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EDITORIALS

Does Community of Practice Theory Apply to Virtual Postgraduate Surgical Training?

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Abstract

Postgraduate surgical training has evolved over centuries as a result of changes in the community, advances in medicine, technological innovations, and the theoretical basis of training and education. The recent pandemic has had a significant effect on postgraduate surgical training. Training has been provided virtually, which has negatively affected the relationship between trainers and trainees. While virtual training has provided a solution for geographical barriers, it did not provide a similar training experience compared to face-to-face interactions. Technical skills, in particular, were extremely difficult to teach virtually.

Although the COVID-19 pandemic is over, and daily life is returning to normality, virtual training is expected to continue to play a significant role in undergraduate and postgraduate medical and surgical education. This paper aims to provide a better understanding of the principles of educational theories with a focus on communities of practice and how it applies to postgraduate surgical training as well as virtual training. The paper also aims to offer the opportunity to reflect on current practice and consider ways of improvement.

Keywords: Community of practice, Postgraduate training, Educational theory, Surgical training, Virtual training

1. Introduction

Postgraduate surgical training (PGST) is a prime example of how the Communities of Practice (CoP) theory can be applied. PGST involves a combination of practical skills and theoretical knowledge, and the hierarchy within surgical departments is highly respected. In PGST, consultant trainers are responsible for patient care and the training of junior doctors. Meanwhile, less senior doctors play a vital role in patient care and junior doctor training within a respected hierarchy of seniority and experience. This hierarchy aligns well with CoP theory, where the more experienced members of a community are at the centre of activity while less experienced members are at the periphery.

The traditional apprenticeship model in surgical training has been replaced by a competency-based

system [1]. PGST consists of two main components: scientific knowledge and practical skills, which are closely linked to other medical specialties, where the boundaries of medical practice influence the learning and training of junior doctors.

Interprofessional Education (IPE) is a vital component of PGST, where trainee surgeons learn and interact with other healthcare professionals such as nurses, therapists, and theatre technicians. IPE occurs when two or more professions learn with, from and about each other to improve collaboration and the quality of care [2].

Lave and Wenger [3] described CoP theory as a concept that is used to transfer and analyse knowledge within a given community. In the PGST perspective, the community is defined as a group of people or practitioners sharing common ground, such as knowledge or skills. It includes interprofessional education, the hierarchy in the medical

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profession, interpersonal skills, and a range of skills necessary for medical practice [4]. Multiple published studies have discussed the application of CoP theory in medical education.

This paper provides a theoretical background on CoP theory and how it applies to PGST, reflecting on recent advances in PGST in relation to CoP concepts and virtual PGST as a possible solution to the COVID-19 pandemic limitations on medical training.

Communities of practice theory Wenger and Lave [3] found that social interaction and situational learning had a huge influence on the community. Wenger described three dimensions for community coherence and three modes of belonging of CoP models [5]. He reported the need for individuals to be involved in a joint activity or enterprise, have a shared reservoir of knowledge and skills, and involvement and engagement in the community to establish its coherence. The modes of belonging and identification were described as Engagement, Imagination, and Alignment. Engagement to work together to produce the end product, Imagination to have a common constructive image of the community, and alignment to align the activities among the community in effective and productive ways. This results in shared experience and knowledge among the community. For this process to be efficient, the CoP is believed to have certain characteristics like shared ways of engagement, mutual relationships, rapid flow of information, and other key characteristics found to be common grounds of efficient CoP [6].

The focus of a CoP is not the individual, it is rather on the social process. Individual contributions are valued as part of the process that results in shared learning and the production of an object. Therefore, individuals are thought to be equal within the community. They all share and learn through the interactive dynamics of the community. One of the key elements of CoP is legitimate peripheral participation which allows new individuals to be involved, giving them the opportunity to participate and, in turn, learn new skills, build on their prior knowledge, and become a central part of the community. It is through this participation that CoP coherence develops, and the sense of identity and belonging gets stronger [7].

2. Communities of practice theory and postgraduate surgical training

The traditional model of education in PGST has evolved over time, and the didactic lecture-based approach to education with the educator as the main

source of knowledge is no longer applicable [4,8,9]. Multiple studies have shown that surgical skills are better taught in practice, in simulation labs, workshops, or hands-on training, rather than through didactic lectures [10]. It is also widely accepted that using multiple senses in learning results in a higher level of retention of knowledge and skills. With the current advances in technology, knowledge is easily accessible [11]. The shift toward a competency-based curriculum in PGST [1] has influenced the theoretical structure of medical education. The competency-based system emphasizes the importance of situational learning, learning as a member of the CoP environment [12].

In healthcare, social interaction is a fundamental part of medical practice [13]. This has been acknowledged for a long time, and communication skills are now part of the assessment for medical jobs. In the UK, the NHS structured interview process includes an assessment of communication skills. Similarly, the British General Medical Council (GMC) assesses communication skills for overseas medical graduates who wish to practice in the UK using the Professional and Linguistic Board exam (PLAB) [14].

Although PGST is competency-based training, apprenticeship remains a valuable training route [4,15]. Pope reported that surgeons draw on their past experience, preferences, and knowledge for decision-making and surgical procedures [16]. The rationale for the decision-making is usually discussed and explained among the team, where team members express their opinions and ask questions to clarify decisions taken. This thought process is part of social interactions within the community [17]. Within the CoP, a team will consist of one or more consultants, one or more specialists, occasionally a fellow or senior trainee, and a group of junior doctors including residents and interns. For this team, it is vital to understand the boundaries of the community and how to interact with other teams. In surgery, interaction with the anaesthetic team and other healthcare professionals is mandatory to deliver the expected outcome for the patient and the whole community. As an example, in the operating theatre, interaction with the anaesthetic team, theatre team, and other surgical teams is necessary. The end product, in this case, is a safe surgical procedure with a successful outcome for the patient. In a published study [18], the internal boundaries within the anaesthetic CoP were explored. The anaesthetic team may include medically qualified practitioners, Operating Department Practitioners (ODP), nurses, and other healthcare practitioners. Internal boundaries within this team define the nature of interactions. Similar boundaries and interactions could be found within the surgical team. Surgical

trainees learn how to interact and manoeuvre these boundaries within the team as part of the social learning and situational learning process [19].

It is important to realize that although junior doctors may make a peripheral contribution within the community and their role may occasionally have a minor impact on the overall outcome of patient care, they are the future of the community, and their current training and identity are crucial for the community to survive. Junior doctors develop their own identity and practices based on the current activities within the CoP, which will shape the future identity of the community. In their study, Nestel and Burgess extrapolated the benefits of a CoP model on healthcare [7]. It decreases the learning curve by sharing experience, responds to patient needs by improving communication, reducing re-work and repetition, and provides a suitable environment to try and explore new technologies. Although these benefits are not formally nor widely recognized as a direct effect of the CoP model, it is informally accepted to be a result of a good healthcare and medical training environment, which, in turn, means that the CoP model has a direct positive impact on healthcare and medical education [20].

3. Advances in technology and its effect on surgical training as CoP model

Surgical practice has undergone significant changes due to advances in technology over the past few decades. Many procedures and tools used today were not available 20–30 years ago, and there is an increasing demand for computer-guided surgery and intra-operative navigation. The future of healthcare is expected to rely heavily on virtual reality, augmented reality, robots, and artificial intelligence. The current cohort of trainers and trainees have different skill sets, with trainers having access to computers and electronic communication while trainees were brought up with virtual reality and simulation games that require a high level of hand-eye coordination. This difference in skill sets can be advantageous in the CoP model of training, as both trainers and trainees can contribute positively to society and exchange knowledge and skills to achieve the expected outcomes.

In the current PGST, where training time is shorter, there is a complaints culture and increased cost of litigations, simulation has become an integral part of skills training. Virtual reality is being used in the medical field to assist surgeons in performing procedures and train them on new technologies, with the aim of improving psychomotor skills in a safe learner-focused environment. Simulation can also be used to improve social interaction by providing situational

simulation training with a focus on communication skills, or as a tool to train surgeons in an interactive simulation environment where the skills and tasks change depending on the trainee's response and actions during the training session.

One of the values of simulation training in surgery is that it allows individuals to explore the dynamics within the community and explore the boundaries within the community in a safe environment, avoiding real-life clashes. The identities of individuals and CoP are not constant and may change as a result of conflicts within the CoP, and simulation can provide an alternative route to explore these conflicts [21].

4. Virtual communities of practice

The COVID-19 pandemic has led to significant changes in surgical training, with elective surgeries being cancelled and trainees redeployed to support other departments. Social distancing measures and the prohibition of face-to-face meetings have left trainees feeling isolated from their usual support networks, resulting in adverse effects on their mental health. To address this, a virtual community of practice (VCoP) has been suggested as a solution to overcome physical barriers and provide trainees with support.

VCoP is a virtual collaboration between individuals with shared goals, using an online platform to share experiences and improve the learning process. It has been successfully used in general practice to connect isolated general practitioners and provide support, resulting in higher satisfaction and improved service. Similarly, virtual departmental meetings, one-to-one and group mentorship, and online social interactions could provide aspects of VCoP support for surgical trainees.

Surgical training has adapted quickly to the current situation, with various platforms used to provide virtual training for surgeons worldwide. This represents a successful implementation of the VCoP concept, where surgeons from the same community interact remotely to achieve a shared goal. It is anticipated that VCoP will be integrated into the training process and continue to be used after the pandemic. This model of VCoP is cost-efficient and likely to grow further with improvements in communication technology.

5. Limitations of CoP model in surgical training

Surgical practice is hierarchical, which can foster effective teamwork, but this may conflict with CoP principles of equality among individuals. Hierarchical structures can also create communication

gaps between central and peripheral individuals, which may prevent less powerful individuals from progressing to the centre of the CoP. This could be detrimental to the social interaction process and may lead to disintegration of the CoP as a solid unit with shared enterprise [6].

While it is not uncommon for multiple sub-communities to exist within a CoP, this can be both healthy and dangerous. Subgroups can focus their efforts and attention on their product and contribute to the wider community. However, subgroup interests may conflict with the main CoP activities, and the subgroup may prioritize their interests over the main CoP activity, potentially due to limited resources. For example, surgical trainees may need time off to prepare for an exam, which is beneficial to the community as it improves knowledge and skills that are shared within the CoP. However, this may conflict with the CoP's enterprise of delivering surgical care services to patients.

While simulation and virtual reality can be useful adjuncts to medical education within a CoP, there are concerns that they do not provide enough social interaction activities and may deepen the separation between central and peripheral individuals within the community. Additionally, there are concerns that these approaches to teaching and learning may separate trainees from the reality of practice. To avoid this negative impact on junior doctors, simulation and virtual reality training should be integrated into structured training and the surgical curriculum [21].

The nature of PGST requires trainees to rotate between different units/departments within the same hospital, which may destabilize CoP coherence. Trainees may not spend enough time within the CoP to develop a strong sense of belonging.

Medical trainees are competitive in nature and compete to get into medical schools, preferred training placements, and progress in their careers against a highly competitive job market. This competitive nature may work against CoP concepts as trainees may not share all their knowledge with colleagues and may view each other as unequal, striving for preferential edge over colleagues [7]. However, interprofessional education can be employed to facilitate sharing of knowledge and skills with non-medical community members, promoting movement from peripheral positions to central contributions and increasing colleagues' preferential edge.

6. Conclusion

PGST has undergone significant changes over the years, mainly due to changes in the healthcare system and the community, with advances in medical

technology having a direct impact on training. Theoretical concepts and educational theories used to formulate PGST evolve in response to these changes. CoP is accepted by medical educators as one of the main theoretical bases of surgical training, and it plays a significant role in the current healthcare environment, expected to continue to shape PGST. However, this theory has limitations when applied to surgical education. Therefore, it is recommended to utilize multiple educational theories and practices to minimize the limitations of any single educational theory and maximize the benefits to surgical trainees.

Ethical approval

Not applicable.

Conflicts of interest

None.

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