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A Framework for Formative Assessment: initiating quality learning conversations

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Problem

This case study is based on a level 2 unit that forms part of the curriculum of a BEng (Hons) Engineering programme. The unit introduces a software engineering theme and draws on knowledge and skill areas that are different from those which form the focus of the other units on the course. A survey indicated that students perceived the unit as not being central to the specific engineering discipline in which they were interested and judged the unit to be of less relevance to them than the other units studied. This was particularly the case for the part-time students who were already practitioners in specific engineering roles. These students saw less need for the 'broadening subjects' that comprise the curriculum. Students had the tendency to 'slow start', not completing early formative tasks designed to aid completion of the summative assessments later in the unit. This resulted in a lack of understanding of the early material thus forming a poor foundation for later, much more complex, concepts. Conversations about the quality and quantity of student learning in process were mainly initiated by the tutor answering questions that the students had not themselves even formulated.

Intervention

The intervention described here uses a redesigned formative assessment strategy that encourages and enables learners to instigate conversations about their learning.

The intervention has a number of key features:

1. All 'classroom-based' learning activities have stated intended outcomes, which articulate the specific knowledge, understanding and skills (both cognitive and practical) associated with that activity. The activities are designed to allow the outcomes to be delivered at different levels

2. These activities require learners to undertake specific preparation, participate in the sessions and make a self-assessment of whether they have met the intended outcomes at a threshold level or above

3. The students record on a single 'progress record' the preparation, activities and post-activity self-

assessment and identify the extent to which the outcomes have been met

4. The students record specific questions for the tutor based on outcomes that they feel they have not yet met.

The activities and the ensuing learning conversations between peers and between learner and tutor focus strongly on what the learner is 'doing', as well as the output from what they are 'doing'.

The progress record is an important aspect of this as it makes the learning tasks explicit and provides a visualization of the extent to which each learner is actually engaging with their own learning.

The specific questions (in 4, above) are formulated and recorded by the learner. The intention here is that by 'owning' these questions, the answers themselves have greater meaning. Further, the learner is instigating the conversation which forms the formative assessment activity. The use of language and structure adopted when the learner articulates these questions can be used as an indicator of the extent of learning. From a SOLO Taxonomy perspective (Biggs, 1999), some learners construct and articulate highly relational questions whereas others, with a less sophisticated understanding of the subject area, tend to pose unistructural or multistructural questions. This provides a quick diagnosis that allows the tutor to explore answers in different ways with different learners

to reflect their level of development. Multistructural questions formulated by the students were identifiably short and focused on the acquisition of facts or the clarification of definitions, 'what is verification?' More relational questions were longer, more sophisticated and dealt with the application of higher level ideas and concepts, '… so what sort of verification techniques would be used in these circumstances?'

Evaluation

The intervention is based on the Mexican Hat Approach[1] (Robinson & Udall, 2003) and has been evaluated by the authors and two external researchers, using inventories and a variant of the Delphi technique[2] (Linstone & Turoff, 1975). For this particular evaluation exercise, the Delphi technique used was computer-mediated. This maintained the advantages of Delphi as a feedback technique but allowed the approach to be more quickly conducted.

From a pragmatic viewpoint, the result of this intervention was improved unit pass rates and higher quality learning outcomes leading to all learners achieving at least a threshold pass.

From a learner perspective, the evaluation results show the importance of clear intended outcomes for activities. These were seen as key to identifying why things were being done, rather than just what was to be done, which was their prior experience of very task-oriented activities. Learners also

felt that they had a much better understanding of how well they were doing as they progressed through their studies and the summative assessment did not come as a big surprise. Some of these learners felt that the intervention reduced anxiety and improved their motivation for study generally.

From a tutor perspective there was clear evidence of a higher quality, learner-driven, dialogue about learning. The conversations were more readily instigated by the learners and comprised richer and deeper questioning.

Developments

As a student explained as part of the evaluation 'More units should adopt this technique as it makes it far clearer what is expected of me and I find it easier to learn the subject.' The framework is currently being used and developed across a number of different units and courses, both at Southampton Institute and in other higher education institutions.

The framework has now been adapted to form part of a Virtual Learning Environment (VLE) and the outcomes of this project will be evaluated later in the academic session.

Notes

1. **Mexican Hat model**
   The Mexican Hat model promotes the design of an aligned teaching, learning and assessment strategy with a particular focus on increasing formative assessments, but within a manageable overall assessment workload. The model provides a visualization for students and teachers of the quantity and quality of learning in process. Therefore, providing an ongoing indication of the likelihood of which students will achieve success so that the appropriate type and level of support can be targeted.

2. **Delphi method**
   After an initial individual non-collaborative brainstorming session in the classroom on a specific question, the facilitator collates the group's views and emails them to each student as a questionnaire. The students' reflections are processed and a revised questionnaire is sent asking students to assess the merit of each idea, using a scale that ranges from '0' (no potential) to '7' (very high potential for dealing with the issue) or 'N' (no judgement).

References

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Keywords

Formative assessment, student self-assessment.

Biography

Alan Robinson is Associate Dean (Operations) and Mark Udall is Principal Lecturer in Computing and Educational Developer for the Faculty of Technology at Southampton Institute. Their research interests currently focus on formative assessment and the related issues of student participation and retention. The Mexican Hat Approach project has been developing for 5 years and has received funding from both Southampton Institute and Learning & Teaching Support Network (LTSN) - Engineering.