning. London. Routledge

Hook P. (2013) Personal Communication.

Hook, P.(2013) SOLO Taxonomy. http://pamhook.com/solo-taxonomy/ accessed 01/06/09/13

Martin S. (2011) Using SOLO as a Framework for Teaching. Auckland, New Zealand. Essential Resources Educational Publishers Limited

McLeod,S.A.(2008).Bruner. http://www.simplypsychology.org/bruner.html accessed 21/02/14

O'Neil G. & Murphy F. (2010) Guide to SOLO taxonomy. Dublin. University College of Dublin.

Owen Wilson L. (2001) The Second Principle: Anderson and Krarhwohl – Bloom's Taxonomy Revised) http://the secondprinciple.co.teaching-essetnails/beyond-bloom-cognitive-taxonomy accessed 29/05/14

Petty, G. (2011) 4th Ed. Teaching Today: A Practical Guide. Cheltenham. Nelson Thornes Ltd.

Prince M. (2004) Does Active Learning Work? A Review of the Research. J.Engr. Education,93 (3) pp 223-231. www4.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Prince_AL.pdf accessed 12.02.14

Silberman, M.(1996) Active Learning: 101 Strategies to Teach Any Subject. Massachusetts. Allyn and Bacon.

Wiliam D. (2011) Embedded Formative Assessment. London. Solution Tree Press

Wenger, E. (2013) Communities of Practice: a brief introduction. www.wenger-trayner.com/theory/ Accessed October 22nd 2013