

Promoting independent learning by curriculum design and assessment

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Abstract

Purpose This paper evaluates whether the revalidated Magnetic Resonance Imaging (MRI) programme encourages independent learning by its curriculum design, delivery and assessment.

Results Evidence regarding the promotion of independent learning was gained from learners and external examiners. The scientific publications, presentations and posters that the learners contributed in the professional arena during or subsequent to programme completion were seen as indicators of independent learning, as this lay beyond the remit of the course.

Conclusion The ethos of the programme to promote independent learning has been successful.

Introduction

This article relates to the M.Sc programme in Magnetic Resonance Imaging (MRI) delivered at St Martin's College, now the University of Cumbria. The learners are mature employed staff, working in clinical practice. The programme has three exit points which are post graduate certificate, diploma and Master of Science. This programme fulfils the academic criteria of such a programme and concurrently assesses clinical competence. The latter is qualificatory and will not be discussed further.

At the re-validation the ethos of the programme leader, was to

- learn lessons from the initial programme delivery and its evaluation by all the key stakeholders, for example learners, staff, mentors and employers
- embed, via the curriculum design, delivery and its assessment independent learning with 'learning to learn' being seen as equally important as curriculum content.

Embedding 'learning to learn' as a transferable skill early on in a curriculum has been shown to provide students with the skills to take charge of their own learning (Whittle and Eaton, 2001). The development of these skills is most effectively facilitated when embedded within the academic field of study, therefore the necessary skills and knowledge can be acquired not in the abstract, but by application to real scenarios and cases (Bloxham, 1999). Independent learning is the creation of opportunities and experiences necessary for learners to become capable, self reliant, self motivated, life long learners (author, 3) 'in which the learner, *in conjunction with relevant others, can make the decisions necessary to meet the learner's own learning needs*' (Kesten, 1987).

Key features of independent learning

Independent learning is based on activities which enable learners to take responsibility for their learning, and is essential for life long motivation and growth (Aspin and Chapman, 2006). Independent learning allows learners to develop skills and competences in the workplace and to demonstrate information fluency, that is the ability to apply the skills associated with information literacy, computer literacy and critical thinking to address and solve information problems across disciplines, across academic levels, and across information format structures (author, 2006). The development of information fluency is embedded in the first MRI module, which contains *inter alia* study skills with a related self study workbook, literature and data base

searching, writing at masters level, concepts of mastery and reflection. This is critical as many radiographers are non-standard entrants who hold a professional diploma, not an undergraduate degree.

Teacher's role

The key features of independent learning is that the teacher, as the learning facilitator, must provide a suitable learning environment; the establishment of an appropriate relationship between the teacher and learner; and the teaching and modelling of skills needed for independent learning. Independent learning involves the teacher and learner in an interactive process that encourages learners' intellectual development and their capacity for independent and reflective judgement (author,3). This ability to reflect is considered in the first module and practiced in the assessment for that module, where the student has to make a reflective judgement regarding the appropriateness of an imaging protocol they use in practice. This concept is revisited throughout the programme, with students making decisions regarding the most appropriate area of their practice on which to reflect via the programme assessment. Guidance and support by the teacher is progressively reduced until the learners can make these judgements independently. This shows a transition from external guidance by the teacher, through shared guidance, to internal guidance by the learner. In effect the teacher's role is gradually taken over by the learner, in that after graduation optimum independent learning can take place (ten cate, 2004).

The learning environment

This must be supportive and address the interests and concerns of the learners (Bloxham, 1999), for example the theoretical underpinnings of the MR programme relate to practice issues which the learners engage on a daily basis. The learners need to see the curriculum is relevant to them, for example to succeed on the programme, and also the learning should be a vehicle to concurrently develop them as autonomous learners (author 3). An example would be the curriculum providing skills such as the preparation of scientific posters. This enables learners to succeed in this assessment, whilst synchronously providing a relevant life long skill which will facilitate the learners in the future when participating in the conference arena. The environment in which independent learning flourishes is one that is sensitive, flexible, democratic and responsive to the learners needs, in order that a strong sense of purpose and motivation is developed. For learners to take responsibility for their own learning they must believe that learning can be enhanced by effort in order that they persevere and maintain intrinsic motivation in the face of difficulties (author 3) with detailed formative and summative feedback vital. The MRI programme provides this by assessment cover sheet feedback, and mentor and personal academic tutor feedback within the learner's personal development portfolio, recorded on a module by module basis. The attrition rate from the MRI programme is less than 2% which suggests that learners feel that despite the difficulties mature learners typically face, their investment in the programme is valuable, relevant and enhanced by the feedback provided.

Teachers need to provide opportunities and strategies for learners to learn independently, for example by enquiry focussed activities (Horne, 2006) and active learning (Sivan, 2000) built into the programme. However it is the learner who will create meaning from the experience, for example by applying their learning to their practice. This is the purpose of one of the assessments in the third module of the programme, where the learners are charged with the analysis of a communication incident, the learning from which will inform subsequent practice.

A motivating factor in independent learning is allowing the learner to pursue their own interests, for example by giving a broad but clear assessment remit which will allow them to focus on an issue within the module of clinical relevance to them, to ensure the task is meaningful and the knowledge gained useful (author 3,). Thus an assessment remit that charges the learner to present a scientific poster relevant to both the second module and their practice will be more motivating than one on a pre-determined topic. Another example of this broad brief is in the first module where a physics practical file has to be submitted. In this the learners undertake several tasks including evaluating a pulse sequence, undertaking a risk assessment and writing a briefing leaflet for a clinician regarding MRI. The learners tailor these tasks to their own practice, and all activities may change their subsequent practice. In the first module, one assessment is a reflective essay which evaluates a MRI protocol the student uses in their workplace for a specific brain pathology. They are charged with reflecting on their protocol in the light of the literature base and either justifying their protocol or suggesting improvements to it. Several mentors have commented that this exercise has advanced departmental practice and optimised imaging.

An antagonist to the development of lifelong independent learning can be the clinical learning environment, for example a workplace which is unsupportive, research is not encouraged and independent life long learning

attributes are excluded from job selection criteria, which can be at odds with the university culture (Sim et al., 2003). Mechanisms for feedback and support in clinical practice need to be optimised (Brown, 2004). In the MRI programme these problems are minimised via compulsory mentor training with a signed commitment to participate in student support and a strong tripartite relationship; learner, mentor and University teacher. These strategies have evaluated well by all three parties.

The relationship established between the teacher and learner

This should be such that increased learner responsibility evolves as the programme progresses. Teachers assist the learners in mastering the decision making process so that the learners gain not only knowledge and experience but are able to grasp the personal meaning of this to their own needs (author 3,), for example in the MRI programme via an assessment that requires learners to reflect on a management change that was made in clinical practice. They evaluate the basis for the change and its implications with reference to theoretical models, resulting in learning that is valuable in the workplace.

The teacher learner dynamic needs to build self confidence and be collaborative with the teacher facilitating and supporting learning in a variety of ways, providing on-going formative and summative feedback and conveying to the learners that learning independently is as important as the content learned (Aspin,). In the MRI programme the learners become empowered to change practice via some of their assessments and to contribute to the profession's knowledge base via subsequent presentation and publication of their work. This has social and personal worth, a described feature of independent learning (ten cate, 2004). For independent learning to be successful provision must meet the demands of the learner (Parker,), thus the teacher must be facilitative and engage the learner, for example by relevant assessment that meets the needs of both the student and the university.

The teaching and modelling of skills needed for independent learning

Such skills need to be embedded within the subject matter, not taught in isolation and independence comes from having learned and practiced a task. As the learner develops, the transfer of responsibility for the learning from the teacher to the learner is achieved in four steps, show learners how, provide practice, have learners structure activities, have them use activities independently, for example within the MRI programme the learners have input in their first module regarding the different levels of academic writing from description to critical evaluation. They undertake exercises to distinguish between levels of writing and then they practice the skill of writing at "M" level. Formative feedback is available on their first assessment prior to submission.

In the second module there is a scientific poster assessment. The learners have input on how to undertake a poster, they evaluate anonymised former poster submissions and they brain storm appropriate topics in a supportive environment. Prior to poster preparation the learners submit an abstract as they would for a scientific conference, which can be rejected until it reaches an appropriate standard, which aims to encourage learners to participate at such events after completion of their programme, demonstrating independent learning.

Independent learning is a cyclical process as learning a skill at one level can underpin the learning of a further skill, for example in the first module, the learners practice levels of writing, from description through to analysis, synthesis and evaluation. This is developed in the last taught MRI module where the learners are charged with writing their own aims and objectives for their assessment (which have to be agreed by the programme leader as being at the appropriate academic level). When submitting, they write a self evaluation of the extent to which they have achieved their aims. This is congruent with independent learning, that is the learners have freedom of choice in determining objectives within the limits of an assessment, and they have the opportunity to realistically appraise their shortcomings (Candy, 1991). This assessment in turn moves the learners on to formulating their own aims and objectives within their research dissertation.

Is there evidence the MRI programme engenders independent learning?

A past chief external examiner (who is an editor for Radiography, the profession's peer reviewed journal) believes that 'much of the work submitted for the programme is worthy of publication'. Other external examiners state; 'the assessments are stimulating and vocationally relevant'; 'the varied and imaginative assessment regimens develops the professionalism and future confidence of the learners in their clinical MR work and future professional role extension.' Albeit the opinion of individual examiners, this suggests that the course assessment shows evidence of learners who are capable, self reliant, self motivated, life long learners. The most tangible evidence of this is the contribution to the profession the students have made post programme completion. Learners report that they would never have submitted work for conferences or publication prior to undertaking the programme, but after the programme some learners have published

their case studies or felt empowered to submit for publication subsequent ones in 'Radiography'. Several learners have submitted their posters to national and international conferences or felt empowered to submit subsequent posters. Two learners have won awards for their posters. The latter award had only previously been presented to doctors. Some learners have felt empowered to speak at conferences based on their research dissertations and enabled by the presentation skills they learned. These skills were initially practiced on the course free from the pressure of summative assessment (Bloxham, 1999), and were subsequently had assessed in the final taught module. Several learners are working towards publication of their dissertations, critiques of a communication incident and their reflective essays.

As post graduate educators, we have an obligation to empower post graduate learners to become independent learners by carefully considered curriculum design, delivery and assessment, rather than just trusting to luck this will happen, because

'the sole true end of education is... to teach men how to learn for themselves, whatever instruction fails to do this is effort spent in vain' (Trippitoe, 2003).

Conclusion

This article has shown that by curriculum and assessment design learners can be encouraged to learn independently. This allows the learners to change practice, to continue to advance themselves, and to develop the knowledge base of their profession.

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