

Peer assisted learning: a planning and implementation framework: AMEE Guide no. 30

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Abstract

Much has been written about the benefits and applications of Peer Assisted Learning (PAL) in the literature. Curriculum developers increasingly consider PAL as a vehicle to help undergraduate healthcare students learn to teach; an outcome which has received more attention in the UK since the General Medical Council stated in Tomorrow's Doctors that medical graduates must 'Be able to demonstrate appropriate teaching skills'.

This guide is primarily designed to assist curriculum developers, course organisers and educational researchers develop and implement their own PAL initiatives. It is structured around a PAL planning framework consisting of 24 questions. The questions are grouped in threes, around eight themes. Each question is discussed with reference to the PAL literature and other related subjects, and is exemplified by responses from a recent PAL project developed at The University of Edinburgh. Working through the 24 questions, particularly with discussion in a small planning group, will enable readers to efficiently develop their ideas for PAL into comprehensive and practical project plans cognisant of current educational theory, existing PAL literature and the local context.

The framework is particularly suitable for those who want to develop healthcare undergraduate PAL initiatives yet have little or no experience of PAL, as it provides an introduction to the relevant literature field and a step-by-step process for the design and implementation of such projects. It will also be of interest to those with experience of PAL and those seeking a structured framework for planning non-PAL curriculum developments in undergraduate healthcare curricula.

Background to the academic field of peer assisted learning

Much has been written in the education literature on the applications of Peer Assisted Learning (PAL) and the associated cognitive, pedagogical, attitudinal, social and economic benefits (Goldschmid & Goldschmid 1976; Kulik et al. 1979; Trevino & Eiland 1980; Wagner 1982; Topping 1996; Maheady 1998; Topping & Ehly 1998). Great diversity in terminology and definitions of types of PAL exists, largely due to the variety of approaches, historical origins, academic disciplines and countries in which PAL has been developed. Box 1 lists some of the different terms used for PAL in the literature, although these are not necessarily interchangeable and some have additional non-PAL meanings. A helpful working definition of PAL which seems sufficiently inclusive is:

People from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching (Topping 1996).

The important points to note are that those helping their peers to learn are from similar social groupings to the learners (although not necessarily from the same course or year of study) and are not themselves professional teachers or 'experts' in the subject. PAL tutors therefore typically have less expansive knowledge of subject matter, less developed

Practice points

- PAL is increasingly employed in healthcare education for a variety of reasons.
- There is a considerable body of literature on PAL available to healthcare educationalists.
- A number of common factors need to be considered when developing any PAL initiative.
- Many difficulties and pitfalls of PAL can be avoided if considered in the planning stages.
- A PAL planning framework facilitates the rapid generation of robust PAL project plans which take account of the existing literature, common pitfalls and local contexts.

teaching skills and less authority than 'expert' tutors (Damon & Phelps 1989). 'Helping each other to learn' is sufficiently broad that it encompasses peer participation in virtually all educational activities normally performed by professional teachers in both formal and informal settings – including, for example, the production of learning resources (Shanks et al. 2000; Kjellin et al. 2003) and peer assessment (O'Donnell & Topping 1998; Topping 1998; Falchikov & Goldfinch 2000; Morris 2001; Morrison et al. 2003). Emphasising 'By teaching' helps

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Box 1. Synonyms and specific forms of Peer Assisted Learning (PAL) from the literature.

Peer appraisal	Collaborative learning
Peer review	Learning cells/Student dyads
Peer assisted study	Parrainage
Peer assessment	Proctoring
Peer tutoring	Students helping students
Peer teaching	Student teaching assistant schemes
Peer counseling	Student teaching/tutoring/mentoring
Peer assisted writing	Study advisory schemes
Peer supported learning	Supplemental Instruction (SI)

Note: These are not necessarily interchangeable and some have other non-PAL meanings.

distinguish PAL from other types of group activity and cooperative learning (Rogers et al. 2000), and from initiatives in which medical students act as standardized or simulated patients but do not teach or assess (Damon & Phelps 1989; Blatt et al. 2000). Students presenting their work, engaging in problem based learning or practising their clinical skills and receiving feedback in a group context are generally not considered to be PAL if there is no overt teaching activity, or if sessions are being led by staff. In this guide we shall draw primarily on literature relating to formalised PAL initiatives in undergraduate healthcare education.

PAL has occurred informally in medical and allied health education throughout history (Wagner 1982; Costello 1989; Gibson and Campbell 2000), but recently there has been considerable international interest in adopting a more formal approach to PAL in undergraduate (Solomon & Crowe 2001; Nestel & Kidd 2003; Morris & Turnbull 2004; Ross & Cumming 2005) and postgraduate (Rogers et al. 2000; Morris 2001; Wong et al. 2004) healthcare education. One of the key drivers for this in undergraduate medical education in the United Kingdom was the General Medical Council's statement that medical graduates must 'Be able to demonstrate appropriate teaching skills' (GMC 2003).

The benefits of healthcare students to learn to teach and of having some teaching experience by graduation have been highlighted elsewhere in the literature (Bibb & Lefever 2002; Bardach et al. 2003; BMA-MSC 2005). Uncertainty persists however about what medical students 'learning to teach' actually means in practice, and how this can be translated into specific learning objectives, opportunities and teaching and assessment methods (Ross et al. 2006; Tierney et al. 2006). Whilst healthcare students may gain useful teaching experience working with patients, colleagues and occasionally other groups such as school pupils (Kamali et al. 2005), PAL approaches have been considered by many curriculum developers as a useful way of providing specific learning opportunities in teaching. Additionally, healthcare professionals are now expected to be skilled in lifelong learning (DOH 1999; Challis 2000; GMC 2004, 2006) and team-working (GMC 2006), and PAL approaches have been shown to help students develop competence in these areas also (Gibson & Campbell 2000; Gill et al. 2006).

Whilst much of the research on PAL in healthcare has focused on students of medicine, it has also been developed in nursing (Byrne et al. 1989; Owens & Walden 2001; Morris and Turnbull 2004), dentistry (Rhodes & Swedlow 1983; Bibb & Lefever 2002; Brueckner & MacPherson 2004), physiotherapy (Lake 1999; Solomon & Crowe 2001), occupational therapy (Folts et al. 1986), osteopathy (McWhorter & Forester 2004), psychology (Clement 1971; Fantuzzo et al. 1989), health sciences (De Volder et al. 1985) and veterinary medicine (Monahan & Yew 2002). Multi-disciplinary PAL projects have been developed with medical & dental students (Shanks et al. 2000); medical & nursing students (Gill et al. 2006); medical, nursing, dental & physiotherapy students (Perkins et al. 2002); and medical & veterinary students ('Coping with Stress' project at the University of Edinburgh). The majority of papers cited in this guide are from the medical education literature, but it also draws heavily on the literature of general and higher education and of the allied health professions. Of particular note in the non-medical literature is the review of PAL by Goldschmid & Goldschmid (1976), and the more recent work by Topping in reviewing the literature on peer tutoring and peer assessment in further and higher education (Topping 1996, 1998; Topping & Ehly 1998). Some specific forms of PAL, described by Topping as 'brand names' (Topping 1996), such as 'Supplemental Instruction' (Bridgham and Scarborough 1992; Blanc & Martin 1994; Sawyer et al. 1996; Congos & Schoeps 1999; Hurley et al. 2003) and 'Student Proctoring' in Keller's Personalised System of Instruction (Keller 1968; Kulik et al. 1979), already have a fairly fixed structure and plan which can be applied in new situations. In some cases guidance and training may be available (<http://www.umkc.edu/cad/si/>). They offer 'tried and tested' PAL methods for certain applications, and are an alternative to designing a completely new PAL project using the framework described below.

The development of a framework for PAL

The purpose of this guide

This guide supplements the PAL principles and exemplars in healthcare education from Ross & Cumming (2005) by providing a generic framework for the design and implementation of new PAL initiatives. It consists not of directions on how such an initiative should be developed, but rather a structured series of questions – the answers to which will form the basis of a project implementation plan. The framework arose out of an attempt to apply some of the general principles from the literature on learning theory and curriculum development (Biggs 1999; Harden et al. 1999; Wiers et al. 2002; Fish & Coles 2005; Harden 2005; Grant 2006), project management (Gale & Grant 1997; Obeng 2003) and the existing PAL literature to the planning of new PAL initiatives at The University of Edinburgh. Background research for the framework began with a review of PAL and related topics in the medical education literature – a rich source of insights and examples from the planning, development, realization and evaluation of previous projects, and tips and guidance on the

Box 2. Typology of Peer Assisted Learning (from Topping and Ehly (1998), our interpretations in brackets).

Curriculum content

Contact constellation [e.g. groups of various forms or pairs]

Within or between institutions

Within or across year groups

Same- or across-ability

Fixed or reciprocal roles

Timing

Location

Characteristics of helpers [tutors]

Characteristics of helped [tutees]

Objectives [aims for tutors, tutees & institution]

Voluntary or compulsory [recruitment of tutors & tutees]

Reinforcement [intrinsic or e.g. by paying tutors]

design and management of new PAL projects (Topping & Ehly 1998; Wadoodi & Crosby 2002; Draper 2006). The review and typology of PAL in further and higher education by Topping (1996) and Topping & Ehly (1998) was particularly helpful in the early stages in typifying the variables between PAL projects documented in the literature (Box 2).

Twenty-four questions about PAL

Some of the questions in this guide correspond directly to variables in Topping's typology; although some such as 'who will lead the project', 'whether there will be tutor-training' and 'details of the PAL interaction' do not feature in his typology. A tentative framework of 21 questions was initially constructed and piloted by the authors during the planning of a number of new PAL initiatives at The University of Edinburgh in 2005–6. These PAL initiatives were seen as somewhat specialized curriculum development projects, and action research on the application of the framework, together with ongoing discussion and critical review from colleagues, enabled the iterative development of the current PAL project-planning framework, consisting of 24 questions grouped in threes around 8 logical themes (Box 3). The descriptors were further refined in 2006–7 when the framework was first deployed to teach Year 4 medical students about curriculum development and course organisation at the University of Edinburgh, and was subsequently used by small groups of those students to plan their own PAL initiatives in-consultation with relevant members of staff. Four such student-led initiatives have been realized to date and it is hoped that these will be sustained and added-to by other students in future years.

Use of the framework

The framework is both comprehensive and simple to use, and in the author's experience seems to be particularly efficient when a small planning group of 3 or 4 people discuss each of the 24 questions in turn, electronically recording their responses below the questions on a blank template

Box 3. PAL project framework.

Background

Q1. What is the current situation and context in the curriculum?

Q2. Why is this PAL project being considered now?

Q3. Who is responsible for the project and who will lead it?

Aims

Q4. What are the aims and objectives of the project for tutors?

Q5. What are the aims and objectives of the project for tutees?

Q6. What are the aims and objectives of the project for the institution?

Tutors

Q7. Who will be tutors and how will they be recruited?

Q8. What training will tutors require and how will this be provided?

Q9. How else will tutors prepare themselves and reflect afterwards?

Tutees

Q10. Who will be tutees and how will they be recruited?

Q11. What related prior knowledge and experience will tutees have already?

Q12. What information and preparation will tutees require before the interaction?

Interaction

Q13. What will be the format of the interaction, and what resources are required?

Q14. What would be a typical plan of activities during the PAL interaction?

Q15. When and where will PAL interactions occur, and how will they be arranged?

Evaluation

Q16. What feedback will be collected from participants and how will it be used?

Q17. How else will the project be piloted and evaluated?

Q18. What are the academic hypotheses and how will they be tested?

Institution

Q19. Who are potential stakeholders in the project?

Q20. What are the staff time and funding implications of the project?

Q21. How could the project be developed, and how might it affect the curriculum?

Realisation

Q22. What are the potential pitfalls or barriers to the success of this project?

Q23. What are key points on the timeline for this project?

Q24. What actions need to be taken to develop the project, and by whom?

(available online) during the meeting to produce a comprehensive electronic project plan. After documenting their responses to the 24 questions, it is suggested that the group then synthesise their project plan by rereading and editing the whole document to ensure alignment, completeness and appropriateness to the local context. Whilst the questions have been arranged in a logical order, there is no perfect order in which to ask them as there is considerable inter-dependency. Some responses may therefore change

following consideration of later questions – for example the response on tutor training (Q8) may change following detailed consideration of what will happen during the PAL session (Q14). Responses may be long or short, complicated or straightforward, lay or academic – depending on the nature of the PAL initiative and the needs of the host institution. Responses may take the form of short bulleted sentences, as in the example in Appendix 1, although many alternatives are possible.

Each of the 24 questions is discussed below with reference to the published literature on undergraduate healthcare PAL and related fields. Many of the references are discussed as examples of what can be done in PAL projects – to illustrate the diversity and rich heritage of PAL in healthcare education – rather than examples of best practice or a comprehensive representation of the literature as it relates to the question. Example responses to each question have been included in Appendix 1, adapted from the project plan for the ‘Y4-Y3 Cannulation PAL’ which was first planned and implemented at the University of Edinburgh using the framework in 2005–6. It involves year 4 students tutoring three Year 3 students on peripheral intravenous cannulation on part-task training manikins in a clinical skills centre. The extracts are neither a comprehensive nor ‘gold standard’ template for responses, but simply examples to help illuminate the questions. The utility of the framework whilst planning the Y4-Y3 Cannulation PAL, and the subsequent implementation and evaluation of that project have been presented elsewhere (Anderson et al. 2006; Morton et al. 2006).

The ‘tutor’ and the ‘tutee’

For clarity ‘tutor’ has been used to denote those assisting the learning of their peers, ‘tutee’ for those being assisted, and ‘project’ to denote the initiative which is planned and described by the question responses. These terms are not intended to be prescriptive, and as with the terminology for PAL itself, different institutions may prefer or require alternatives. It is not uncommon in the literature for ‘student leaders’, ‘instructors’, ‘proctors’ or ‘advisors’ to assist the learning of ‘students’, ‘participants’, ‘subjects’ or ‘clients’. The term ‘students’ has been used to denote all non-expert learners (whether ‘tutor’ or ‘tutee’), and may include postgraduate ‘students’ such as junior doctors and those training to be nurse-practitioners. The terms ‘tutor’ and ‘tutee’ have also been somewhat stretched to accommodate forms of PAL interaction which differ from the typical ‘tutorial’ or other teaching session, such as in the production of learning resources, e-learning, distance learning and some forms of peer assessment. Tutor and tutee roles are not necessarily fixed either, as in reciprocal forms of PAL individual participants are at different times ‘tutor’ and ‘tutee’ (Hendelman & Boss 1986; Yeager & Young 1992; Nnodim 1997; Solomon & Crowe 2001; Johnson 2002; Brueckner & MacPherson 2004; Kassab et al. 2005; Krych et al. 2005). One form of reciprocal PAL which Topping (1996) highlights as particularly effective is ‘same-year dyadic PAL’ in which equally-matched pairs of students facilitate each-other’s learning (Annis 1983; Fantuzzo et al. 1989). Even in reciprocal

forms of PAL it is generally helpful to consider both tutor and tutee training and activities separately during the planning stages, although certain aspects of the project, such as timetabling, may be much more straightforward. When PAL tutors teach on pre-existing courses (Moust & Schmidt 1994; Nestel & Kidd 2003) much of the planning of the teaching has already been done, but it is still recommended that each step of the framework is followed to ensure that no important aspect of the project plan is omitted.

The PAL ‘project’

The term ‘project’ is used here and elsewhere (Bazell et al. 2004; Ribeiro et al. 2005) to denote a focused initiative in curriculum development or course organisation, and relates to the concepts of project planning and project management from business and educational technology literature (Laurillard 1993; Obeng 2003). It should not be confused with other uses of the term for ‘student projects’, amateur interests, or time-limited one-off activities; rather it denotes the background research, planning, implementation, evaluation, sustenance and ongoing development in a defined area within the context of a wider curriculum or programme. The framework is focused on developing individual PAL projects embedded within, or extracurricular to, the core curriculum. Most institutions do not currently make extensive use of PAL in their formal core curriculum, although in the very small number of institutions that do (Sobral 2002) a more integrated approach than that taken by this framework will probably be required, so that the whole curriculum with multiple PAL initiatives can be considered collectively. In such programmes it may be possible to offer generic tutor-training (Sobral 1989), a number of different complementary PAL teaching experiences and perhaps the integrated assessment of a students’ competence in teaching. Courses for healthcare students on learning to teach which are not linked to specific PAL projects (Pasquale & Pugnaire 2002; Bardach et al. 2003), and initiatives to increase student participation in educational management and organisation (Visser et al. 1998) and the evaluation of trainee medical teachers (Fry & Morris 2004) have also been reported in the literature, but detailed discussion of these topics is beyond the scope of this guide.

Additionally, whilst student peer-assessment is briefly discussed below, this aspect of PAL is not covered in great detail herein, so readers requiring more information about the issues and practicalities of learners assessing their peers may wish to read some of the expanding literature on this subject (Topping 1998; Morris 2001).

Questions relating to peer assisted learning

Background for PAL

Q1. What is the current situation and context in the curriculum? All curriculum development projects occur within the wider context of the undergraduate or postgraduate curriculum and the host institution. Understanding the

philosophy, ethos and culture of the institution and programme, together with detailed knowledge and experience of the existing curriculum, are invaluable when planning any new curriculum development. The approach to PAL may be very different in problem-based, systems-based and traditional curricula for example; and these will be very different to the approach to PAL in one of the few institutions with an established culture of PAL, centralized support and multiple projects embedded throughout the programme (Sobral 2002). Some institutions have stated policies or precepts which regulate the development of new PAL initiatives, such as the 'Ten PAL Precepts' for the MBChB programme at The University of Edinburgh (e.g. 'Academic staff responsible for the subject must agree to the introduction of PAL and be aware of the proposed content and methods').

The proposed content of new PAL projects needs to be considered in relation to wider curriculum issues of stage, sequence, progression, linkage and context (Fish & Coles 2005; Harden 2005; Grant 2006). A number of general principles are likely to be common to most curricula, such as a focus on student learning (Biggs 1999; Prosser & Trigwell 1999; Ramsden 2003; Marton et al. 2005), constructive alignment of curricula with learning outcomes (Biggs 1999; Harden et al. 1999) and the need to comply with guidance from external regulatory bodies (GMC 2003). Though much about an institution's philosophy is often tacit, it is helpful to try to define this along with its educational principles and the key features of the existing curriculum, to inform the responses to subsequent questions and the final synthesis. Taking cognizance of well-established educational principles will ensure that even when PAL projects are to supplement core teaching, students will be protected from conflicting terminology or approaches, and teaching will not become needlessly repetitive. Other consequences also flow such as ensuring that PAL experiences link with other learning opportunities and contribute to course progression as a whole – perhaps contextualizing and integrating content which is already familiar to students, or extending their experiences and understanding in new areas.

Q2. Why is this PAL project being considered now? PAL approaches may be considered to address gaps in student learning identified during curriculum review or evaluation (Perkins et al. 2002) or as additional support on courses with relatively high failure rates (Hoad-Reddick & Theaker 2003; Hurley et al. 2003). Complex learning and concept manipulation seem to lend themselves more to PAL approaches in this regard than does rote-learning of factual information (Clement 1971). Alternatively there may be new learning outcomes or drivers from external and political sources that must be addressed, as with the GMC requirement for UK medical graduates to have some teaching experience (GMC 2003) and the apparent lack of dental graduates interested in academic careers (Bibb & Lefever 2002). It is important to document the range of issues and drivers that have prompted consideration of a PAL project and the reasons why PAL was considered in preference to non-PAL alternatives. This will bring focus to the proposed subject or content area of the project and may also

be relevant when considering stakeholders (Q19) and potential barriers to success (Q22).

Change is a feature of modern life, and many authors highlight the great potential to capitalize on change by 'managing' it actively (Ford et al. 1996; Gale & Grant 1997; Harden 1998; Obeng 2003). The first step towards actively managing change however is to recognize and, where possible, define it. Some papers report that financial issues or staff recruitment difficulties featured highly in the decision to try a PAL approach (Goldschmid & Goldschmid 1976; Wagner 1982; Haist et al. 1997; Glynn et al. 2006). Whilst limited resources may be an additional consideration in choosing PAL, ethically it is hard to defend replacing staff with students for financial reasons unless one can demonstrate that neither PAL tutors nor tutees are disadvantaged. It is wise to consider such ethical issues at an early stage, and consider submitting the project proposal for ethical review. This is especially important if the student cohort is not to be offered equal access to the same teaching and learning experiences (see also Q18 and 19) or if established methods of teaching core material is to be replaced with those that might be considered inferior. The more clearly defined the rationale and purposes of the project, the more focused the project will be in addressing them. In summary responses to this question define the 'problem' that PAL is going to solve.

Q3. Who is responsible for the project and who will lead it? PAL initiatives generally require a team approach, and it is helpful to consider who might be part of the organizing team and who will take the lead. As with most projects, the leader should maintain vision and direction, and coordinate the decisions, communications and actions of the group (Gale & Grant 1997; Obeng 2003). Some authors have suggested that PAL initiatives should be led by students, and that 'The less explicit the involvement by staff, the more likely the student-centred nature of the initiative will be maximized' (Wadoodi & Crosby 2002). There are a few examples in the literature of PAL initiatives led by students alone (Johansen et al. 1992; Shanks et al. 2000), or led by students with non-directive staff 'advisors' (Hurley et al. 2003), but the great majority are developed and led by a combination of staff and students. One paper reported 'deficiencies' which they attribute to insufficient support and supervision of the project by staff (Johansen et al. 1992) and another states 'Students have generally not learned to actively shape their own learning environment. Even in the 'equal' peer situation, the teaching staff should help them in organizing and running the new learning situation.' (Goldschmid and Goldschmid 1976). Most authors recommend a combination of staff and students in the organizing team, as even with staff involvement students can be encouraged to take the lead in the detailed planning, promotion and delivery of all aspects of the PAL intervention (Bibb and Lefever 2002).

The aims of PAL for tutors, tutees and the institution

Q4. What are the aims and objectives of the project for tutors? The reported benefits and stated aims for PAL tutors in the literature are often multiple and typically include

pedagogic objectives, such as learning and developing the knowledge, skills and attitudes of a competent teacher (Bibb & Lefever 2002; Bardach et al. 2003; Tierney et al. 2006); academic objectives in content-related knowledge and skills (Goldschmid & Goldschmid 1976; Annis 1983; Topping 1996; Foot & Howe 1998; Chou 2005; Krych et al. 2005); and professional objectives of increased responsibility, confidence, self-concept and self-directed learning (Goldschmid & Goldschmid 1976; Cohen et al. 1982; Topping 1996; Foot & Howe 1998).

Joseph Joubert is reputed to have said 'To teach is to learn twice', and the evidence suggests that preparing to teach, and particularly the vocalization of content during presentation of information and in response to learner questions, involves different kinds of learning and cognitive benefits compared to simply learning for understanding (Durling & Schick 1976; Bargh & Schul 1980; McKeachie & Svinicki 2005). PAL tutoring seems to drive students to engage more with content, to synthesise and verbalize what they know, and to identify and address their own areas of weakness. This can lead to enhanced exam performance in the topics being taught compared to non-tutoring peers, and may also have more general cognitive and 'learning to learn' benefits (Bargh & Schul 1980; Cohen et al. 1982; Annis 1983; Topping 1996; Sobral 2002). Many authors believe tutors actually gain most from PAL interventions (Annis 1983; Krych et al. 2005). Aims for a project may be stated as general aims and outcomes or as specific learning objectives and competencies, and should ideally be both realistic and substantiated with evidence from the literature. It is, for example, unreasonable to expect students to become fully competent teachers after only a few isolated PAL teaching experiences, or to subsequently gain full marks in their own exams.

Q5. What are the aims and objectives of the project for tutees? The reported benefits and stated aims for PAL tutees in the literature are often multiple and include academic objectives, such as developing content-related knowledge and skills (Goldschmid & Goldschmid 1976; Haist et al. 1997; Foot and Howe 1998); personal and professional objectives, such as increased confidence, self-concept, personal responsibility for learning, and enhancing students' ability to cope with university life and exams (Rhodes & Swedlow 1983); and more social objectives such as opportunities to meet others in the same course and role-modeling (Goldschmid & Goldschmid 1976). As with aims for tutors, the aims for tutees may be expressed as general aims and outcomes or as specific learning objectives and competencies, and should be both realistic based on the nature of the proposed project and substantiated with evidence from the literature. Tutees receiving PAL as a supplement to their normal teaching have been shown to perform better in objective content assessments than non-PAL controls in some studies (Cohen et al. 1982). One study of PAL in which a control group spent an equivalent time working individually found that tutees felt PAL was very helpful to their learning of course content even when no significant difference in content understanding or exam anxiety could be measured objectively (Rittschof & Griffin 2001).

Direct comparisons between peer and staff tutors have shown equivalent objective outcomes for tutees in most but not all PAL applications, and suggest that PAL tutors provide tutees with a qualitatively different educational experience than staff, which may enhance meaningfulness, tutee motivation and the amount of individual feedback received (De Volder et al. 1985; Moust & Schmidt 1994; Sobral 1994; Topping 1996; Dolmans 2000; Steele et al. 2000; Howman et al. 2002; Perkins et al. 2002; Nestel & Kidd 2003; Kassab et al. 2005). One frequently highlighted theoretical advantage of PAL over staff teaching is the opportunity for 'scaffolded learning' in the tutees' 'zone of proximal development' (Vygotsky 1978; Topping 1996). The zone of proximal development is defined as 'The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers' (Vygotsky 1978, p. 86). It is postulated that the level of understanding that PAL tutors have on a particular subject is only a small step up from that of the tutees, which may serve to motivate and encourage tutees to learn and develop. Conversely the level of understanding of expert staff is likely to be so much greater than that of students that it may seem impossible to achieve or may be presented in such a way that it is too complex or advanced for tutees, leading to discouragement. As Moust & Schmidt (1994) observe, 'Student tutors seem to be more "cognitively congruent", they seem to be better able to understand, and to express themselves at, their students' level of knowledge.' Other advantages for tutees which were highlighted in Topping's review of PAL include more active learning, increased opportunities for verbalization and questioning, increased opportunities to make mistakes in a supported environment and reduced anxiety (Topping 1996).

Q6. What are the aims and objectives of the project for the institution? Clarifying how the project proposes to address the institutional, political and governance issues raised in Question 2 will help determine whether or not the project is worth developing, and whether it is likely to receive the approval of senior management in the institution. These are likely to overlap with the aims for tutors and tutees. Reported benefits and stated aims for the institution typically include enhancing a culture of collaboration and cooperation amongst students, increasing student morale and academic success, fostering student interest in institutional and academic activities, enhancing student-centered learning, addressing the requirements of external bodies such as the GMC and financial considerations (Goldschmid & Goldschmid 1976; Rhodes & Swedlow 1983; Sobral 2002; Morris & Turnbull 2004). For example, one institution perceived a need to train students in teaching so that they could provide a particular service as 'standardized learners' for the assessment of clinical teaching staff (Morrison et al. 2003). These students then assessed the teaching abilities of staff, enabling both groups to gain useful teaching experience whilst also addressing the needs of the institution.

PAL tutors

Q7. Who will be tutors and how will they be recruited? Outline the cohort from which the tutors will be drawn (by year, course of study, achievement level, etc), the experience and training these individuals will already have, both in teaching and in content-related knowledge and skills, and how they will be recruited and selected (advertising, compulsory vs. volunteer, on basis of grades, etc). In some initiatives, particularly in reciprocal PAL, tutors are drawn from the same cohort of students as the tutees ('equal' PAL), and in others they are more experienced or advanced in some way ('unequal' PAL). Some programmes require potential tutors to have passed all assessments in the relevant subjects (Glynn et al. 2006) or to have high academic achievement (Trevino & Eiland 1980; Escovitz 1990; Howman et al. 2002; Hurley et al. 2003; Forester et al. 2004); others ask course organisers to select or recommend suitable tutors (Walker-Bartnick et al. 1984; Lake 1999). Some tutors may be required to have completed a course on teaching (Sobral 1989). A few non-medical PAL projects have used tutors with lower-than-average achievement or learning difficulties (Maher et al. 1998; Scruggs & Mastropieri 1998), reporting considerable benefits of PAL participation for these tutors. The majority of PAL programmes however are open to any students from a particular year group becoming tutors (Reiter et al. 2004), although care must be taken in such cases to ensure all have equitable access. In most PAL programmes tutor participation is thus voluntary, either as an extra-curricular activity or student-selected component (Rhodes & Swedlow 1983), although there are a few programmes which are embedded in the core curriculum in which all students are expected to participate as tutors (Hendelman & Boss 1986).

Where student participation is voluntary, it may be helpful to predict the intrinsic and extrinsic rewards they may gain from participation, as this may have considerable bearing on recruitment and retention of PAL tutors. Reported intrinsic rewards include a positive and enjoyable experience, satisfaction at being able to help other students, gaining new insights and understanding, and developing skills (Solomon & Crowe 2001; Bibb & Lefever 2002). Some PAL initiatives offer extrinsic rewards to tutors in recognition of the teaching role they have assumed, which may take the form of payments, book tokens, academic credit or a certificate of participation (Trevino & Eiland 1980; Rhodes & Swedlow 1983; Escovitz 1990; Owens & Walden 2001; Sobral 2002; Hurley et al. 2003). Extrinsic rewards such as payments for tutors are more common in the USA than in the UK where they remain somewhat controversial (Goldschmid & Goldschmid 1976; Wadoodi & Crosby 2002). In the authors' experience the high level of tutor enthusiasm and intrinsic reward from PAL has been such that no additional recompense has seemed necessary at the time. There has, however, been greatly increased interest from students to participate and organise PAL initiatives in the UK over the past few years as they are now expected to write about teaching experiences in their applications for postgraduate training posts (a significant extrinsic reward). The requirement for extrinsic reward probably depends upon the extent to which tutors will be expected to give-up their own

time to provide a service for tutees, and on the level of intrinsic reward for each project.

Q8. What training will tutors require and how will this be provided? Answering this question requires consideration of the tutors' prior level of training and experience relating to the content and in teaching, the roles tutors will be expected to perform during the PAL interaction (Q14) and the aims of the project for tutors (Q4). Typical tutor roles include teaching new content, helping tutees assimilate prior knowledge or skills, producing learning resources, assessment with feedback, and student support (Goldschmid & Goldschmid 1976; Clarke & Feltham 1990; Goodfellow & Schofield 2001; Reiter et al. 2004). Tutors may be involved in a number of different activities during a PAL session (Bridgham & Scarborough 1992), each of which may require specific preparation and training. When tutors are expected to help tutees with content this may be in-relation to a specific course or teaching session (Walker-Bartnick et al. 1984) or more broadly responding to tutee requests during PAL sessions (Schaffer et al. 1990). On the basis of all this information, a needs-analysis can be performed and a training package developed as required. Training may include pre-training reading (which will need to be sourced or created), formal training sessions, and assessment of competence or 'validation' of content knowledge or teaching abilities (Clarke & Feltham 1990; Blatt et al. 2000). In some cases PAL tutor-training involves teaching by, or co-tutoring with, the previous 'generation' of PAL tutors; for example the Year 5 'senior tutors' working with Year 4 'junior tutors' described by Verburgh et al. (1971). PAL tutors may also require ongoing mentoring or 'coaching' by staff (Kernan et al. 2005). Most of the PAL literature suggests tutor training is perceived to be of benefit, and there is some evidence from studies in schools that tutor training enhances the outcomes for tutees (Cohen et al. 1982; Topping 1996; Chapman 1998), but there is insufficient evidence on this currently in the medical education literature. Some PAL initiatives do not offer any additional training for tutors (Schaffer et al. 1990; Rogers et al. 2000; Goodfellow & Schofield 2001; Reiter et al. 2004), although the organizers of one such project felt tutors might have received better assessments had they participated in formal training (Reiter et al. 2004).

Training commonly focuses on basic principles of teaching (including theory, such as defining teaching as 'facilitating learning', and practical training appropriate to the role tutors will perform such as leading a small group); the qualities expected of a teacher (such as timekeeping, respect, appropriate tutor behaviour and data protection of individual tutee marks or feedback); how to give constructive feedback, interaction format and related administrative procedures (sometimes with role-play or simulated PAL interactions); specific content knowledge or skills required; and a discussion about the issues and topics which may emerge during the PAL interaction (Rhodes & Swedlow 1983; Escovitz 1990; Blatt et al. 2000; Centeno et al. 2001; Solomon and Crowe 2001; Nestel & Kidd 2002; Wadoodi & Crosby 2002; Field et al. 2004). Often tutor training is relatively short and focused before the PAL interaction, although in some cases multiple focused training

sessions are scheduled over a more extended period of time (Sobral 1989; Blatt et al. 2000; Culver et al. 2003b) or occur on a more regular basis between individual PAL interactions in a series (Matthes et al. 2002).

Many authors highlight the importance of tutors appreciating the limits of their competence – admitting when they do not know something and advising tutees with serious educational or emotional problems to seek professional help (Walker-Bartnick et al. 1984). Other areas of tutor difficulty which may be addressed during training include clarification of the teaching role they are expected to perform and any lack of confidence or discomfort about the idea of teaching their peers (Solomon & Crowe 2001; Morris & Turnbull 2004). Where students are being substituted for staff in existing courses, they generally undergo the same training that staff would receive (Moust & Schmidt 1994) or participate in externally-accredited training (Weberschock et al. 2005).

Q9. How else will tutors prepare themselves and reflect afterwards? Tutors are usually encouraged to take responsibility for the preparation and management of their PAL interactions in a similar professional manner to staff. This requires thorough prior understanding of the practical arrangements, learning objectives, format, sequence of activities and room layout for the PAL interactions. If no staff will be onsite it may also include knowledge of emergency procedures and contacts in the event of fire or needle-stick injury. The tutor must also know what appropriate action should be taken if they cannot attend a PAL session and consider what they would do in a variety of challenging situations which may arise during the session, such as a tearful or disruptive tutee. Preparation may involve the creation of detailed lesson plans, teaching materials or visual aids such as handouts, PowerPoint slides, role-play scenarios or assessment materials (Clarke & Feltham 1990). In some cases they may need to research a topic in the literature, address specific clinical questions or discuss their intended approach to teaching with a mentor (Wong et al. 2004). In addition to preparation for the PAL interactions it is important that PAL tutors are encouraged to reflect on their teaching experiences afterwards (Schön 1987; Ramsden 2003). Specific tools for reflection such as learning plans, logbooks, diaries or significant event analysis can be used to facilitate this process (Byrne et al. 1989; Solomon & Crowe 2001).

PAL tutees

Q10. Who will be tutees and how will they be recruited? As with tutors (Q7), it is important to outline the cohort from which the tutees will be drawn (by year of study, level of achievement, etc) and how they will hear about and be recruited into the PAL project, for example as a required part of the formal curriculum or voluntary participation. In the latter, care must be taken in advertising the sessions to reach and appeal to all appropriate tutees and ensure equitable opportunity, otherwise only certain groups of students may apply such as those who regularly read notice boards or who are already high-achieving students. As PAL is often very popular, the recruitment system must be able to cope with

heavy demand. Tutees are typically in the same course of study as tutors at an earlier or equivalent stage of training, although exceptions to this have been reported in the literature. For example, one 'PAL' initiative involved final-year medical students tutoring clinical examination skills to experienced nurses on a nurse practitioner course (Gill et al. 2006); although it is debatable whether they can be considered 'peers'.

Some institutions have PAL programmes embedded in the core curriculum, with compulsory tutee participation (Hendelman & Boss 1986; Yeager & Young 1992; Bibb & Lefever 2002; Brueckner & MacPherson 2004; Forester et al. 2004; Weberschock et al. 2005). Other PAL programmes are developed for remedial purposes with only low-achieving students being invited to participate (Trevino & Eiland 1980; Collins-Eiland et al. 1991); or else they may be compulsory for low-achieving students but voluntary for others in the cohort (Bridgham & Scarborough 1992). Most programmes however are open to all students in a particular cohort who wish to participate (Rhodes & Swedlow 1983; Walker-Bartnick et al. 1984; Schaffer et al. 1990; Hurley et al. 2003).

Q11. What related prior knowledge and experience will tutees have already? Both the project-planning group and PAL tutors need to have a clear understanding of the likely level of tutees' prior learning, relevant learning objectives, and knowledge of ways in which the content has or is being taught and assessed in the curriculum (Q1). In many cases PAL projects focus on revision or development of prior learning, although in some cases PAL is used to teach content which may be completely new to the tutees (Bibb & Lefever 2002; Culver et al. 2003a). No curriculum development project occurs in isolation, and it is important to minimize needless repetition, confusing tutees with different terminology or approaches, and teaching material which is not relevant to tutees at their current stage. In some cases tutees' prior learning on a topic will be quite straightforward to determine (such as in the cannulation example below), but more complex or diverse topics may require more detailed investigation and curriculum mapping (Harden 2001; Shehata et al. 2006). Such mapping may also be of great use in other areas of the core curriculum for staff and students, increasing clarity and constructive alignment (Biggs 1999; Ramsden 2003).

Tutees' prior knowledge and experiences are important because 'Their experiences are fundamentally important to the way they perceive their learning situation and approach their studies in that situation' (Prosser & Trigwell 1999, p. 26). Tutee-centeredness is arguably one of the most important attitudes to nurture during any tutor-training. Assumptions about tutees' prior knowledge and experience should be avoided however, so that PAL tutors remain open and responsive to the needs of individual tutees in the PAL sessions – each of whom are likely to have slightly different levels of understanding of any particular topic and will find different aspects of the content difficult.

Q12. What information and preparation will tutees require before the interaction? Depending upon the nature of the PAL interaction, tutees may have to do some preparation. This may include background preparatory reading around the subject (which will need to be sourced or created), an overview of the PAL interaction detailing what is expected of tutees and how they can maximize the educational benefits, additional training (such as a CAL package), or asking tutees to keep a record of cases or problems to bring along and discuss. In reciprocal PAL tutees will receive the same training as tutors (Q8). One post-graduate PAL project required tutees to gather real clinical questions and send them to their tutor in advance so they could be addressed by the tutor during the PAL sessions (Wong et al. 2004). In some initiatives it would not be practical for tutees to prepare anything however, particularly in the few PAL projects which run within days of the tutees arriving at university (Bibb & Lefever 2002; Culver et al. 2003a). In most initiatives tutees are not expected to specifically prepare for the PAL intervention other than perhaps reading or hearing a brief description of what will happen during the sessions.

PAL interactions

Q13. What will be the format of the interaction, and what resources are required? Outline the format that PAL interactions will take (if known), listing the number of people who will be present in each group (tutors, tutees, staff, patients and any other participants) and any equipment and resources required. Various constellations of tutors and tutees have been reported in the literature, although the most common are large or small groups led by one or more tutors (Nnodim 1997; Solomon & Crowe 2001; Bibb & Lefever 2002) and one-to-one pairs or 'dyads' (Annis 1983; Walker-Bartnick et al. 1984; Fantuzzo et al. 1989). Many authors recommend PAL tutorial sessions be led if possible by two or more tutors for additional peer support, increased breadth of knowledge and skills (with tutors learning from each-other) and to reduce the chance of idiosyncratic teaching (Nestel & Kidd 2005; Ross & Cumming 2005). Some have suggested that the presence of staff may disrupt PAL interactions (Solomon & Crowe 2001) although in some cases a member of staff is integral to the PAL interaction (Kernan et al. 2005) and in others it may be desirable to have staff onsite and available if required but not actually present in the room where the PAL is occurring. If the interaction involves practising clinical skills such as history-taking or physical examination, real or simulated patients may be required.

Availability of suitable accommodation and equipment (such as audio-visual equipment, examination couches, simulation mannequins, etc) may restrict where and when the PAL interactions can take-place (Q15). The Y4-Y3 Cannulation PAL (Appendix 1) was limited by the number of available simulation mannequins. Other initiatives in the literature have been limited by the number of available small group rooms (Goldschmid & Goldschmid 1976). In some projects it may be desirable to consider ways of making the learning environment more welcoming, and so occasionally refreshments may be required (Hoad-Reddick &

Theaker 2003). In some cases the 'interaction' between tutors and tutees does not actually occur in any one physical location, but rather at a distance via CAL packages, written materials and 'learning objects' produced by PAL tutors, or via e-mail (Shanks et al. 2000; Kjellin et al. 2003). The format and resources required for distance and e-learning are often quite different to those required in face-to-face situations (Smith & Curry 2005; McKendree 2006).

Q14. What would be a typical plan of activities during the PAL interaction? Numerous different types of PAL intervention have been described in the literature, including traditional tutorials, demonstrations, seminars and presentations (De Volder et al. 1985; Hendelman & Boss 1986; Nnodim 1997; Weberschock et al. 2005; Zebrack et al. 2005); training in clinical skills such as communication, physical examination and practical procedures (Flax & Garrard 1974; Pepe et al. 1980; Escovitz 1990; Culver et al. 2003b; Nestel & Kidd 2003; Field et al. 2004; Chou 2005; Glynn et al. 2006; Graham et al. 2006); teaching in clinical situations (Byrne et al. 1989; Iwasiw & Goldenberg 1993; Wong et al. 2004); peer assessment (Topping 1998; Falchikov & Goldfinch 2000; Morris 2001; Morrison et al. 2003; Reiter et al. 2004; Dannefer et al. 2005); problem-based learning tutoring (Johansen et al. 1992; Sobral 1994; Steele et al. 2000; Solomon & Crowe 2001; Hoad-Reddick & Theaker 2003; Kassab et al. 2005); and combinations of these (Keller 1968; Ebbert et al. 1999; Bibb & Lefever 2002; Howman et al. 2002). Mentoring and other less-formal support are also common features of many different PAL projects, although this may not always be explicitly stated. One author identified 18 separate activities which regularly took-place during their PAL sessions (Bridgham & Scarborough 1992).

When PAL is used in the context of a pre-existing teaching session there may already be very clear guidance on what content should be covered in the PAL interaction and how this might be achieved (Nestel & Kidd 2003). When the PAL interactions are new, those designing the project often suggest a structured format and process for each part of the PAL interaction (Krych et al. 2005). There is some evidence from several studies that providing a structure in PAL interactions increases tutee satisfaction (Chapman 1998; Wadoodi & Crosby 2002) and objective outcomes (Cohen et al. 1982; Fantuzzo et al. 1989; Topping 1996). In contrast however, some PAL initiatives specifically do not pre-determine a structure for the interaction, encouraging tutors to decide on this themselves in advance (Kernan et al. 2005) or to respond spontaneously and flexibly to the needs of the tutees present (Trevino & Eiland 1980; Duggan 2000; Wadoodi & Crosby 2002). Even if tutors are expected to develop their own lesson plan or to be spontaneously led by the needs and preferences of attending tutees, it may still be helpful to suggest session formats which they may want to use and to highlight issues or topics which they might want to cover (Wadoodi & Crosby 2002).

Some PAL interactions involve working with real patients, and it may be prudent to remind tutors and tutees of what constitutes appropriate dress, behaviour and language; although healthcare students are generally very aware of

such issues. Some PAL interactions, particularly those on clinical skills, involve peer physical examination (PPE) between tutees and occasionally tutors (Krych et al. 2005). PPE occurs relatively commonly to varying degrees in healthcare education. It does, however, have considerable potential for embarrassment and even inappropriate behaviour, and may exclude those students who do not feel comfortable examining or being examined by their peers (Metcalf et al. 1982; O'Neill et al. 1998; Chang & Power 2000; Braunack-Mayer 2001; Rees et al. 2005). If peer physical examination is planned, suitable alternative subjects such as simulated patients should also be available for those who choose not to participate.

Q15. When and where will PAL interactions occur, and how will they be arranged?. With reference to other timetabled activities for student tutors, tutees and staff (if required), clarify the practical arrangements for the PAL interactions. If these are to take the format of small group sessions (Q13) arranged in advance, this involves decisions about how many groups will work in parallel at a single location, booking the required rooms and equipment, perhaps giving several potential dates to student tutors to decide on the most appropriate depending upon other commitments, and finally advertising to tutees when sessions are confirmed (Q10). Online sign-up systems, if available, are a very practical means to advertise PAL sessions to tutees, as they can typically see available places and book a place as appropriate. One study reported problems with advance sign-up as many tutees either did not attend, or attended sessions they were not signed-up for (Hurley et al. 2003), so tutees may need to be specifically discouraged from doing this. In some instances tutors and tutees may already be in the same learning situation, whether in non-clinical (Walker-Bartnick et al. 1984) or clinical (Byrne et al. 1989; Iwasiw & Goldenberg 1993) environments, and it may therefore be very simple for staff or students to informally coordinate PAL interactions. In some circumstances PAL tutors may require a system whereby appropriate rooms at the institution can be booked by staff at short notice. Usually PAL interactions are discrete events clustered at certain times of the year such as prior to tutee examinations, although in some cases PAL tutors assume their teaching & mentoring role over longer periods, with tutees requesting interactions as required at any time of year (Keller 1968; Owens & Walden 2001). In such circumstances PAL tutors and tutees often organise when and where to meet without staff intervention. It is worth encouraging tutors to think about how different environments may affect the teaching-learning interaction, stressing that certain non-clinical environments, such as their bedroom or a local bar, may not be the most appropriate location in which to offer a teaching session. If tutors are to organise their own PAL sessions, it may be prudent to keep a record of interactions which can be monitored by a member of staff to reduce the possibility of excess demand on individual tutors, clashes with tutors' own scheduled teaching and clinical attachments, and the possibility of developing tutee dependence (Rhodes & Swedlow 1983; Walker-Bartnick et al. 1984; Haist et al. 1997; Centeno et al. 2001).

The evaluation of PAL

Q16. What feedback will be collected from participants and how will it be used?. 'Evaluation is an important part of any change programme and needs proper consideration at an early stage' (Gale & Grant 1997). It is essential to collect participant feedback to demonstrate the worth (or otherwise) of continuing and developing the project, and to gather suggestions for improvement. PAL tutors also need adequate and appropriate feedback to enable them to reflect-upon and develop their teaching abilities (Schön 1987). Common methods of collecting feedback are formal questionnaires (paper or online) for tutors, tutees and any simulated or real patients involved with the sessions, and informal feedback between tutors and tutees at the end of the interaction. Typical tutee questions relate to the appropriateness and timing of PAL interactions, their perceived usefulness and the approachability of the tutors. They may also be asked about any changes in their attitude towards the subject-matter (Cohen et al. 1982). Typical tutor questions relate to their preparedness and the adequacy of tutor training, the success or otherwise of the PAL interaction, and the benefits or otherwise they perceive to have gained from participation. If PAL interactions had no fixed structure (Q14) it may also be desirable to ask tutors what happened during each session and what topics and issues were covered (Trevino and Eiland 1980; Rhodes & Swedlow 1983; Schaffer et al. 1990).

Project organizers may also want to evaluate specific points of interest such as gender differences (Schaffer et al. 1990; Johansen et al. 1992). It is worth considering at an early stage when the most desirable time would be to collect evaluation feedback. For example tutors can be evaluated before and after training, and minutes to months after the PAL interaction itself (Morris 2001; Nestel & Kidd 2003). A large number of books and papers are available which offer guidance on the construction of good questionnaires (Cohen et al. 2007, Chapter 15).

Q17. How else will the project be piloted and evaluated?. The majority of PAL initiatives in the literature have been evaluated on the basis of subjective participant feedback from questionnaires only, however such participant feedback seems to be almost invariably positive from both tutors and tutees and may not reflect actual benefit to participants (Rittschof & Griffin 2001). Whilst it is reassuring to find that both groups of students typically enjoy and engage with PAL activities, it may not adequately reflect whether the project has addressed the proposed aims or how well tutors have performed as teachers. Topping suggests that those experimenting with new PAL projects use it initially for consolidation rather than teaching new material because 'The quality of tutoring from a peer tutor may be a good deal inferior to that from a professional teacher (although this should not be assumed), and the need for monitoring and quality control cannot be overstated' (Topping 1996).

Various methods of PAL evaluation and quality control reported to be more objective than questionnaires have been discussed in the literature (Congos & Schoeps 1999). Observation of PAL interactions by staff, simulated patients or peers can be very revealing (Steele et al. 2000;

Nestel & Kidd 2003; Ross 2004; Kernan et al. 2005) although one must be aware that third parties may disrupt the PAL interaction (Solomon & Crowe 2001). Pre- and post-intervention tests (Iwasiw & Goldenberg 1993; Rogers et al. 2000; Hurley et al. 2003) have been used successfully, as has double-marking by staff of PAL assessments of written work or video consultations (Escovitz 1990). It is also increasingly common for PAL organizers to compare formal assessment of knowledge and skills between participants and control groups (who have had only staff tutors or no additional training) in existing summative assessments or National Board Exams. Some have also developed special assessment tools to evaluate their PAL project, assessing content-related outcomes either just after the PAL intervention or some time later, both for tutees (Clement 1971; Trevino & Eiland 1980; Cohen et al. 1982; Bridgham & Scarborough 1992; Yeager & Young 1992; Moust & Schmidt 1994; Sobral 1994; Lake 1999; Howman et al. 2002; Perkins et al. 2002; Nestel & Kidd 2003; Graham et al. 2006) and/or tutors (Cohen et al. 1982; Annis 1983; Howman et al. 2002).

Some recent studies have sought to evaluate PAL tutors' teaching skills using focus group interviews (Shanks et al. 2000; Morris & Turnbull 2004; Glynn et al. 2006); self-evaluation and analysis of reflective journals (Solomon & Crowe 2001); Objective Structured Teaching Examinations ("OSTEs" - Morrison et al. (2003); observation and grading by staff (Kernan et al. 2005); and mixed-methods which often include a component of tutor self-assessment (Blatt et al. 2000; Kassab et al. 2005; Nestel & Kidd 2005).

As with any other development in the curriculum, PAL evaluation should be constructively aligned (Biggs 1999) with the aims and learning objectives of the project (Q4-6). Thus if the principal aims of the project relate to enhancing tutees' content knowledge, this should be assessed as part of the project evaluation. If the principal aims relate to tutors learning to teach, evaluation should focus on tutors' teaching abilities. In a similar way PAL projects which aim to change attitudes, increase confidence, reduce anxiety, develop practical skills, encourage student involvement in the curriculum or save money should target evaluation towards demonstrating whether these aims have been achieved or not. In practice there are usually multiple aims for tutors and tutees and so mixed methods of outcome evaluation are usually preferable. Organizers can use the data gathered to make a informed judgment about whether the PAL project should continue, and whether or how it might be developed (Blatt et al. 2000).

Q18. What are the academic hypotheses and how will they be tested? In addition to evaluating the initiative itself within the host curriculum, organisers of new PAL initiatives often seek to define and answer a more generalisable academic hypothesis around the subject. Such questions or refutable hypotheses need to be defined early in the planning stages, as they may impact on the design of the whole project. Readers with little experience of educational research would be well-advised to refer to an accessible textbook on the subject, such as the recently updated 'Research methods in Education' (Cohen et al. 2007). As with most educational interventions, PAL outcomes are often multi-factorial and difficult to measure, compounded by the fact that they are usually relatively small-

scale interventions within the wider curriculum. Examples of PAL research in the literature include comparison of outcomes for staff and peer-tutored groups (Clement 1971; De Volder et al. 1985; Moust & Schmidt 1994; Haist et al. 1997; Steele et al. 2000); comparison of outcomes of peer tutoring vs. self-reflection (Rittschof & Griffin 2001); student preferences for staff or peer tutors (Iwasiw & Goldenberg 1993); and whether participation as a tutor increases academic achievement or gains in teaching skills (Sobral 2002; Tierney et al. 2006).

A positivist approach might be to design a randomized-controlled trial of PAL and 'no PAL' to compare various outcomes, although this would involve considerable practical challenges due to multiple variables affecting learning outcomes and confounding factors such as self-selection and difficulty in blinding participants. Even were such variables controlled in a randomized cross-over study it would still be difficult to ascribe causality. For example, Johnson's paper on reciprocal PAL in anatomy showed subtle benefits for students who dissected and taught their peers compared to those who were only taught, concluding there were 'Subtle effects of dissection on examination performance' (Johnson 2002); although the effect of teaching may also have accounted for the differences. Qualitative research focusing on process rather than outcome can also be very revealing (Glynn et al. 2006), and may be explored as an alternative or addition to quantitative methods. There is considerable scope for research on student experiences and attitudes towards PAL, not least because levels of student engagement and enthusiasm for such initiatives is at times strikingly higher than is shown for other areas of the curriculum. Depending upon the nature of the academic hypothesis and research, these proposals will usually have to be submitted to an appropriate ethics committee (Q19).

The institution and PAL

Q19. Who are potential stakeholders in the project? As with any curriculum development or proposed change, it is vitally important at the planning stages to consider what individuals and groups will have interests in the project or may be affected by it (Gale & Grant 1997). Support for PAL from senior academics has been highlighted in the literature as being critical for success (Blatt et al. 2000). Obeng, writing for project managers in business, suggests that stakeholders can be grouped into 3 categories: people to involve, people to consult and people to inform (in advance) about the project (Obeng 2003). Identifying who these stake-holding individuals or groups are may require further work after the initial planning meeting, although many will be obvious. It may be that permission or some form of authority is required; funding may need to be sought; or it may be that practical or political opposition is likely if certain individuals do not have a sense of ownership in the project from the beginning. Typical stakeholders include academic and clinical staff responsible for the teaching of related aspects of the curriculum, senior management, the medical education unit and students themselves.

Although most studies report a high degree of student enthusiasm for PAL interventions this cannot be assumed, as

there have been reports in the literature of students feeling uncomfortable about PAL and being reluctant to become involved (Morris & Turnbull 2004). Ethical approval will usually need to be sought for academic work which may be published (Parsell & Bligh 1999) and in many institutions there is an educational ethics committee to address the needs of academic research in Higher Education. Various ethical guidelines are available from educational research and medical education organizations (BERA 2004), research councils and funding bodies (ESRC 2005; MRC 2007) and journal publishers. If the project is to involve real patients, clinical staff such as those working for the National Health Service in the UK will also need to be involved. Any research involving patients also needs to be submitted for consideration by a medical ethics committee. There may also be legal or regulatory issues around access to patients, consent, tutor competence and accountability, such as who would be the responsible clinician should an error occur?

Q20. What are the staff time and funding implications of the project? Although PAL initiatives draw largely on the resources and engagement of student tutors and tutees, they often also require relatively high levels of staff input and administrative time. Planning the project, tutor training and hosting sessions (if a member of academic staff is to be available onsite during PAL interactions) all require academic staff time, as may the creation of new learning resources and materials and staff training if required (Blatt et al. 2000; Krych et al. 2005). Administering the project – including timetabling, room booking, authoring notices and feedback forms, communication with the various student and staff groups and managing any problems arising – is often much more complicated compared with a similar initiative with staff tutors, and the experience and time required of academic and administrative staff must not be underestimated. Peer tutors are also more likely to require ongoing informal support and encouragement than their staff counterparts.

Funding may be an issue with regard to room usage, teaching materials (e.g. acetates, pens & flipcharts), administrative costs (photocopying & phone calls), the cost of specialized equipment and consumables (IV cannulae, simulators, etc), extrinsic tutor rewards (Q7) or refreshments, and the costs incurred by involving other people such as travel expenses for simulated patients. As discussed in Q2, some authors have reported the potential for PAL initiatives to save money for the institution (Goldschmid & Goldschmid 1976; Wagner 1982; Haist et al. 1997) and this is a commonly cited driver for PAL in early PAL initiatives. Financial saving is not commonly reported in the recent PAL literature however, and it seems more likely that a small amount of funding will be required for most PAL projects at least initially.

Q21. How could the project be developed, and how might it affect the curriculum? Although it is impossible to accurately predict how a PAL project may be received and develop over time, it is helpful to think about possible outcomes, both in the short and longer-term. What might the PAL project be like in five years if it became established and embedded in the

curriculum? What impact might this have on student learning, and on current staff teaching of that subject? Might it create more work for staff, or could students take on staff roles in certain areas?

There may be other people who become involved in the project such as real or simulated patients (Pepe et al. 1980; Escovitz 1990; Howman et al. 2002; Nestel & Kidd 2003) or staff and students from other disciplines or institutions (Gill et al. 2006). There may also be involvement with professional bodies such as the National Health Service or external training and accrediting bodies (Weberschock et al. 2005). These may all have resource implications and affect, either positively or negatively, how the PAL project is viewed within and outwith the host institution.

Realization of PAL

Q22. What are the potential pitfalls or barriers to the success of this project? As stressed by De Bono (2000) under the 'Black thinking hat', it is very important during the planning stages of any change to consider potential drawbacks, problems and unintended consequences which might ensue were it to be enacted. This will highlight weaknesses in planning, may lead to elaboration or reconsideration of particular aspects of the proposal, and can hopefully allow obstacles to be anticipated early and either avoided or more easily overcome. Some potential pitfalls may have already been averted by involving appropriate stakeholders (Q19), training tutors (Q8) and by clarifying the practical arrangements for PAL interactions (Q13–15). On reviewing the responses to the previous questions towards the end of the initial planning meeting, new pitfalls may be identified which might be addressed by simple adjustments to the project plan. As with any new initiative or change in medical education, PAL projects may lead to concerns by staff about the potential impact on their time or status, or about available resources (Gale & Grant 1997).

Others potential problems common to most PAL projects include inadequate time in the curriculum for tutor-training, creating teaching materials and quality-assurance; ethical concerns about accountability, competence and consent; and the potential for timetable and resource conflicts with other core teaching (Maheady 1998). Certain potential problems may be peculiar to one institution or a particular PAL approach and can only be predicted by those who are familiar with their local context. Some obstacles identified by this question may require further consideration after the planning meeting, and as such would be listed as action points (Q24). If barriers appear to be insurmountable or there is potential for particularly undesirable outcomes, a decision will be required on whether or not the project should proceed. It is vitally important at this stage for the planning group to meticulously critique the proposed project, even though this may seem contrary to all the good work done creating the plan.

Q23. What are key points on the timeline for this project? As with all project plans it is helpful to devise a timeline at an early stage which details the most significant project

milestones and deadlines which will need to be met (Obeng 2003). In coordinating PAL initiatives there are usually multiple groups of students and staff requiring different information, timetabling and training at different times. This can become very confusing, particularly if one member of staff is coordinating multiple PAL projects simultaneously. It is very easy to miss vital deadlines when concentrating on other aspects of the project – such as forgetting to advertise PAL sessions to tutees whilst concentrating on tutor-training – leading to project failure. A timeline ensures that important windows of opportunity are not missed, and also ensures that other significant dates (such as student exams and holidays) are taken into account. The timeline can be added-to and amended during the course of the project, and the sequence and all timings can be reviewed again for the following year if the project is to be repeated.

Q24. What actions need to be taken to develop the project, and by whom? As with any business meeting, creation of action points linked to those individuals responsible for addressing them can greatly enhance the likelihood of appropriate actions being taken following the meeting (Gale & Grant 1997). This enhances accountability, but more importantly allows progress on the project to be charted and any areas of difficulty to be more easily highlighted at subsequent organizing meetings (where previous action points can be revisited). Responding to this question typically involves the planning group reading back through responses to earlier questions, identifying points which need action and agreeing who will take responsibility for each. The list of action points are perhaps more dynamic than all the other question responses in the plan, with new actions becoming apparent and others being addressed over time. Such new action points can be added to the plan as required. Responses to other questions may also need to be amended with new information as these points are addressed. Completed action points are worth keeping (suitably marked 'done' or similar) as these provide a record of work done on the project and may need to be repeated in subsequent years.

Synthesis of answers to questions

After documenting answers to each of the 24 questions in turn it is important to consider the responses together as a coherent project plan, thinking about how different parts relate to each other and to the local context. An example of a complete plan is provided in Appendix 1. Applying the principles of learner-centered education (Prosser & Trigwell 1999; Ramsden 2003), constructive alignment (Biggs 1999) and curriculum design (Fish & Coles 2005; Harden 2005; Grant 2006) there should be coherent alignment between drivers for change (Q2), intended learning outcomes (Q4–6), teaching, learning and assessment activities (Q13–15) and evaluation (Q16–18). The project must be appropriate and workable for all concerned (Q7–12; Q19–21), and potential pitfalls and barriers to the success of the project (Q22) should be detailed and, if possible, minimized.

In attempting to synthesise the PAL project plan towards the end of the first meeting it may be necessary for the planning group to re-read it several times, adjusting the

responses as appropriate until the plan seems logical, balanced and aligned. It is also helpful to try then to consider the project from as many different standpoints and perspectives as possible. The meeting finishes when the planning group is content that they have produced a coherent and workable plan, which includes all key points raised in their discussions. The process of documenting responses to each of the questions electronically, then reviewing them all together, to enhance and synthesise as appropriate, should crystallise the thinking of the whole planning group into a complete and permanent record of their meeting. The resulting planning document is typically clear and comprehensive enough by the end of this single meeting for it to be circulated to a wider audience for consultation and further development. Such wide consultation is very important in any form of curriculum development, and the nature of the electronic project plan is such that suggestions and feedback can be efficiently incorporated into the final modified project plan before publicizing any proposals and implementing the project (Gale & Grant 1997).

Conclusions

Although at first glance the list of questions in this framework may seem long and daunting, the process of asking them in a group and recording the answers into a proposal document is very fast and efficient, particularly if a standard electronic proforma containing the numbered questions is used (available online). Many of the question responses become obvious as soon as the question is asked, though may remain obscure or undecided were the question not asked. In the authors' experience a detailed comprehensive electronic PAL project plan can be achieved within a typical 60–90 minute meeting. Such plans can be considered as provisional documents, aspects of which may be developed and negotiated as appropriate following further reflection and wider circulation before implementing them in practice. The framework has been designed to be flexible so that readers can adapt it to their own particular situation or institution, although broadly following the framework will ensure all the important issues are covered. The authors hope this guide will promote further discussion and debate about the utility and application of PAL in healthcare education; and stimulate the development of new PAL initiatives, resulting in greater experience, understanding and evidence about Peer Assisted Learning within the wider international medical education community.

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Appendix 1

THE Y4-Y3 Cannulation PAL

The following is a slightly adapted project plan for a new cross-year PAL programme in clinical skills which was developed and successfully implemented in the undergraduate medical curriculum at the University of Edinburgh in 2005–6 (Anderson et al. 2006; Morton et al. 2006).

Background

Q1. What is the current situation and context in the curriculum?

- The Edinburgh curriculum is both horizontally and vertically integrated, using mixed-mode teaching approaches to encourage independent learning.
- Students report diverse benefits and enjoyment from previous PAL projects.
- Peripheral intravenous cannulation is a core clinical procedure.
- Staff teach cannulation at the beginning of year 3. Students are expected to practise independently before being examined on this procedure in the end of year 3 OSCE [objective structured clinical examination]. All students are encouraged to practise their clinical skills together, and are expected to observe each-other and offer constructive feedback.
- Learning to teach is one of the 8 core outcomes of the PPD theme.
- The College Teaching and Learning Strategy encourages student-centred and interactive methods of teaching.
- The MBChB programme has a set of PAL Precepts that define the conditions for PAL in the curriculum and have been referred to.

Q2. Why is this PAL project being considered now?

- Tomorrow's doctors (GMC 2003) contains outcomes relating to medical students learning to teach. Learning to teach has recently been highlighted as a core learning outcome for the Edinburgh course but does not yet have a formal place in the curriculum.
- The Practical Assessment of Core Clinical Skills (PACCS) project undertaken in April 2005 indicated that cannulation was the clinical procedure that year 5 students found most technically challenging. They reported a lack of opportunity to practise the skill in years 3 and 4 leading to a lack of consolidation, confidence and resulting competence on entering year 5.
- In April/May 2005 large numbers of year 3 students attended the skills centre to 're-learn' cannulation in the weeks before the year 3 OSCE, most reporting that they had not practised the skill since formal teaching at the beginning of the year

Q3. Who is responsible for the project and who will lead it?

- Project steering group: F Frame & L Anderson (project leaders), J Morton (responsible for clinical skills), J Moyes (clinical skills facilitator), M Ross (PAL coordinator)
- Y4 & Y3 student representatives will also be consulted, but must not learn about the cannulation station in the Y3 OSCE.

Aims

Q4. What are the aims and objectives of the project for tutors?

- Increased confidence and competence in intravenous cannulation, in-particular confidence to transfer their procedural learning from the simulated environment of the skills centre to real clinical situations.
- Develop group facilitation skills (building on skills learned during PBL).

- Develop skills in observation and constructive feedback.
- Help develop professional role as teacher.

Q5. What are the aims and objectives of the project for tutees?

- Provide an opportunity to meet & discuss concerns and ask any questions they have with senior students.
- Increased confidence and competence in intravenous cannulation in the simulated environment, and encouragement to transfer these skills to real clinical situations.
- Promote self-directed and collaborative learning in clinical procedures.
- Increase direct observation of student's clinical performance in cannulation, with increased timely feedback.
- Give tutees a model for skills practice and feedback they can use with each-other

Q6. What are the aims and objectives of the project for the institution?

- Enhance team-working, self-directed learning and personal professional development.
- Promote a culture of collaborative learning through interaction and dialogue.
- Encourage students to work together to optimize their learning experience.
- Promote the giving and receiving of feedback between peers.
- Increase the quantity and quality of feedback on individuals' clinical skills.

Tutors

Q7. Who will be tutors and how will they be recruited?

- Message on EEMeC [the undergraduate virtual learning environment] late October to all year 4 students asking for volunteers
- Online sign-up sheets for training and PAL sessions.
- Need around 32 tutors to work alongside 128 tutees, but if more tutors are recruited further sessions can be organised.

Q8. What training will tutors require and how will this be provided?

- Pre-training reading of 'learning to teach' study guide when tutors volunteer.
- Tutors will have their competence 'validated' in intravenous cannulation and receive further health & safety training on the handling of contaminated sharps.
- Tutors will need to learn some basic concepts about teaching, particularly with regard to group facilitation and giving appropriate and constructive feedback.
- Introductory session will include an outline of core concepts and principles (overview; validation of the skill including competence check; learning/teaching approaches; facilitator assessment checklist; giving feedback/feedback tool).

Q9. How else will tutors prepare themselves and reflect afterwards?

- Based on the general outline tutors will create detailed learning plans for the PAL interaction.
- Tutors will be encouraged to reflect on the responsibilities of a teacher before the sessions and to think about how they would respond to difficult situations (e.g. asking “What is your worst nightmare that could happen in the tutorial?”).
- Tutors will be encouraged to practise their cannulation skills and teaching approaches before the PAL interactions.
- Tutors will arrive half an hour before tutees to set-up the room and prepare. They will also stay after tutees leave to tidy away the equipment.
- Tutors will collect and read evaluation forms from their own tutees, and have an opportunity to discuss this and any other concerns with staff after the sessions.
- A feedback analysis session will be arranged for tutors and staff following the PAL interactions and collation of feedback.

Tutees

Q10. Who will be tutees and how will they be recruited?

- Offered to all year 3 medical students.
- Message posted to year 3 outlining the PAL proposal with link to sign-up sheets for those wishing to participate.
- Year 3 students will sign-up for available places on a first-come first-served basis, but will only be allowed to attend one session initially.

Q11. What related prior knowledge and experience will tutees have already?

- Tutees will be expected to be safe and competent at intravenous cannulation of a simulated arm in the end of year 3 OSCE.
- Sessions will occur after tutees have their formal training by staff and will therefore supplement informal practice and skill development.

Q12. What information and preparation will tutees require before the interaction?

- Tutees will be given a written outline of tutorials including aims, content and self-directed approach when signing-up for the sessions. This will specifically encourage tutees to participate actively rather than expecting to be passively taught as occurred in (a PAL project at the University of Edinburgh in 2004).
- Tutees will be encouraged to revise their knowledge and skills in cannulation before the sessions.

Interaction

Q13. What will be the format of the interaction, and what resources are required?

- 4 groups consisting of 1 tutor and 3 tutees working independently in the skills lab.
- Session duration 1-1½ hours.
- 4 functional simulated arms with appropriate cannulation equipment at each site.

- No staff present in room, but one available in the centre to direct tutors and tutees to the correct rooms, ensure equipment is present and to distribute/collect feedback. Tutors will contact staff in the event of needle-stick injury or other incident to ensure appropriate management of the situation.
- Resources: feedback forms for tutors and tutees and peer assessment forms for all participants.
- Extra supplies of consumables to be ordered to keep stock levels adequate.

Q14. What would be a typical plan of activities during the PAL interaction?

- Tutors will remind tutees of the health and safety aspects of practicing intravenous cannulation, and will then introduce and discuss the structured observation/feedback sheet.
- Tutors will encourage each tutee in-turn to practise cannulation whilst other tutees and the tutor observe and provide constructive feedback using the cannulation assessment forms.
- Tutors will bring session to a close and request evaluation.
- Tutors will collect & read evaluation forms, then tidy-up after their PAL session.

Q15. When and where will PAL interactions occur, and how will they be arranged?

- Sessions will take place in weeks 6 to 8 of semester 1 (avoids holidays and exams).
- Extra-curricular, 5:30–7pm on Mondays, Tuesdays or Thursdays (confirm appropriate timing with medical students committee).
- Duration 1–1½ hours.
- Skills lab will be booked at each site from 5pm onwards each evening (tutors will arrive early).
- Tutors and tutees will sign-up online for sessions.

Evaluation

Q16. What feedback will be collected from participants and how will it be used?

- Tutors will be encouraged to ask for informal oral feedback from tutees towards the end of their sessions.
- Feedback forms for all tutees to complete after each session. Tutors will collect this and read feedback from their own tutees before handing-in to organizers.
- Feedback forms for all tutors to complete after each session.
- Staff will be available afterwards to discuss feedback with tutors if required.
- Staff and others involved will be asked to e-mail the project leader with observations and comments about how the sessions ran.

Q17. How else will the project be piloted and evaluated?

- A member of staff will sit-in on a random sample of sessions to passively observe group interactions, activities and pedagogical approaches.

- Staff will be asked to e-mail the project leader with observations and comments about how the sessions seemed to run.
- There will be a cannulation station in the Y3 OSCE at the end of this year, although this information will not be passed to any students (including student representatives).
- Ethical approval will be considered to keep a register of all tutees attending PAL cannulation sessions to compare results on the Cannulation OSCE station between PAL participants and non-participants. Issues of consent will be considered further before the next meeting.

Q18. What are the academic hypotheses and how will they be tested?

- Hypothesis: "Year 3 students who received supplementary PAL training in cannulation will perform better than their peers in the cannulation station of the Y3 OSCE".
- Ethical approval will be sought for this in advance of the project.
- Great care will need to be taken to avoid any students (including Year 4 tutors) becoming aware that there will be a cannulation station in the OSCE.

Institution

Q19. Who are potential stakeholders in the project?

- Item to be added to the agenda of the next Medical Students Committee meeting.
- Discussion with directors of years 3 & 4, the director of the medical teaching organisation, and the CSPPD (clinical skills, personal and professional development) committee.
- Educational ethics committee approval to be sought for study component of the project (not described in this guide).
- Make arrangements with security for evening sessions.

Q20. What are the staff time and funding implications of the project?

- Need administrative time to write & post notices, set-up and maintain online sign-up sheets, respond to student queries & book rooms.
- Some additional teaching resources & photocopying (skills teaching budget).
- Approximately 2 hours per week of (project leader) time will be made available for 6 weeks prior to PAL sessions, increasing to 6 hours in the weeks when PAL sessions occur, however it may be possible for delegation to administrative staff.
- A member of staff will be in the centre (but not the tutorial rooms) during each of the sessions (evening sessions, but staff can take time in-lieu).

Q21. How could the project be developed, and how might it affect the curriculum?

- If successful, it may be possible to extend the project into the hospital environment with the participation of real patients. This would require prior discussion with hospital staff and further consideration of the ethical issues.
- In future years if successful the project could potentially expand to include other year groups and other clinical procedures such as venepuncture (Y3-Y2) and urethral catheterization (Y5-Y4).
- No reduction or changes to the current staff teaching of clinical skills is envisaged as a result of this project.

Realization

Q22. What are the potential pitfalls or barriers to the success of this project?

- Tutors may teach the 'wrong thing' and reinforce poor practice. This can be reduced with use of the detailed Cannulation Protocol, training & 'validating' the tutors' 'in peripheral intravenous cannulation, and by encouraging tutors to facilitate Y3s in rehearsing the procedure and giving each-other feedback.
- Tutors may overload tutees with information or frighten them leading to reduced confidence. This can be reduced with tutor training, but need to look carefully at evaluation for evidence of this.
- There has been considerable opposition from some clinicians who believe it inappropriate for students to teach on content relating to their specialty. These staff members may therefore object to this project.
- As sessions are extracurricular the project should not have an impact on tutors' clinical attachments, but this needs to be monitored.

Q23. What are key points on the timeline for this project?

- Further meetings of project steering group (dates).
- Discussion with stakeholders, consider consent & apply for ethical approval by (2 weeks hence).
- Advertising and recruitment of year 4 tutors (date).
- Session dates to be confirmed and rooms/supervising staff timetabled.
- Sessions to be advertised to Y3 tutees.
- PAL sessions (rough dates).
- Y3 OSCE (date).
- Joint feedback seminar post-analysis (all Y4 & Y3 participants invited).

Q24. What actions need to be taken to develop the project, and by whom?

- Construct feedback forms for tutors and tutees (JaM & MR).
- Develop cannulation assessment and feedback form (FF & LA).
- Write proposal for ethical approval (JM).
- Discuss plans with Medical Students Committee and year directors (JM & FF).
- Suggest suitable dates for training and PAL sessions (all).