Training for clinical skills in the 20th and 21st centuries: two generations and two worlds apart

Part Two*

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Received: 13 April 2010
Accepted: 21 May 2010

Objective. Here, we compare clinical skills training in the 20th and 21st centuries in two different countries, in order to underline advancements and principal obstacles. **Methods**. The clinical training of medical students in the nineteen-sixties at the Sarajevo School of Medicine, Yugoslavia, and contemporary training at one of Europe's prestigious medical schools at Heidelberg University, Germany were analyzed with respect to the organization of training, teaching tools, methods, and staff. Several issues were defined as unimproved over the course of time, and we suggest that they present the core of the current problem. **Results**. Considerable advances have been made in teaching methodologies, tools and assessment of students. The major remaining obstacles are the institutional value system, poor motivation of teaching staff, curriculum structure, timing, and placement of training in the curriculum, as well as the patients' attitude towards participation in the training. **Conclusions**. In the process of bettering the existing training models we suggest acting along several lines. Increased institutional awareness of obstacles, as well as willingness to develop the ways and means to increase the motivation of the faculty, is imperative. Furthermore, it is necessary to introduce changes in the structure and timing of training and to complement it with a Catalogue, Practicum and Portfolio of Clinical Skills. We believe that recognizing the impediments and employing the proposed solutions could significantly improve the quality of clinical skills training.

Key words: Clinical skills, Medical education, Curriculum reform, Catalogue, Portfolio.

* Part one published in Acta Medica Academica 2009:38(2):70-6.

Results

Comparing the training from the mid of the last century with a contemporary one we tried to identify the improvements that have been made and the major obstacles that are still present. To facilitate this analysis we arranged all components and features we found important in a table and compared the two ways of training in two different systems, with a time-span of forty years (Table 1).

Table 1 Main clinical skills training components in two curricula, 40 years apart

Training component	Sarajevo, ex-Yugoslavia, 1968	Heidelberg, Germany, 2008
Teaching facilities		
Amphitheaters, seminar rooms	Fair	Excellent
Clinical skills labs	Non existent	Poorly equipped
Training in the laboratory	Non existent	Rarely available
Training on small animals	Non existent	Available
Teaching tools		
Standardized patients	Non existent	Available, mostly in development
Mannequins, basic	Non existent	Available
Mannequins, interactive	Non existent	Available, to some extent
Textbooks	Scarce	Abundant
Catalogue of skills	Non existent	Non existent
Portfolio of competencies	Non existent	Non existent
Practicum of skills	Non existent	Non existent
Libraries	Poor	Excellent
Inter-library loans	Non existent	Excellent
Access to journals	Poor	Excellent
Multimedia	Non existent	Abundant
Interactive software	Non existent	Scarce
On-line resources	Non existent	Unlimited
Teaching staff		
Senior	Distanced	Distanced
Junior	Poorly motivated, rarely available	Poorly motivated, available
Teaching methodologies		
Traditional	Yes	Yes
New teaching (PBL, CBL)	No	Yes
Assessment, formative	No	Yes, sporadic
Assessment, summative	Yes	Yes
Bedside practice		
Organization	Chaotic	Well-organized
Practical work	Rare occasions	In some extent
Patients' cooperation	Limited	Restrained
Skills learnt	Small number	Limited number
Skills assessment	Non-existent	Poor
Achieved competencies	Not satisfactory	Not satisfactory

Obviously, considerable advancement was achieved in training of clinical skills. Diligent efforts of hundreds scholars, combined with introduction of high technology, resulted with the substantial changes in this subject (Box 1). Still, when dealing with clinical skills, as well as medicine in general, it is good to permanently bear in mind that technology is almost always a tool, rarely an answer (1-3).

No one can deny that many aspects of clinical skills teaching have been radically changed and that considerable advancement

was achieved over the last 40 years; still, it seems that there is room for further improvements. Based on the overview of data collected in the previous text and summarized in Table 1, we composed a list of obvious advancements and improvements (Box 1), and another list with identified the principal obstacles and impediments (Box 2). These impediments remained the same and did not improve much with the passage of time. We intend to focus our full attention on them, because we believe that some of those impediments can be corrected with carefully planned action.

Box 1 Major advancements in teaching of clinical skills

Teaching facilities
- Clinical skills laboratories

Teaching tools
- Textbooks
- Libraries
- Inter-library loans
- Journals
- CDs and DVDs
- Multimedia
- Traditional software
- Interactive software
- On-line resources
- Standardized patients
- Mannequins

Teaching methodology
- Problem Based Learning
- Case-related Learning

Assessments
- Formative
- Objectively Structured Clinical Examination (OSCE)
- Short answer test (SAT)

Box 2 Major impediments in teaching of clinical skills

Institutional value system
- Non-existent rules of conduct for Faculty
- Insufficient teaching staff motivation
- Non-existent mentorship

Structure and organization of training
- Poor structuring of curriculum
- Fixed schedule of the hands-on practice
- Inappropriate training dynamics

Missing tools
- Catalogue of clinical skills
- Practicum of clinical skills
- Portfolio (logbook) of acquired clinical skills
- Inadequate patients' participation and cooperation

Discussion

At present time, a fair number of students receive their diplomas and licenses to practice still having smaller or larger gaps in their skills arsenal. The teachers are aware of this problem, but they have no adequate response and are prone to neglect it, consoling themselves that the student will master this or the other skill at some later time, during internship or residency. Unfortunately, this "later time" sometimes never comes – and as a consequence we have all witnessed tragic mistakes made by partially competent doctors. We believe that in this part of education rules have to be simple, strict and uncompromising: nobody can receive a diploma and a license to practice, if he or she does not master, to full extent, the essential and most vital clinical skills.

What comprises these *essential skills* could be a matter of discussion for learned men and women, but once a comprehensive list is created there should be no more room for negotiation and compromise – every educated medical doctor must possess this fundament to start building the personal tower of knowledge. In the following text we propose a possible approach to this problem.

Institutional value system

Even in the most distinguished and highly ranked medical schools and teaching hospitals, teaching is handicapped by the institutional value system. Research accomplishments and generation of clinical revenues are rewarded; excellence and innovations in teaching are neglected and underestimated. A recent editorial in New England Journal of Medicine stressed, "*the harsh, commercial atmosphere of the marketplace has permeated many academic medical centers. Students hear institutional leaders speaking more about "throughput," "capture of market share," "units of service," and the financial "bottom line" than about the prevention and relief of suffering. Stu-*

dents learn from this culture that health care as a business may threaten medicine as a calling" (4). As a consequence, the education of medical students was reduced to a byproduct of the operation of academic health centers (4). To quote the advice of a chairman of internal medicine department at a prestigious medical school, "*If you want to teach, do so at lunch – and keep your lunches short*" (5). Fewer and fewer clinical faculty members are willing to serve as teachers and mentors, being under permanent pressure to be '*clinically productive*,' what is just another euphemism referring to the amount of fees generated. Who are the enthusiasts, under these circumstances, to volunteer for an academic career? New times reshape old values and worship new heroes, whether we like it or not.

Rules of conduct for faculty

Substantive reform will be possible only if there is a strong willingness to support the educational mission. Visionary leadership will be needed to change the prevailing culture; institutional values may and must be changed (3). To preserve '*old values*', community of teaching hospitals should reach a mutual agreement and declare solemnly that the teaching of new generations is a noble and sacred task for benefit of entire society, equally important as healing and research. In accordance to such a policy, each of the teaching hospitals should develop an internal set of acts and regulations, which will support the teaching with an adequate financial input and career promotion mechanisms. Same set should clearly state mechanisms for control of the teaching process, regular assessment and evaluation of teaching staff, including the students' surveys.

Teaching staff motivation: mentorship and teaching credits

It seems that in both high-income and low-income countries, the main problem is low interest and the lack of motivation of young medical school graduates to follow an academic career in medicine. A recent international survey of 806 of the 2200 (37%) members of the Association for Medical Education in Europe identified that the main challenges in medical education were lack of academic recognition (40%), funding (36%), faculty development (24%), lack of time for medical education issues (22%), and institutional support (21%) (5). Introduction of well-structured mentorship and 'teaching credits' could motivate the faculty.

Given that most professionals respond to incentives, it is obvious that hospital authorities, who take pride in the management of outstanding teaching hospitals, have to develop means and ways to encourage, support and reward good teaching. In the long run, this novel approach could be considered as a sound investment; without outstanding teaching, one can hardly expect highly competent physicians, on which the flow of hospital's revenues, patients intake and research achievements depend.

There still are a number of enthusiasts who devote their time and energy to teaching, even if the reward and glory are somewhere else, but this is not good enough. Apparently, something has to be changed in the very core of the structure (6).

Mentorship

The essential prerequisite in clinical training is "*a meaningful, ongoing relationship between faculty and students*" (6). Unfortunately, mentorship in the majority of institutions of today is "*either fragile or does not exist, and the progressive advancement of student competencies is not well guided across the curriculum*" (7). Without doubts, mentorship has to be reestablished to ensure adequate observation, supervision, and mentoring of students' professional development (5).

We suggest that students should be attached, at the very beginning of their stud-

ies, to a competent mentor, to instruct and coach them, and to monitor and assess their level of proficiency in clinical arts. We believe nobody would confront or argue this statement, but they will be quick with a substantial question, "*Where to find so many highly competent professionals, willing to be enrolled in such demanding task?*" The answer lies not in the persons but in '*the network,*' in cooperation across clinical specialties, in an "*interdisciplinary ownership of the clinical curriculum*" (8).

In proposed scheme, the mentor would be an experienced clinician–educator, competent to organize and manage a large network composed of preceptors, residents, clinical instructors, technicians and nurses. We are well aware that no single person today is able to demonstrate and instruct all complex skills requested in undergraduate curriculum; still such mentor has to be broadly skilled in the core competencies that transcend all disciplines of medicine. The other members of *the network* will be responsible for specific part of clinical curriculum, and instructs the student in an area of his expertise, from acquisition of basic skills to the most sophisticated ones. The principal role of a mentor is a supervisory one; he gradually and in continuity directs the students, oversees their progress, assesses their acquired competencies, and takes care that nothing of importance is missed or neglected.

An independent assessor should do the final, summative assessment of students' competency. The achieved results would reflect the quality of the mentor's work and serve, beside the teaching credits and other criteria discussed elsewhere in this paper, as a reliable basis for mentor promotion and advancement.

Teaching credits

An alternative (or additive) approach could be sought in *'the credits for good teaching practice*'. Over the past decades, life-long learning (LLL) and continuous medical education (CME) became values which cannot be challenged, and an inseparable part of every health professional life. Why not apply this well-functioning system to the field of medical education? The system could be developed in which every member of the teaching staff would need to collect credits awarded for research and publishing in education theory, through seminars and workshops of advanced teaching and assessment methodologies, etc.

Organization of training

Restructuring of curriculum

In most European and North American medical schools curriculum is artificially separated in two parts, preclinical and clinical. Consequently, the clinical skills are generally taught in senior years of study, and there is a heavy burden on students to master a large number of skills over a short period of time.

This problem could be at least partially solved if the training of simple skills started early in curriculum, even at the very beginning of education. The instructions should start with the simplest tasks of patients' care (such as positioning them in the bed, proper cleaning and skin care, control of antisepsis measures) gradually increasing the level of difficulty of the training, with acquisition of more and more complex skills. Heidelberg Medical School has a similar system, where medical students are engaged as nursing aides in the summer of the first two years. This is useful, but it can be significantly improved by additional structuring and introducing more advanced, *'physicians*' clinical skills at the same time. If medical schools accepted this reasoning, the curriculum would have to be restructured and training in clinical skills organized like a cascade of logical sequences, starting at the very beginning of medical study and ending when

all prerequisite skills are mastered. Final product of such educational practice should be a competent physician. If the suggested changes in curriculum were accepted, students, their mentors and clinical instructors would have more time for clinical training, which should be organized in several stages.

In the first phase, the clinical skills instructor would explain the rationale for the procedure, introduce the equipment, instruments and materials, and present the procedure in depth, gradually and in detail, using drawings and multimedia as well as real instruments and equipment. All instructors don't necessarily have to be doctors – many skills could be learnt by assistance of preceptors, nurses, technicians and other related health professionals, who are proficient in their fields of expertise.

In the second phase, the clinical instructor would practice a skill with students in the Clinical Skills Laboratory on mannequins, models or in virtual reality. At the end of this phase the instructor would inform student's mentor and confirm with signature that the student had mastered the skill well enough to be allowed to practice it in the clinical environment.

In the third phase, the clinical instructor would practice the same skill with students in a clinical setting, first showing them the complete procedure, and finally allowing them to perform under his supervision. When this exercise is performed in a satisfactory way, the instructor would guarantee with his signature that students have fully mastered the skill.

Finally, during the final assessment in all clinical disciplines, the senior assessors would have an opportunity to re-evaluate the students "Portfolio of acquired skills," estimate the students' level of competency and issue the final approval. Only in this way would no single essential skill would be neglected, and no single student would finish his or her studies with the idea that "*this or that skill will be acquired at some latter time*."

In order for the proposed model to succeed, mentoring is the single most decisive factor. Students need regular meetings with mentors to reflect on the information, diagnose the state of their competence, and set further learning goals. Evidence shows that portfolios improve the planning and monitoring of education by combining external assessment and self-assessment with mentoring. They enable the students to develop more challenging learning goals than is customary in traditional medical education (8).

Scheduling the bed-side teaching

In the majority of teaching hospitals, the strict scheduling of training is responsible for poor training outcome. At first sight, scheduling appears to be a trivial and an easy-to-solve matter, but the clinical teaching staff knows well that it is not so. The instructions must not interfere with routine hospital tasks. Besides, often the planned schedule for clinical practice does not match with availability of appropriate clinical cases for demonstration, and even the simplest demonstrations are not possible for myriad of reasons. The standardized patients cannot solve this problem even if they are very talented actors, for obvious reasons.

Another problem can be identified in the partnership between higher education institutions and service providers. Both systems are currently reluctant to devote the required resources and expect the other side to take responsibility for the clinical part of the curriculum Results of these weak and sometimes conflicting relationships result in the poor quality of clinical teaching.

What can at least in part solve this problem is, in our opinion, a flexible schedule able to adapt to given circumstances. As previously discussed, at the beginning of their undergraduate study students should be equipped with a list of skills that must be mastered, along with the name of the tu-

tor/clinical instructor who is responsible for this part of teaching. The task of planning the clinical time of students cannot be the responsibility of an administrative secretary. What we suggest is that students and their instructor plan the in-hospital activities together. Time and date should not be important - the fact that a specific skill has to be learnt should be the primary concern. Weather this happens in the morning or in the afternoon, on a workday or over the weekend, in one hour or over the course of a week – should not matter.

Tools and supplements

Catalogue of the knowledge and the clinical skills

A standard requirement in contemporary literature on medical education is that "*a graduate student should be competent and should posses the adequate clinical skills to examine the patients, to suggest the preliminary diagnosis and to propose the diagnostic plan and strategy*" (1, 4, 6, 7). In such manner, the medical students are uncompromisingly confronted with demand to master a large number of complex clinical skills, which will ensure all competencies necessary to perform in a satisfactory manner during their professional career. Again, there are many definitions of competence in medicine and a good one is a simple one: "*The competence in medicine is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individuals and communities being served*" (9). This citation is a nice example of flawlessly composed text, result of good and profound thinking. Unfortunately, we are afraid that such outstanding definition would not be of help to young students, who at the very beginning of education need simple and easy understandable answers to their basic dilemmas: what is it that everybody expects of them, where is the clear line between necessary knowledge and decorum and finally, when can one be confident that one is a competent doctor, ready to make decisions with profound impact on people's lives.

With those statements we wish to underline the significance of a *"Catalogue of the Knowledge and the Clinical Skills"*, in which most of the knowledge and skills that should be in possession of a young competent graduate would not only be listed, but also classified in relation to their significance. Apparently, each medical school has to develop its own system – from one part of the world to another the organization of medical care, diagnostic and treatment regimens, as well as pattern of disease, vary greatly. Composing the catalogue in accordance to before mentioned principles we would achieve two important goals: students would know exactly what they have to know and what is expected of them; teachers would know how to plan and structure their teaching.

Recently we started a program of radical curriculum reform (10-13), supported by Trans-European Program for Co-operation in Higher Education in Central and Eastern Europe (Tempus). Within the frame of this program we created the "The Catalogue of Knowledge and Clinical Skills". Thirteen medical schools from eight European countries joined expertise in this enterprise: Vienna, Austria; Gent, Belgium; Aarhus, Denmark; Heidelberg, Germany; Split and Zagreb, Croatia; Chieti, Italy; Ljubljana, Slovenia and 5 schools from Bosnia-Herzegovina (14).

Practicum of clinical skills

Composition of a comprehensive practicum of clinical skills is another important prerequisite for sucessful training of clinical skills. Many would argue that all clinical skills and techniques are already described in hundreds of texts, books and Internet sites. This is undeniably true, still it is surprising that

a detailed and comprehensive practicum, which in one place combines both the essential and the most complex skills, is a rarity on the medical textbook market, in contrary to hundreds existing books on anamnesis and physical examination. One praiseworthy exception is a recent introduction of "*Procedure Consult*", an innovative online clinical procedure reference tool (15).

To execute any given skill, a student should know why it is important, what the indications and contraindications for the procedure are, and which instruments, materials and equipment are necessary for its successful execution. The student needs to know how to explain the procedure to the patient and ask for informed consent, how to position the patient, what kind of anesthesia to apply, and how to handle the specimens for analysis. At first sight all of this can seem trivial and superfluous, but how can a student know if she or he should use the needle number 16 or 20? Moreover, such tiny details can make a crucial distinction between a successful and a failed procedure. This introduction should be followed by a step-by-step description of the procedure itself, with appropriate comments on anatomy and physiology, as well as a warning on possible complications, their prevention and management.

Such a practicum, integrated with the "Catalogue of Clinical Skills", would be a valuable tool. Last year we drafted and published the first edition of our Practicum of Clinical Skills (16), where we applied above mentioned principles. A practicum was organized around different clinical disciplines, and immediately it became clear that there would be plenty of overlapping, since some clinical skills (e.g. airway maintenance or insertion of intravenous line) are omnipresent and students should be able to use them everywhere at any time. We are aware that there is plenty of room for improvement and that a restructuring of our Practicum is necessary.

Portfolio of acquired clinical skills

It has long been observed that assessment drives learning. If we care whether medical students become skillful practitioners and sensitive and compassionate healers, we must employ all instruments we have at disposal today: self-assessment, peer evaluations, written assessments of clinical reasoning, standardized patient examinations, oral examinations, and sophisticated simulations. Most importantly, all results of the learner's work should be duly noted in portfolios. Rigorous assessment has the potential to inspire learning, influence values, reinforce competence, and reassure the public (8).

Permanent follow-up of student's progress during clinical skills acquisition is a prerequisite in the process of building a competent physician. Therefore, we propose that students receive a small booklet at the beginning of their training (tentative denomination could be "*Portfolio of Acquired Clinical Skills*"). In this booklet, all skills that are essential to the practice of contemporary medicine should be listed and classified. Having the *Portfolio* in possession, students will know from day one what to expect and what is *'the must'* if one aspires to become a competent medical doctor. Clear guidelines on the purpose, contents, and organization of the training are essential. Not less importantly, students would be able to plan in advance and set their own pace individually. As previously discussed, every acquired skill should be assessed by clinical instructors, first in the virtual then in the real setting. When a particular skill is mastered, this would be duly noted and acknowledged with the instructor's signature. The concept of combining formative professional development alongside summative assessment is a relatively new one and we believe that, if such approach is applied, nothing of importance would be neglected and the number of medical graduates who start their careers

with considerable gaps in their armamentaria would be significantly reduced (7, 8).

Patients as "the tools"

Cooperation with patients is instrumental in training of clinical skills. Today the market is overflowing with atlases, multimedia and interactive software perfectly able to create any clinical setting in realistic shape of virtual reality. Still, young doctors-to-be have to touch, feel, hear and smell how all this looks like in this real world of ours. Such necessity creates a serious problem, because during the last half century the patients' way of thinking and their attitudes radically changed.

Today the common patient is not a humble, grateful, and obedient one. Doctors are not the God-like creatures anymore and demand for a second (or third) opinion is a standard. Thanks to the Internet, patients believe that they know much more about their illness than any highly specialized expert. Any half-literate person has just to type the question into the machine, and in a few seconds hundreds, if not thousands of answers are readily available. What is the real quality and value of such information? This question is rarely asked. Not less importantly, the Pandora box was opened by greedy barristers, who were quick to advise the patients that the medical profession is full of ignorant and neglectful individuals, who should be brought to curt of law for any reason (21).

As a consequence, the relationship between medical professionals and patients (not rarely addressed in medical jargon as *consumers*) is, euphemistically speaking, tense and one of mutual distrust, in spite of an abundance of sweet words, smiles and warm hand shaking. Under described circumstances, what are the student's chances to palpate a lump in an unfortunate woman breast, or to palpate a breast without the lump at all? We are afraid slim at best: the doctor in charge of clinical teaching should have plenty of courage to suggest this examination, and hope that the lady who posses a lump will not claim sexual harassment and call her lawyers. Better is to forget the idea, students will learn once when they start their own practice. Is it good enough? The question is now.

Over the last years there were quite a few attempts to overcome this problem. Apparently, the use of mannequins, models and plastic parts of human body would serve in part, and would actually be indispensable in introductory lessons. In addition, there is an increasing number of good interactive software which creates a virtual reality and its quality is improving and advancing daily (1, 15). Third track was engagement of patients-actors, as we described in previous paragraphs of this paper.

We also wish to draw the attention of the audience to another possibility, rarely explored in the context of clinical skills training: *basic research*. At the first sight this statement could sound absurd, until we recall that the tedious work with small laboratory animals as mice, rats and cats can beautifully prepare the students for the clinical experience proper. In the laboratory the student can acquire relevant manual dexterity and technical ability, in addition to development of scientific thinking, which will certainly be useful not only in the clinical career but also in everyday life (18). Still, if we want to teach students how to sail, they have to experience the warmth of the sunshine on their skin, feel the blowing of the wind and enjoy the scent of the salt sea air. Only in such a manner they will survive in the storms, when the sea is rough and angry.

The solution to this issue cannot be an administrative one. In spite of the fact that every patient admitted to a teaching hospital understands that such treatment entails active participation in training, they generally dislike being "*the guinea* pigs" and prefer to avoid participation in teaching of students.

Who can blame them? At present, there are two sharply separated worlds - world of pain and suffering, inhabited with patients and their families, and a world of health professionals. Those two worlds need each other and cannot exist independently. A lack of confidence dominates in their communication; they speak different languages and can hardly understand each other. The improvement of a doctor-patient relationship based on compassion and mutual trust is the answer. As suggested in an editorial of Lancet, if the ability to feel compassion is missing and cannot be learned, paying attention to patients, respecting them, and being empathic towards them certainly can be (19, 20).

It would be a good start if we stop to address to our patients as "*clinical material*," "*managed care lives*" or "*consumers*" (21). Our view is that better understanding of patients' needs could arise from an immersion of medical students in patients' world. Obviously, nobody can expect of students to inoculate some germ, become ill and hospitalized. However, it is possible to merge first year students with patients by employing them as nurse aids, orderlies or porters. In such a way students will get a chance to see things from an opposite, more patient centered perspective, to see the pain, misery, confusion, and helplessness, and to give a moral support for people condemned to dependence and suffering (22). There is some hope that the students and doctors-to-be will look at their patients' from a different perspective. If this is achieved most of the patients will know that they are not "*the guinea pigs*" but respectable humans beings and would gladly participate in education of young doctors.

Concluding remarks

As it is possible to see from our recall of '*good old times,*' the problems are not new and they are still in good health. All of them were addressed over the past times by many learned men. To end this article, we will list some of possibilities at disposal for some problems-solving (Box 3).

Box 3

Possible solutions for bettering the training of clinical skills

1. Willingness to reconsider the institution's value structure, with new Rules of Conduct;
2. Re-introduction of the firmly structured mentorship;
3. Cross-departmental ownership of clinical curriculum;
4. Publishing of a set of clear-cut Catalogue, Practicum and Portfolio;
5. Formal relation of teaching staff status and promotion with good teaching;
6. Mix the students with the patients' world; and
7. Independent external assessment of acquired skills and overall competency (on state or national level).

We hope that this paper will be understood as a call for discussion, not as suggestions or ready-made recipes, with hope that after another 40 years one will not see the same problems which are still present today.

Conflict of interest: The authors declare that they have no conflict of interest. This study was not sponsored by any external organisation.

Acknowledgments
The authors wish to thank Ms. Sandra A. Zerbo for reading the manuscript and providing useful comments.

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