Peer-Assisted Learning (PAL): reinforcement enabling the concept in medical education

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ABSTRACT

Peer-assisted learning (PAL) which has been in practise in medical education boasts of several benefits. This paper explores the learning theories that substantiate for the perceived benefits of PAL. Literature search was done in PubMed, SCOPUS and Google Scholar using the keywords peer-assisted learning (PAL), peer teaching, near-peer teaching, peer tutors, peer learners, student-learners, theoretical framework to locate the related articles. The theoretical underpinnings of PAL have been explained with suggestions to overcome the disadvantages. Succinct details on the future of PAL have been discussed as well.

Keywords: peer-assisted learning (PAL), peer teaching, near-peer teaching, peer tutor, student-learner, learning theories
INTRODUCTION

Peer teaching takes its roots from peer-assisted learning (PAL) which can be defined as “people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching” (1) which reflects the bi-directional nature of PAL (2). Near-peer teaching is defined as a situation where “the teacher and learner are on the same educational level but differ by one or more years and is advocated when challenges such as heavy physician workload and high number of patients are met with, in hospitals (3).

PAL is the bigger umbrella that encompasses processes such as peer mentoring, peer teaching and peer assessment (2). It has been agreed that any form of peer teaching is beneficial for both the student tutors and tutees (4) as cooperative or collaborative learning between them ensures deep learning (5). It has been thought that the success of peer teaching is due to the similar social roles and almost-same level of knowledge between the tutor and student that ensures social and cognitive congruence of the tutors and tutees (6).

The word ‘doctor’ is derived from the Latin word “docere” meaning “to teach” (2). Inculcation of life-long learning is also an important rationale to introduce PAL in medical schools (2). The concept of PAL was introduced as supplemental instructions (SI) in United States and Canadian schools which slowly expanded to universities as well (2). With the pressing need for educational reforms in developing countries, PAL provides an affordable solution, especially when the teacher-student ratio is lacking (2,8) and helps to sustain medical programmes in a strained environment (5). This measure also removes pressure from clinical teachers who struggle to meet the teaching requirements for medical students (5) and profitable for the university management as it enables small-group teaching at a manageable cost (7).

PAL has promising subjective benefits of enjoyment, learning and satisfaction with objective benefits of improved scores and skills (2). Learning theories form a strong basis for PAL and
exploring the theoretical reinforcement of this concept would enable educators to accept it despite the challenges.

METHODOLOGY

Literature search was done in PubMed, SCOPUS and Google Scholar using the keywords peer teaching, near-peer teaching, peer tutors, peer learners, student-learners, learning theories to locate relevant articles. The articles were identified based on their description of PAL in conjunction with learning theories that support them. The information from these articles have been extrapolated to its use in medical education to reinforce the use, identify the benefits both for learners and teachers, recognize potential challenges, and combat obstacles based on the theories.

RESULTS AND DISCUSSION

Benefits for Peer Learners

Social and cognitive congruence between the peers is considered one of the most important reasons as to why PAL is accepted worldwide (1). Congruence fosters a supportive, non-threatening learning environment that decreases anxiety and fear of failure whilst enhances the ability to cope with stress amongst peer learners (1,9,10). Emotional support rendered by peer tutors also comforts the peer learners (11). Cognitive distance between peers is shorter and hence peer teachers process the information in a better way than their teachers and present to their peer learners in a more acceptable way (1,2). Peer teachers being medical students who have dealt with the subject matter themselves are considered more effective than their non-medical teacher counterparts as they focus on the correlation between knowledge and practise (1) and would be able to propose appropriate learning styles, mnemonics and areas for reinforcement of knowledge (6).
Students have voiced out that peer-teaching engages them well and is enjoyable (3). Student learners feel very comfortable in opening up to their peers rather than lecturers. This nurtures a facilitatory academic learning environment devoid of undue pressure (11). Prompt, constructive feedback provided by peer teachers proves beneficial for self-improvement of student learners which finds its use in 360° feedback or multi-source feedback (5). These benefits substantiate that if PAL is provided as a supplementary to main learning, it would benefit the low achievers considerably (5).

**Benefits for Peer Tutors**

Most of the studies quote the benefits for peer learners and visibly side lines the umpteen benefits for peer tutors. Medical students are future teachers and hence providing them hands-on training through a peer teaching programme would be extremely beneficial (13). Doctors not only educate their peers, but their main agenda would be to educate patients on the disease, its complications and prevention. Such peer teaching programmes would boost the confidence of peer teachers and make it easier for them to educate patients in future (13). Teaching is said to enhance the knowledge of the teachers, provides the much-needed teaching experience, indicates the importance of alignment of the content to learning outcomes and the expected competencies (1).

Peer teachers are considered as role models who raise student motivation levels (14), a concept well known as peer-modelling (5). Intrinsically motivated peer tutors consider teaching to be a pleasurable and enjoyable activity (13) and are a source of motivation for their peer students as well (15). Peer teachers automatically take up the role of a mentor, a trait which would be useful for their practise (3). Peer teachers have reported deeper understanding of the subject, improved teaching skills, clinical skills (2,4), development of soft-skill competencies such as leadership, feedback-providing techniques and autonomy (3). Peer tutors effectively process the information which results in them being well versed in their subject matter (2,4). Interaction
with student learners, nurtures professionalism in peer tutors including responsibility and guidance (4).

Communication skills develops through active listening and transmitting knowledge in an effective way (4). During communication with their peers, peer teachers use verbal and non-verbal cues to make the peer students understand the knowledge imparted (4). It has been widely agreed that communication is a learned skill rather being inborn, and that medical schools fail to provide such experience to students which can be effectively addressed by PAL (13). Peer teaching paves way for reflection and self-improvement among the peer teachers (4). Peer tutors also understand the paramount pressure of being in front of students, something which the professors undergo but seldom understood (4). Adding on, peer tutors also have the responsibility of maintaining confidentiality, which could be put to practise later on with their patients as well (4).

Currently, patients are empowered and wish to be a part of medical decision-making which involves information-providing and rationale for choices for treatment (13). The peer tutor also gains skill in eliciting patient’s fears, their own knowledge about the disease and expectations from healthcare. The peer tutor would be efficient in communicating with the patient and providing them with the right information, accepting to their response, understanding their point of view and in general effectively handle the case (13). Teacher-duality stands on the grounds of sound social communication, metacognition, self-learning and the practice of renewing knowledge with constructive feedback (13). Peer tutors exhibit personal moral development as they know the hardships faced by their own same-aged individuals who are similar to them in all ways except in understanding certain cognitive concepts. This nurtures a feeling of empathy that is vital for a doctor in practise (12). Social and managerial tasks carried out by peer teachers hones their leadership abilities and boosts their self-confidence (1,5). Peer
Tutors are able to grasp the nuances of teamwork and team roles, collaboration with colleagues which leads to their overall personal and professional development (16).

**Theoretical basis of Peer-Assisted Teaching (PAL)**

The foundation of PAL heavily rests on well-established learning theories that substantiate the psychological basis of benefits of PAL and which can be broadly classified into the theories that fit student learners and student teachers (Fig 1).

**Theoretical underpinnings for student learners**

**Lev Vygotsky (1896–1934)** - Peer-teaching is rooted on social constructivism, an idea propagated by Vygotsky (17). He postulated that social structures and relationships are vital for the development of advances mental functions (18). Constructivism was revolutionised by Vygotsky by coining the term Zone of Proximal Development (ZPD). ZPD denotes the progress zone of students from an area of actual development to an area of potential development. Development within ZPD is nurtured by scaffolding which might be expert tutors, artefacts and peer tutors (14). This makes PAL move away from a teacher-centred to a student-centred approach (15). PAL thus ensures a safe, facilitatory social environment that results in effective learning (17). The interpersonal interaction results in primary learning which is later reinforced by individual learning (18). Among the three types of speech among the learners, social, private and internal, PAL belongs to both social and private types to reinforce knowledge (18).

**Jean Piaget (1896–1980)** - The father of “Constructivism” ascertains that, humans generate knowledge due to the interaction between their ideas and the experiences they undergo resulting in the change of their ‘schemata’. This process is done by either ‘assimilation’ that is incorporation of a congruent, new idea with their old knowledge or ‘accommodation’ that is change in the old schema to accommodate new knowledge (14). Knowledge is learnt voluntarily when the learner is met with a cognitive conflict (19). Peer tutors play a very
important role in addressing the cognitive conflict faced by the student learners. This would lead to disequilibrium and knowledge gaining would set back the learner back into equilibrium (19). Loss of egocentrism, a normal developmental pattern as quoted by Piaget, helps learners to understand the peer tutors point on view enabling them to learn better (18).

**Bandura’s theory of social learning (1974)** - Learning occurs in a social environment which is facilitated by observation of other’s actions and behaviour (2) as peer students are not just reactive to the environmental inputs or inner forces. This belongs to the social learning theory (SLT) school of thought where learners tend to imitate their environment, in case of PAL, their peer tutors, as learners not only learn by direct reinforcement, but also by watching (20). As a result of careful scrutiny of their tutors, students tend to self-organize, become proactive, self-reflect, and self-regulate themselves (21). The peer learners undergo a three-step process of observation, imitation and modelling to attain the intended competencies (20). However, learning is influential and occurs only if the observation phase is appealing to the learner (20). Bandura’s SLT is superior over behaviourism since no rewards are promised for change in behaviour (20). Social cognitive learning theory (SCLT), an extension of Bandura’s theory argues that knowledge is gained in learners as a result of internal advantages such as self-contentment, achievement and self-esteem (20).

**Theoretical underpinnings for student teachers**

**Kolb’s experiential learning (1984)** – Experiential learning is based on the work of Kurt Lewin, John Dewey, Piaget and David Kolb. John Dewey explained the integration of experience and education in learning. Piaget offered explanation how experience is used to model intelligence (22). The peer teachers who undergo a teaching experience learn through it and apply the experience as suggested by Kolb. They would be able to allay their own fears and doubts in knowledge through the teaching experience (14). The students undergo a concrete experience upon which they reflect which then results in formalisation of abstract
concepts and making generalisations. Then they would test this new knowledge in new situations and reflect back again to start the process all over again (23). From an institutional standpoint, the peer teacher is exposed to real-life challenges through hands-on experience which is a vital aspect of medical education (23). When the peer-teacher is convinced he/she is a learner, it would be simple for them to undergo the peer teaching process as a pathway to their learning as well (24). Reflection is the hallmark of experiential learning which enables peer teachers to make sense of a situation, use social connections, increase knowledge by continuous reinforcement and avoid mistakes (26).

*Atkinson and Shiffrin’s Information processing theory (1968)* - This theory explains how information is being processed in the mind of the learner and relates it to the short term and long-term memory as well as information retrieval (27). Peer tutors receive information though their sensory register. This is stored in their working memory. In the process of relearning and retrieving the knowledge to teach student learners, the tutors process the information effectively with repeated retrieval when they teach (27). This aids in the information being encoded in their long-term memory, ensuring effective storage, retrieval and application (26).

*Deci & Ryan’s Self-determination theory (2000)* - A learner is motivated if three basic psychological needs of competence, relatedness and autonomy are met with (28). These basic psychological needs are targeted by peer teaching. Peer teachers are competent, they have autonomy over their learning, and they feel related to the subject matter and hence indulge in learning with full dedication and interest (12,13). A peer teacher indulges in this activity due to intrinsic motivation. They willingly teach with interest for the sheer enjoyment of it and with inherent satisfaction. A peer learner might be amotivated or subjected to extrinsic motivation and learn due to rewards, fear of punishments or pressure. Observation of their peer teachers and indulging in study activities with them would then provide a sense of
autonomy in learning for peer learners enabling them to shed light over complex facts and patient care and relatedness with the peer teacher’s experience. This would eventually make a shift from amotivation or extrinsic motivation to intrinsic motivation among the learners (12,13).

Paul Pintrich’s Metacognitive learning (2002) - Metacognitive knowledge includes knowledge of learning strategies, cognitive tasks and self-knowledge (29). The tutors have to generate their own meaning in response to the questions posed by student peers. This encourages metacognitive knowledge in them as they know their own learning styles, motivation and knowledge fallacies (9,13). The peer tutors have to be well versed in the knowledge of general strategies for learning, thinking and problem solving. They should also be able to weigh their cognitive tasks and hence be prudent in time management assigned to the tasks and know to address the various socio-cultural aspects of learning in student learners. Eventually this process makes student tutors weigh their own strengths and weaknesses and help in self-regulating their own knowledge (29).

Abraham Maslow’s needs hierarchy theory (1943) - According to Maslow’s theory, human beings move from basic physiological needs to safety needs to belongingness, self-esteem to attain self-actualization (29). Viewing through the lens of Maslow’s needs, peer teachers attain a higher level in the pyramid as they rise to satisfying their needs of self-esteem, respect, recognition and freedom (14). Personal growth enables the movement up the hierarchy and is invariably present throughout their life inculcating life-long learning (30).

Limitations in PAL

Though there are numerous benefits, PAL is also noted to have challenges while implementation. Inconsistencies in knowledge, lack of enthusiasm and poor preparedness for teaching may be noted among peer teachers (3). Non-preparedness is considered one of the main obstacles for peer-teaching which can be eliminated by incorporation of dedicated time
slots (13), briefings, and a well-framed curriculum (3). The attitude of being lackadaisical, involved in personal relationships with peers, not knowledgeable enough and lack of professionalism among peer tutors are major obstacles to practice PAL (7). This can be overcome by giving incentives for peer tutors in the form of evaluation and certification which aids in their professional development as well (31).

According to Maslow, self-actualization varies from person to person and it explains why certain peer teachers fail to attain the pinnacle of exemplary behaviour (30). Since reflection is a cornerstone of learning, peer tutors can be asked to reflect on their experiences which would enable them to recognise their disinterest and avoid similar mistakes (25). Engagement in PAL has students lose the teaching from experienced faculty members, uneven delivery of knowledge and lack of staff-student interaction (8). There might be a sense of low self-esteem among the tutees as they tend to compare themselves with peer tutors. This can be surpassed effectively addressed by role reversal of tutors and tutees (2). The tutees have crossed the four stages as specified by Piaget and that aids lower levels of ego when presented with the correct knowledge and helps to overcome egocentric issues (18). It has also been found out that summative peer assessments tend to be biased and lenient and hence peer assessments could be reserved only for formative assessments (2). Peer teachers are more likely to be challenged due to less experience and inadequate knowledge compared to faculty members (32). Some studies have also reported the anxiety, lack of confidence among peer tutors (9). They also seem to worry if the student learners would consider them arrogant as well (9). Providing activities and asking questions to stimulate the intellect among the learners is suggested by Lev Vygotsky to maintain the sessions lively and interactive (18). This also reduces the power struggle between the tutor and tutee (18). Research studies also report that student learners do express more confidence in faculty
members rather than peer tutors and hence calls for peer tutoring to be a supplementary programme (32).

**Future of PAL in Medical Education**

Though peer tutoring is a voluntary programme, the faculty has the mammoth task of selecting suitable peer tutors based on their accomplishments (11). The peer teachers should be provided the theoretical basis of andragogy, teaching strategies and formal training in order to strengthen the effort (13). This approach also favours the shift of the peer teaching from the hidden curriculum to formal curriculum (13). A comprehensive, outcome-based, out of class programme for enhancing teaching skills should be targeted for peer teachers that includes aspects of teaching and communication skills (13). A well-planned programme should be composed of targeted teaching-learning activities with evaluation of satisfaction, learning and attainment of outcomes (2,13). The teaching skills of peer teachers can be evaluated through longitudinal Observed Structured Teaching Evaluation (OSTE) hence making the process reliable and valid (3). Peers can become OSCE assessors which is profitable for the institution, provides a relaxing exam environment and promotes learning (7). Peer teaching is effective when socio-cultural diverse issues form the crux of the content, enriching collaboration (5). Daniel et al have suggested to use tailor-made peer tutor programmes for re-test takers, supplementary programmes or barrier examinations (6). The programme can be extended for training of peer mentors, by providing them training, guidance and feedback (10). Formal peer tutor training can be evaluated and awarded excellence in personal development of the students (2). Alternatively, general practice (GP) trainees can be trained for being near-peer tutors for undergraduate medical students and they would impart hidden curriculum being role models as well (33).
CONCLUSION

The theoretical reinforcement provides educators the basis to implement PAL in the confines of medical education to tap the full benefit. Nevertheless, the limitations and operational difficulties should be borne in mind to be able to provide educator support to overcome them efficiently.

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Fig 1: Theoretical framework of Peer assisted learning

- **Social congruence**
  - Peer tutor
  - Peer tutee
  - Self-Esteem (Maslow 1943)

- **Cognitive congruence**
  - Actual development
  - Potential development
  - Observation of behaviour and actions
  - ZPD (Vygotsky 1896-1934)
  - Equilibrium (Piaget 1896-1980)

- **Scaffolding**
  - Relatedness
  - Competence
  - Autonomy

- **Experiential learning** (Kolb 1984)
- **Metacognitive learning** (Pintrich 2000)

- **Sensory register**
- **Long-term memory**
- **Intrinsic motivation**

- **Accommodation**
- **Assimilation**

*Atkinson & Shiffrin (1968)*