

# INTERNATIONAL JOURNAL OF CLINICAL SKILLS

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*by teaching  
and by learning*

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# Contents

## Foreword

Welcome to the latest edition of the International Journal of Clinical Skills (IJOCs), Volume 7, Issue 6, November 2013.

Peer examination (PE) is an educational strategy whereby students learn by using each other as models in supervised clinical skills sessions. Academics at James Cook University investigate the willingness of Year 1 medical students to learn basic examination skills through PE. The informative results of this study set an important basic standard for all medical schools employing peer examination.

The teaching of intimate physical examinations is a salient example of a boundary transgression allowed to physicians, and potentially associated with discomfort for both patient and physician. Professor Jean Ker (Medical Educator, UK) concluded that medical students' "experience of intimate examination in terms of both confidence and competence is limited at qualification". In addition, students bring to the experience deep-rooted attitudes, past exposures and sensibilities concerning sexuality. Considering such challenges, our colleagues at The Alpert Medical School of Brown University, USA, and The Technion-Israel Institute of Technology, Israel, present their findings after designing, implementing and evaluating a sustainable curriculum to teach intimate examinations.

Lack of time in modern medical curriculum is often cited as the reason for the decrease in anatomical dissection teaching. Researchers at The University of Sydney, Australia, evaluate whether a 'community of practice' concept provides a nurturing and prosperous environment for knowledge acquisition in anatomy dissection courses. The results of this study have implications for all anatomy teaching and curriculum policy makers.

As always, your feedback is invaluable for the continued development of the International Journal of Clinical Skills – the only peer reviewed international journal devoted to clinical skills (e-mail: [feedback@ijocs.org](mailto:feedback@ijocs.org))

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**International Journal Of Clinical Skills**  
 P O BOX 56395  
 London  
 SE1 2UZ

[info@ijocs.org](mailto:info@ijocs.org)  
[www.ijocs.org](http://www.ijocs.org)  
**Tel:** +44 (0) 845 0920 114  
**Fax:** +44 (0) 845 0920 115

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# Teaching anatomy by whole body dissection: a community of practice

## Contributors

**Dr Annette Burgess BBusStud MBT Med MMedEd PhD**  
Executive Officer <sup>1</sup>

**Professor George Ramsey-Stewart MD FRACS**  
Professor of Surgical Anatomy <sup>2</sup>

**Professor James May MD FRACS**  
Bosch Professor of Surgery <sup>3</sup>

**Professor Craig Mellis MD MPH FRACP**  
Associate Dean and Head of School <sup>1</sup>

<sup>1</sup> Sydney Medical School – Central, The University of Sydney, New South Wales, Australia

<sup>2</sup> Discipline of Anatomy and Histology, Sydney Medical School, The University of Sydney, New South Wales, Australia

<sup>3</sup> Discipline of Surgery, Sydney Medical School, The University of Sydney, New South Wales, Australia

## Correspondence

**Dr Annette Burgess**  
Sydney Medical School – Central  
The University of Sydney  
Building 63, Level 4  
Royal Prince Alfred Hospital  
Missenden Road  
Camperdown  
NSW 2050  
Australia

**E-mail:** annette.burgess@sydney.edu.au  
**Tel:** +61 (0) 295158172  
**Fax:** +61 (0) 295153359

## Keywords

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Cadaver dissection  
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Community of practice  
Community of learning

## Abstract

### Background:

Topographical anatomy has been taught successfully for centuries where groups of students carrying out dissections, facilitated by anatomical instructors, construct their knowledge in a relevant context. We feel that the “community of practice” concept may provide a key educational tool and explanation for the success of such courses. The Community of Practice, encompassing the three elements of domain, community, and practice, is recognised as an effective socialisation strategy in education. We have applied the concept in the analysis of teaching methods for our recently reintroduced ‘Anatomy by Whole Body Dissection’ course at Sydney Medical School, Australia.

### Methods:

24 students participated in the course. The effectiveness of the Community of Practice was assessed by student knowledge acquisition and retention, and by student perception of the course.

### Results:

The increase in students’ topographical anatomical knowledge was statistically significant. The median pre-course assessment score was 10.5/20 (interquartile range 6) and the median post-course assessment score was 20.0/20 (interquartile range 1). Student perception of the course was very positive.

### Conclusion:

The community of practice concept found in our anatomy dissection course provided an enriched learning environment that motivated students to build on their knowledge and apply what had been learnt.

## Introduction

It is well documented that the teaching of anatomy by dissection has decreased considerably in medical schools during the last twenty years [1, 2, 3]. However, there has been a recent renaissance of this method of teaching [4]. An 'Anatomy by Whole Body Dissection' (AWBD) elective program has recently completed its fourth year of teaching since being re-established in 2009 at Sydney Medical School, University of Sydney, Australia. This is an optional course held in the final year elective component of the four year graduate entry medical program. Experience prior to the 2012 course has been reported previously [3, 5, 6]. Student assessments and perception of these courses have been similar to those currently being reported. Establishment of this dissection course was a consequence of a curriculum review indicating that strengthening of anatomy teaching was needed [7].

In 1997, following the introduction of the four year graduate medical program at Sydney Medical School, total curriculum hours for anatomy teaching were reduced from 253 in 1996 to 50.5 in 1997 and all teaching of anatomy by dissection was eliminated. Despite protests from students, the surgical community and graduate surgical trainees (who complained of a deficiency in topographical anatomical knowledge), this state of affairs persisted for almost a decade. Eventually it became obvious that Sydney Medical School graduates were severely disadvantaged in the exacting anatomy examinations of the Royal Australasian College of Surgeons. Following the 2007 curriculum review, the total hours spent in anatomy teaching in Stages 1 and 2 (the first two years of the graduate medical program) were trebled to 170.5 hours, but no anatomy dissection teaching was reintroduced. Anatomy in Stages 1 and 2 consist of lectures and demonstrations (theme sessions on prosected wet specimens and models). However, a major seven week elective course, 'Anatomy by Whole Body Dissection' (AWBD) was introduced in the final year option term for those students who had decided on a surgical career. Places on the courses were, however, limited by the available facilities and acceptance was on a "first come first served" basis. All courses were oversubscribed and applicants were interviewed to confirm their bona fides regarding a surgical career.

The socialization and team learning strategies encouraged and entrenched in the culture of the dissection course can be described as a "*community of practice*", where students construct their knowledge in a relevant context. As described by Wenger (2006), a

*community of practice* is characterized by three main elements [8].

1. **Domain:** a shared domain of interest and competence;
2. **Community:** engagement in joint activities, discussion, sharing of information and development of learning relationships;
3. **Practice:** the collection of resources, experiences and tools developed over time, through interactions.

This study, based on the 2012 course (AWBD2012), describes the benefits that teaching anatomy by dissection within a *community of practice* brings to student engagement.

## Methods

In the 2012 program, 24 final year medical students were selected after interview to participate in a 34-day (272 hours) dissection elective, over a period of seven weeks.

### Course design

A number of team learning strategies were followed [6, 9]. At the commencement of the dissection course, four groups of six students were allocated to four embalmed cadaver subjects. Students were allocated to groups alphabetically. Pre-class reading from the course dissection manual [10] was assigned (and required) for each day's dissection. This required pre-reading shifted the burden of learning content to out of dissection class time. Specific group dissection tasks for each day were also clearly outlined from the manual on colour-coded spreadsheets. The actual dissection instructions were transcribed onto laminated colour-coded cards for each anatomical region, and supplied to each dissection group. Images from the dissection manual were projected onto a central console and used to assist with the dissection tasks. Frequent formative and summative in class tests and practical assessments were held by the supervisors. All students completed a total body dissection according to the dissection manual. This was an intensive full-time course with dissection five days a week.

### Facilitators

Twelve senior surgeons (some retired) from various specialties were recruited to act as supervisors. All of these surgeons had many years experience and were present for their anatomical areas of expertise. At any one

time, two to three supervisors were present in the dissecting room. Thirteen surgical trainees were recruited to demonstrate to students at various times depending on their availability. At any one time, two to three demonstrators were present in the dissection room. This provided anatomical revision for the surgical trainees in preparation for their surgical college examinations.

The daily program consisted of:

- 1) 9.00am – Daily dissection briefing given by an allocated demonstrator utilising diagrams;
- 2) 9.30am – Allocated dissection tasks on cadavers in the wet lab reinforced by small group wet prosected specimen demonstrations;
- 3) 1.00pm – Daily 30 minute lecture by a supervisor on the clinical applications of the anatomy being dissected;
- 4) 1.30pm – Completion of the allocated dissection tasks for that day.

### **Student knowledge assessment**

The primary outcome measured acquisition of topographical human anatomical knowledge via standardized practical assessments. Each assessment consisted of accurate identification of 20 labelled anatomical structures in four wet prosected specimens of different anatomical regions. These summative assessments were carried out at four time points: Pre-, Mid- and End-course (progress assessments), and Post-course (one month after course completion). Each assessment had a maximum score of 20. Grading was on the post course assessment as follows: >17 (high distinction), >15 (distinction), >13 (credit), >10 (pass).

Comparison of the Pre-course scores with subsequent scores was made, especially the Post-course score, as a measure of acquisition and retention of knowledge. These analyses examined improvement in scores (from Pre- to Mid-course) and then, whether there was maintenance or further improvement in scores (from Mid- to End-course, and then from End- to Post-course). In addition, a comparison was made between the Pre- and Post-course assessments. Since the scores subsequent to the Pre-course assessment were significantly skewed, summary data are presented as medians with interquartile ranges (IQR) and the Wilcoxon signed-rank test for related samples was used for all comparisons between time points. All analyses were conducted using IBM SPSS Statistics software, version 19.0 (SPSS Inc., Chicago IL). A P value of < 0.05 was considered statistically significant.

### **Student perception**

Data were collected by survey questionnaire from all students (100%) at the post-course assessment. Students were asked to complete a questionnaire regarding their experience in the course. The questions consisted of 12 closed questions (5-point Likert scale questions) regarding teaching methods. Responses ranged from “Strongly Disagree” (1) to “Strongly Agree” (5). The questionnaire also included 2 open-ended questions aimed at eliciting responses from students regarding the “most useful” and “least useful” aspects of the course.

Ethics approval was obtained from The University of Sydney Human Research Ethics Committee.

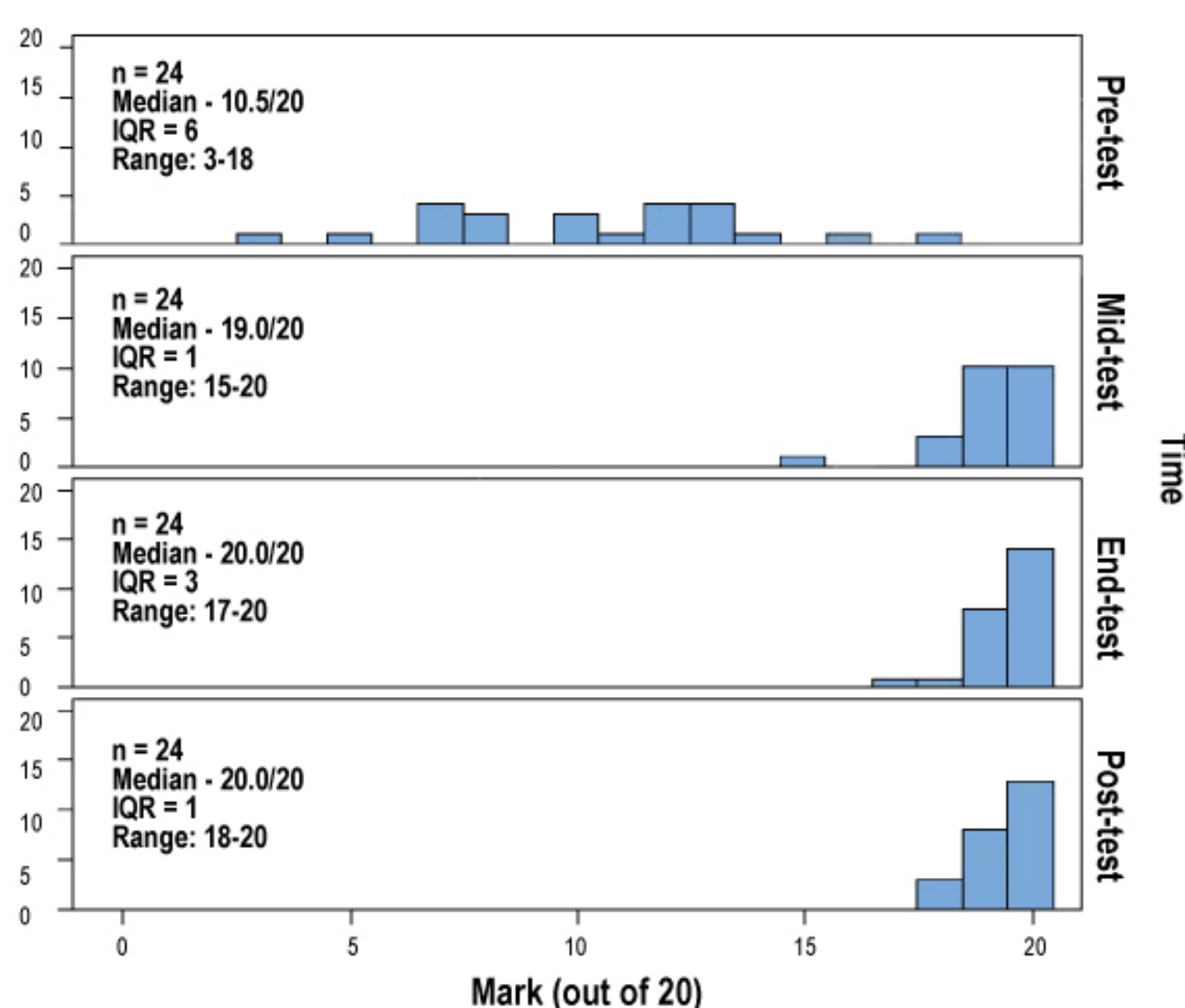
## **Results**

### **Student knowledge assessment**

All 24 students completed the summative assessments at each of the four time points (Figure 1). There was a statistically significant improvement in students' assessment scores from the Pre-course test (median 10.5, IQR = 6) to the Mid-course test (median = 19.0, IQR = 1) ( $z = -4.30$ ,  $P < 0.001$ ). This improvement was maintained, with no significant difference in scores between the Mid- to End-course assessments nor between the End- to Post-course assessments. Comparison between the Pre-course test (median = 10.5, IQR = 6) and Post-course test (median = 20.0, IQR = 1), both of which were whole body assessments, confirmed the significant increase in test scores ( $z = -4.29$ ,  $P < 0.001$ ).

### **Figure 1: Overleaf**

**Figure 1: Dissection course test histograms for Pre-course, Mid-course, End-course and Post-course 2012**



### Student feedback

All 24 students (100%) completed the feedback survey at the end of the course.

### Student demographics

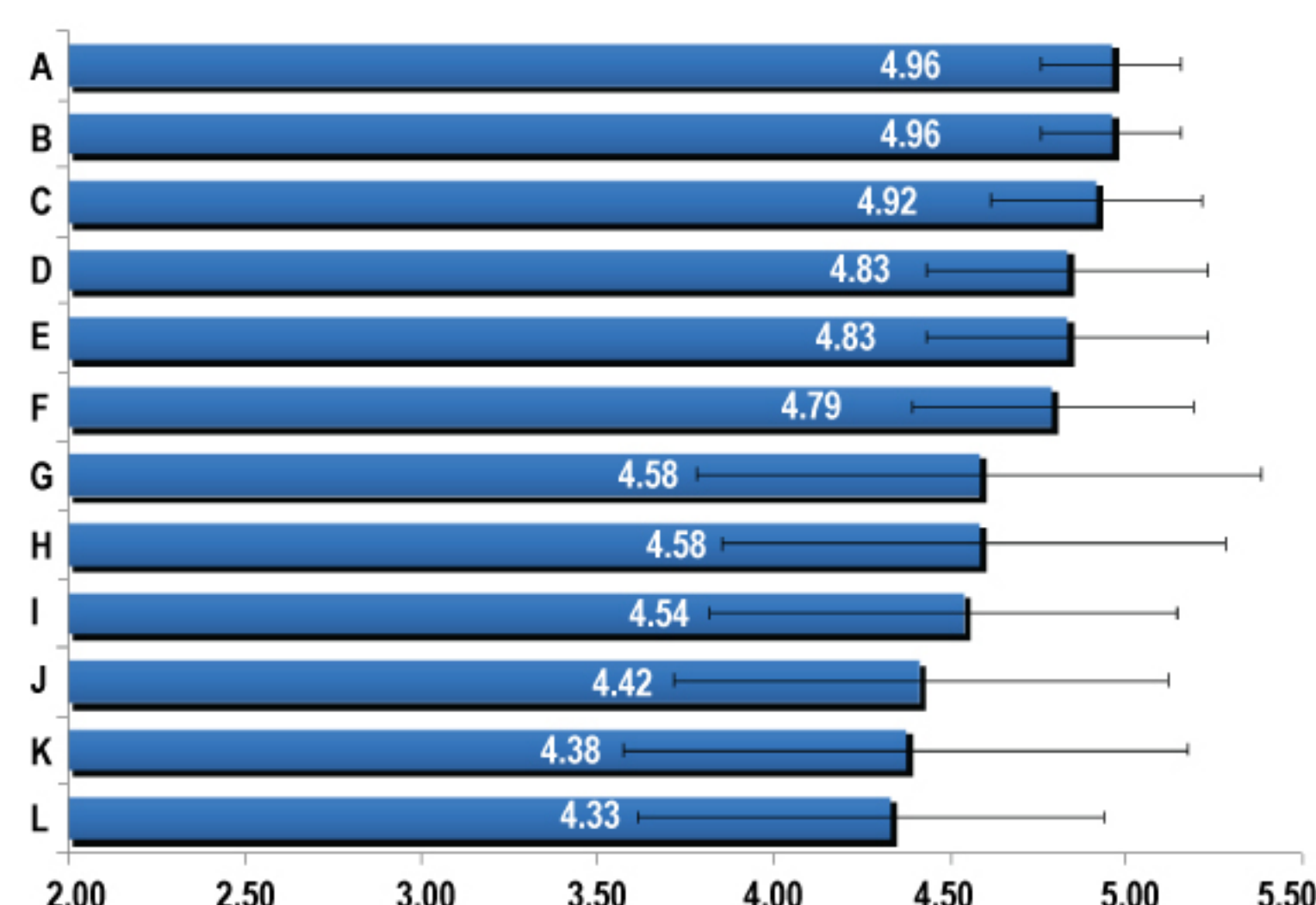
A total of 24 final year medical students (16 male and 8 female) with a mean age of 28.4, SD 3.84, range 24 to 39 years, participated in the course. All students held a prior degree, including degrees in physiotherapy, radiology, science, veterinary science, commerce, engineering, pharmacology and law. Twelve students identified themselves as having no prior anatomical teaching other than in Stages 1 and 2 of the medical program at The University of Sydney. All 24 students were contemplating a surgical career and perceived a deficient anatomical knowledge to be their main reason for participating in this elective course. The 24 students were from five different metropolitan clinical schools.

### Survey responses

Results for each of the 12 closed questions are reported in Figure 2. All 24 students (100%) rated the course as "very good" (from a range of very good / good / neutral / poor / very poor). Students reported a high level of satisfaction with the course overall, especially with regard to "Teaching anatomy within the clinical context with supervision from clinicians improved my learning" (strongly agree = 95.8%).

**Figure 2: Student feedback survey responses for Anatomy Dissection Elective 2012 (N = 24) with mean values shown.**

### Student Feedback



- A The projected anatomical wet specimens were useful for my learning.
- B Teaching anatomy within a clinical context with supervision from clinicians improved my learning.
- C Teaching resources during the course were helpful to me.
- D The Supervisors were helpful during the course.
- E The mid-course practical assessment was useful for gaining feedback about my progress.
- F Teaching methods during the course were helpful to me.
- G I found the transcribed laminated dissection cards useful to complete dissections.
- H I found the projected scanned Cunningham's Manuals images useful to complete dissections.
- I The Cunningham's Manuals used in the course were helpful for my learning.
- J The weekly lectures were useful for my learning.
- K The number of students per cadaver (6) was appropriate for learning.
- L The surgical trainees were helpful as Demonstrators in the course.

### Qualitative Feedback

Students' qualitative feedback regarding the usefulness of the course fell into three main themes, supporting the quantitative results described above.

#### Theme 1: Learning within a surgical clinical context

Almost all (n = 23/24, 96%) of the students remarked on how having senior supervisors teaching anatomy within the clinical context was the most useful aspect of the course:

*"the high quality teaching we received, applying what we were dissecting to clinical contexts and also the inspiring nature of the supervisors. It's the best teaching I've had as a student". (Student)*

Professional terminology and language was developed and enhanced through conversations and personal communications with the more "knowledgeable" and senior members of the surgical / anatomy community [11].

## Theme 2: Development of knowledge and skills in topographical anatomy

Just over one-third ( $n = 9/24$ , 38%) of students remarked on the development of an understanding of the three dimensional nature of topographical human anatomy:

*“Understanding the three dimensions of human anatomy would be impossible without this course – texts and IT can only help so much and prosections – although well presented, don’t allow you to observe all the related structures”. (Student)*

Working within the community of practice facilitated the understanding of the three dimensional nature of structures and allowed distribution of cognition amongst the students, trainees and senior surgical staff, expanding the dynamics of the learning and teaching process [12].

## Theme 3: Engagement in joint activities

A quarter ( $n = 6/24$ , 25%) of the students also valued the opportunity to be able to interact and learn from each other:

*“A very collegial atmosphere... we encouraged each other to learn.” (Student)*

Participation in group activities, working alongside others, tackling challenging tasks and problem solving together enhanced students’ learning process and knowledge acquisition [13].

## Discussion

The idea that a *community of practice* provides a nurturing and prosperous environment for knowledge acquisition has gained significant recognition in recent years, and is well demonstrated in this course through student feedback together with their Mid-, End- and Post-test scores. Individuals working alone are at a disadvantage as far as learning is concerned compared to those working in a group *community of practice* [12]. The three key features of a community of practice: the domain, the community and the practice (as described by Wenger, 2006), offer a contextual framework to describe the learning and understanding acquired by students during this anatomy dissection course [8]. With this framework, knowledge is developed as a social, rather than individual feature, which hinges on the concept of “distributed cognition”, where individuals are dependant

upon the knowledge of other people and other resources, and learning particular knowledge, such as surgical / anatomical information, may be socially rather than individually constructed [13].

### Domain

Students undertaking this elective dissection course, instead of attending individual overseas or local elective placements, came together from five different, geographically separate clinical schools to develop surgical anatomical skills. Surgical trainees from metropolitan and regional hospitals acted as Anatomy Demonstrators, assisting the students in their learning and understanding, while at the same time, better preparing themselves for their future examinations and careers as surgeons. Senior surgeons, both currently working and retired, provide expert guidance to both students and surgical trainees in their areas of expertise, forming an integral part of this unique network. Here, students, surgical trainees and senior surgeons, with common but differing levels of skills and knowledge, share information and experience to further their professional development in the specialised area of surgical anatomy [14]. Students were given a sense of identity where their educational purpose was to master the course [15]. In this community of practice setting, with opportunities to engage with others with the same aims and special interests, the curriculum opens up, with guidance to required information, so shaping the quality of learning [13].

### Community

As illustrated by student feedback, with the implementation of team learning strategies, students moved beyond individual active learning and were participating in structured learning activities that were engaging, interactive and relevant [16]. Activities included group dissection, frequent informal tutorials and assessments, through which inter- and intra-group relationships with non threatening competition were developed [6, 17]. Students benefited from participation, largely through the power of interaction. Dissecting together in groups of six students, rather than as individuals allowed for continual discussion amongst group members, building on each other’s knowledge. Students were dependant upon each other for their learning. In this context, three levels of experience (students, surgical trainees and senior surgeons) prompted collaborative learning. This dynamic interplay provided opportunity for the development of knowledge and clinical skills [12, 16].

## Practice

During the course, students became familiar with the resources and teaching methods. Self-directed learning within groups was possible through well established routines of pre-class reading, daily dissection briefings, set dissection schedules, dissection instructions and clear objectives. Thus, order, engagement and a commitment from the learner was developed [18]. Students' knowledge base was increased by developing their own shared practices, such as impromptu tutorials and quizzes by senior staff. Further to this, students were able to construct their own knowledge in a relevant context, with 38% students remarking on the development in understanding of the three dimensions of topographical human anatomy. With surgical trainees and specialists contributing their stories and examples to provide a relevant clinical perspective [14, 15], almost all students (96%) remarked that the clinical context was the most useful aspect of the course [19]. Individuals constructed their knowledge within these social surroundings and social practice was developed [13].

## Limitations

While this was a small selected group of students, who were anxious to increase their topographical anatomical knowledge (in view of their plans for a surgical career), it has been demonstrated that this aim has been achieved. However, it must be acknowledged that this is only a 10% selection from the whole student body and the anatomical knowledge of the other students has not been considered. The poor performance of this select group in the pre-course testing may well have significance as far as the anatomical knowledge of the remainder is concerned.

## Conclusion

The community of practice found in these anatomy dissection courses provided an enriched learning environment that motivated students to build on their basic knowledge and apply what had been learnt in a surgical context [20]. The interactions of experienced junior and senior facilitators, sharing their expertise within a contextual surgical framework, prompted effective student engagement in learning and understanding. Anatomy dissection, though now less prominent as a method of teaching anatomy, provides a very valuable means for students to acquire and retain knowledge of

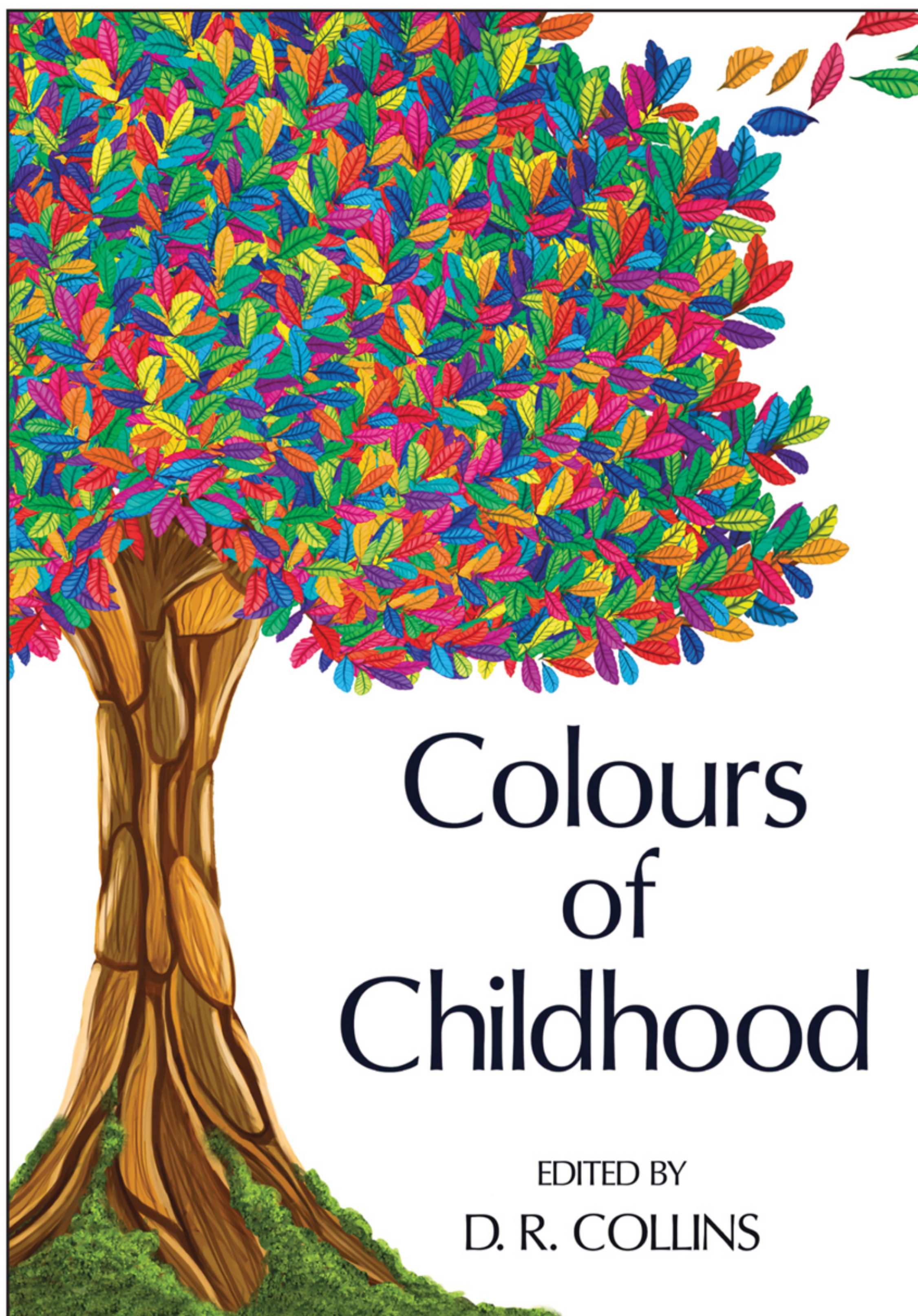
essential surgical anatomy. Lack of time in the modern medical curriculum is often given as the reason for the decrease in anatomical dissection teaching. We have shown that an elective intensive and well organised course can provide an effective dissection experience for those students streaming early towards a surgical career.

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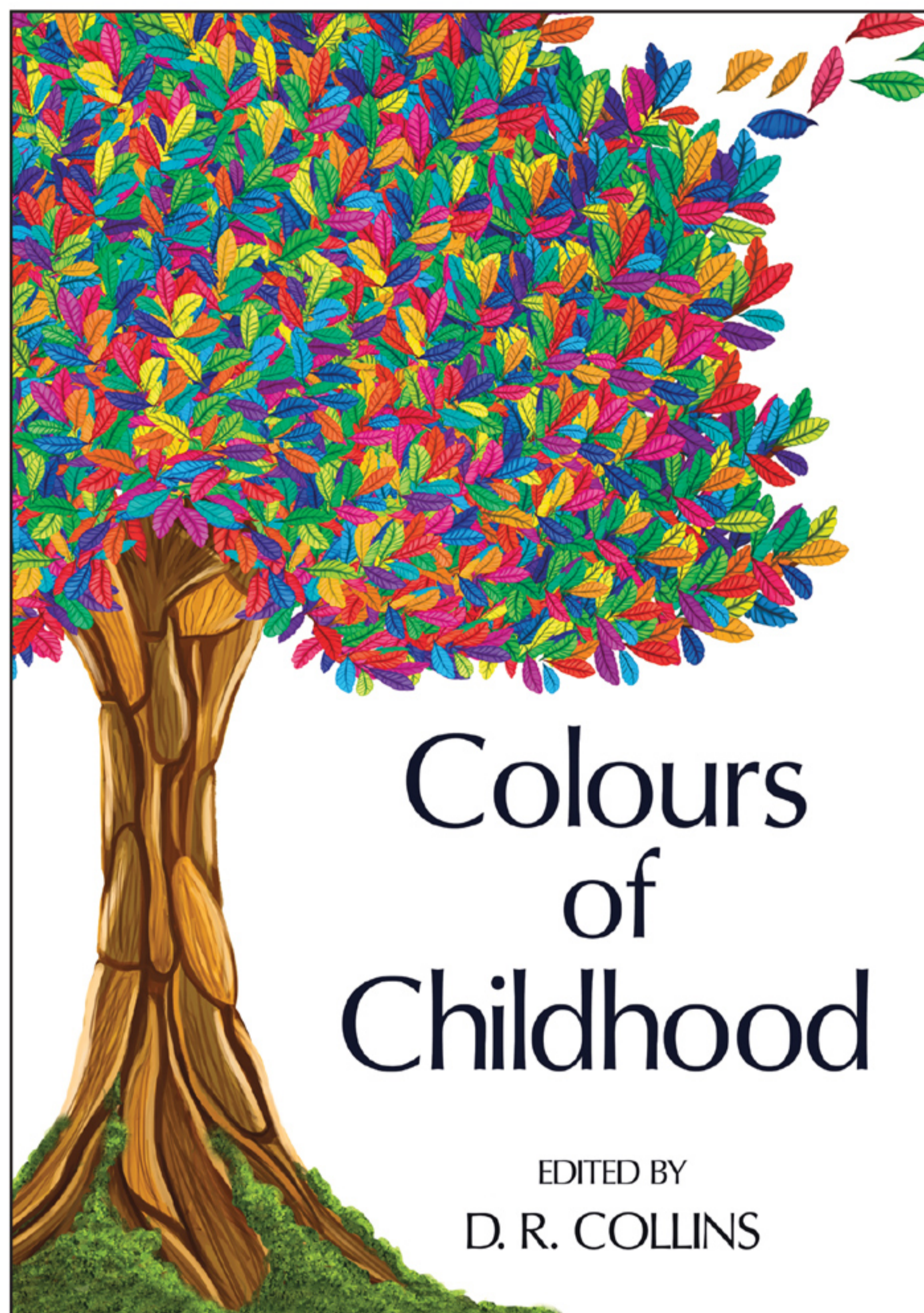
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