

Numeracy assessment and screening tools project

Background

The University of Huddersfield has a long history (over 60 years) of delivering Post-Compulsory Teacher training. The School of Education and Professional Development currently offers In-Service and Pre-Service PCET teacher training and subject specialist teacher training in Numeracy, Literacy and ESOL. The University is also the lead partner in the Consortium for Post-Compulsory Education and Training (CPCET) and in 2007, the University of Huddersfield attracted 45 partners to join it in a successful bid to become one of only 11 Centres for Excellence in Teacher Training for the Lifelong Learning Sector. The introduction of new standards for the Subject Specialist qualifications introduced in September 2007 included guidance for an entry assessment for all applicants with exemption for those who possess a mathematics degree. The current screening process for applicants to subject specialist numeracy teacher training involves candidates attending an interview and undertaking a formal written assessment that is administered in a formal examination method. This was a pragmatic approach, given the short timescales, to assessing the personal skills of applicants but does not sit well with the student-centred approaches to assessment espoused on the programme. The current test does identify a range of personal skills at Level 3; however it is questionable if the methodology employed allows process skills to be assessed, which is the main requirement of the SVUK entry criteria. This approach was under review and a more learner-friendly approach is being considered that will allow for process skills to be assessed more reliably.

Approach

The development project involved:

- the creation of an assessment carousel pitched at QCF Level 3 and including problem solving, analysis, interpretation and evaluation
- a pilot with the current cohort of learners and a selection of former students from a variety of contexts.

Before work on the project commenced the screening processes of other teacher training providers were examined. A variety of strategies were employed which combined interviews, formal tests, presentation of pre-set tasks and work completed prior to interview. None of the strategies appeared to address the issues identified with the current methodology.

The first stage of the project was to clarify the intended outcomes of screening tool. This involved referring to the SVUK guidance, which led to the development of a mapping document where the criteria identified within the guidance were set out in a table so that tasks/activities could be mapped against them. The adoption of an assessment carousel required an alternative assessment strategy which employed the new screening tool.

An assessment strategy was written that involved the completion of tasks in small groups, with participants assessed by the teacher trainer through observation and questioning if required. The next stage was to identify individuals to contribute to the evaluation process. It was decided that the component parts of the assessment tool would be trialled with existing learners and a selection of former students. A date was identified when former students would be invited to participate in the trial of the carousel tasks. It was decided to combine the event with the mentor training activity.

The initial intention was to identify maths concepts that might be employed in the carousel; however given the need to assess the applicants' process skills it was decided that a selection of task/problems would be more pertinent. Initially ten tasks were identified and each was evaluated against the criteria. A combination of three tasks was identified that together covered the criteria at least once. The three tasks chosen for the carousel were designed to be completed as a collaborative activity that could provide sufficient challenge and ample opportunity to demonstrate the process skills required and a range of personal skills. In one instance this involved the task being presented in several completed states, with the participants having to identify the correct answer.

As each task was completed it was trialled with existing students, the tasks were introduced as warm-up exercises at the outset of lessons. The trial with former students had to be abandoned as the mentor training overran and left no time to complete the trial. As each task was trialled, amendments to the layout and appearance were made based on the comments of the learners; however the fundamental nature of the task was not changed.

Guidelines for the carousel's application were devised and added to the assessment strategy. Materials were combined in a trainer pack so that the carousel could be applied by others unfamiliar with its design.

We produced:

- A mapping document comprising the process skills and aspects of the SVUK criteria. The mapping document assisted in the design of the tasks and would support the development of a range of further tasks to be used with the screening tool.
- An assessment strategy that would allow the necessary skills to be identified and supported a more learner-friendly method of assessment. Guidance on its application was written and added to the assessment strategy.
- An assessment feedback sheet was produced for tutors to complete whilst observing the participants completing the tasks.
- Three tasks were produced that provided the opportunity for both process and personal skills. These three tasks are representative of the kind of tasks that could be employed as part of the screening tool:

The Solar System task was designed to develop understanding, and involve extended mathematical problem solving in an unfamiliar situation.

The Building Extension task provides participants with the opportunity to demonstrate good understanding in an unfamiliar situation.

The Department X task provided a context with which participants may be familiar and an opportunity to develop understanding of modelling a situation.

- A Notes and Reflections document was produced for participants to complete whilst moving around the carousel.

Feedback from trainees

The tasks were trialled with current numeracy trainee teachers in small groups as proposed in the assessment strategy. They were given the tasks in the form of a warm-up activity at the outset of three sessions and all tasks were completed before the purpose of the tasks was revealed.

What was interesting was that trainees' opinions of the tasks changed when the purpose of the tasks was revealed. During the trial the trainees performed very well with one of the tasks and struggled to complete two of them. When the purpose of the tasks was revealed many considered the tasks too difficult and some considered the contexts in which the tasks were set to be the main problem. Having explained that successful completion of the tasks in the time given was not essential and that the purpose of the task was to identify process skills, many trainees stated they preferred the process that had been applied to them during their interview and screening process.

Trainees involved with the implementation and piloting of functional skills did identify the tasks as a suitable tool for assessing functionality.

The general consensus was that the skills required to complete the task were at Level 3. Whilst trialling the tasks with current trainees it soon became apparent that two of the tasks produced the most difficulty. =The solar system task posed the greatest challenge and whilst all the groups identified the issues involved, none of them was able to provide a solution that addressed the issues.

All groups eventually identified the correct graph in Department X; however several groups struggled to interpret the graph and suggest ways of growing the provision. The main problem that learners identified with Department X was the way the information was provided and several suggested that a bullet point list of constraints would have been easier to follow.

Lessons learnt

The tasks designed for the carousel did allow participants' mathematics process skills and personal skills to be observed. Furthermore the combination of the three tasks provided enough evidence for the aspects of the SVUK entry criteria to be assessed.

However there are also several concerns raised by the trial. The majority of people who took part in the trial considered the tasks to be too difficult, as did other specialist numeracy tutors. The design of tasks that provide sufficient stretch for individuals yet are not impossible to achieve is a difficult balance. By their very nature problems should require participants to employ current knowledge in contexts that are both familiar and unfamiliar and develop new knowledge. It is the very essence of what is required from participants to demonstrate functionality. If tasks are comfortably within the ability of participants they are simply exercises that provide participants to demonstrate current skill levels. What is very apparent from this project is that functionality is a difficult concept to assess and possibly a rare commodity even within the numeracy workforce.

Given the possible replacement of basic skills with functional skills there is a need to develop a greater understanding of the functional skills required by the numeracy workforce.

Next steps

The carousel will be employed with applicants to the numeracy subject specialist teaching qualifications in the 2010/11 academic session. The methodology and screening tool will be evaluated after the recruitment process and if considered a valid and reliable approach, further tasks will be developed to create a bank of tasks that can be combined together in different combinations. Given the issues that emerged during the completion of the project it is intended to carry out further research into the assessment of functionality, and to what extent functionality exists within the workforce.

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