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A TEACHING SCENARIO COMBINING ROLE-PLAY, SMALL GROUPS AND COLLABORATIVE ASSESSMENT IN MEDICAL EDUCATION: DESIGN AND STUDENT EVALUATION

Kenza Dafir [1, 4, *], Oussama Cherkaoui Rhazouani [2, 4] and El Mostafa El Mezouari [3, 4]

[1] Medical Genetics Unit, Department of Bacteriology-Virology and Molecular Biology, Avicenne Military Hospital, Marrakech, Morocco.
[2] Department of Neurology, Avicenne Military Hospital, Marrakech, Morocco.
[3] Department of Parasitology-Mycology, Avicenne Military Hospital, Marrakech, Morocco.
[4] Faculty of Medicine and Pharmacy, Cadi Ayyad University, Marrakech, Morocco.
* Corresponding Author

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ABSTRACT

This descriptive study reports the design and student evaluation of a teaching sequence combining role-play and small-group work with collaborative assessment in parasitology-mycology. It was conducted at the Faculty of Medicine and Pharmacy of Marrakech, Morocco, during the 2023-2024 academic year with third-year medical students, using hydatid cyst disease as the clinical theme. Each two-hour session comprised five steps: preparation (15 minutes); a role-play simulating history-taking and test requests, in which eight students played the patient, a relative and six physicians (15 minutes); a debriefing (15 minutes); small-group teaching supervised by four residents (45 minutes); and a collaborative assessment combining five individual multiple-choice questions with discussion in pairs (30 minutes). At the end of the session, 123 students in four groups completed an anonymous fifteen-item questionnaire covering six dimensions of the scenario, each rated on a four-level scale from insufficient to excellent. For every item, at least 94% of students gave a rating of good or excellent. The clarity of the description of activities received the highest proportion of excellent ratings (87%), followed by the active nature of the targeted learning (80.5%) and the quality of the assessment methods (79.7%). The least favourable items concerned the balance between teamwork and individual work, the progression of objectives and the use of technological tools. This combination appears feasible and well accepted in medical biology teaching; its effect on knowledge acquisition remains to be measured.

Keywords: Active learning; Role-play; Small-group teaching; Peer assessment; Medical education; Parasitology

1 INTRODUCTION

Teaching in the medical biology sciences still relies largely on lectures and on practical sessions focused on laboratory technique. These formats transmit knowledge effectively, but they do little to engage students actively or to help them transfer concepts to clinical situations. Active learning refers to all the methods that lead learners to “do” things and to think about what they are doing, rather than listen passively [1]. In this perspective, the teacher moves from the role of transmitter of knowledge to that of facilitator, and the student becomes an active participant in their own learning;

active pedagogy brings together the methods and techniques that create favourable conditions for student engagement and perseverance [2]. Reviews of the literature show that these methods improve engagement, the understanding of complex concepts and examination performance [3,4]. Role-play is an active learning technique that is particularly well suited to the health sciences. Mucchielli defines it as "the staging of a problem situation involving characters with an assigned role, under the supervision of a facilitator" [5]. It places students in a situation close to professional reality, requires them to use their knowledge to solve a concrete problem, and allows them to practise communication and clinical reasoning in an environment where patients are not at risk [6,7]. It is part of the experiential learning cycle, which alternates concrete experience, reflective observation, conceptualisation and experimentation [8].

Small-group work, for its part, encourages interaction between peers, makes reasoning explicit and supports the collective construction of knowledge [9]. When it is organised according to the principles of cooperative learning, in particular positive interdependence and individual accountability, it improves both learning and interpersonal skills [10,11]. Finally, collaborative assessment, which involves students in assessing their own work and that of their peers, strengthens self-regulation and the understanding of success criteria [12,13].

Parasitology-mycology lends itself well to these approaches: diagnosing a parasitic or fungal infection requires combining clinical, epidemiological and laboratory data, and bringing several specialties together around the same patient. This is particularly true of hydatid cyst disease, a parasitic disease endemic in Morocco, whose management involves the general practitioner, the clinical biologist, the radiologist, the surgeon and sometimes the intensive care physician. Yet these approaches are still little used in medical teaching, and few studies describe the combination of several active learning techniques in this discipline. To our knowledge, this is the first teaching scenario of its kind implemented at the Faculty of Medicine and Pharmacy of Marrakech, which makes gathering students' views all the more necessary.

The aim of this study was to describe a teaching scenario combining role-play and small-group work with collaborative assessment in parasitology-mycology teaching, and to analyse how students perceived it in order to guide its improvement.

2 MATERIALS AND METHODS

2.1 Study design and setting

This was a cross-sectional descriptive study conducted at the Faculty of Medicine and Pharmacy of Marrakech (Cadi Ayyad University) during the 2023-2024 academic year. It involved third-year medical students, within the parasitology-mycology tutorials devoted to hydatid cyst disease. The teaching scenario was delivered in two-hour sessions, repeated for each of the four student groups.

2.2 Participants

A total of 123 students took part in the study, divided into four groups: group 1 (31 students), group 2 (27 students), group 3 (32 students) and group 4 (33 students). Each session was supervised by one teacher and four residents.

2.3 Course of the teaching scenario

Each session comprised five successive steps, summarised in Table 1.

Table 1: Course of a two-hour session

Step	Duration	Participants	Activity
1. Preparation	15 min	Teacher, all students	Presentation of the session, the objectives, the roles and the scripts of the student actors
2. Role-play	15 min	8 student actors, observers, supervisors	Simulation of history-taking and requests for further tests, followed by input from the audience
3. Debriefing	15 min	Teacher, 4 residents, students	Consolidation of observations and discussion of conclusions
4. Small groups	45 min	Subgroups of 4 students, 4 residents	Epidemiology, clinical features, diagnosis and treatment of hydatid cyst disease
5. Collaborative assessment	30 min	Each student, then pairs	5 individual MCQs (15 min), then discussion of answers in pairs (15 min)

Step 1: preparation (15 minutes). The teacher presented the course and objectives of the session, then explained in detail the role and script given to each student actor. This step aimed to ensure that students were fully immersed in the scenario.

Step 2: role-play (15 minutes). Eight volunteer students played the characters of the case: a “patient”, a “relative” and six “physicians” (internist, intensive care physician, gastrointestinal surgeon, clinical biologist, general practitioner and gastroenterologist). The role-play focused on history-taking and requests for further tests; it involved collaboration between specialties, the way students introduced themselves and the management of interactions with the patient. The other students, seated in a U-shape around the stage, observed the exchange (Figure 1). At the end of the role-play, the audience, made up of the observing students, the residents and the teacher, stepped in to correct errors, fill gaps and enrich the content with additional questions.

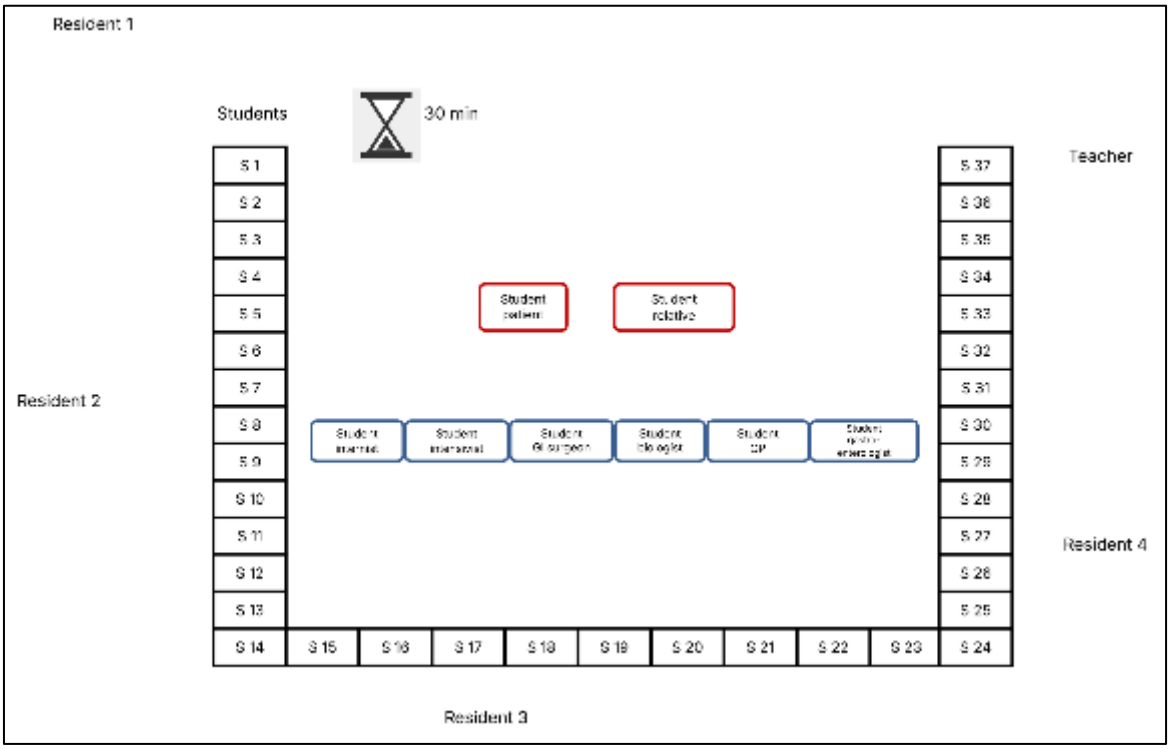


Figure 1: Layout of the students (S1 to S37), the role-play actors and the supervisors during the role-play session

Step 3: debriefing (15 minutes). The teacher, the four residents and the students carried out a collective debriefing to consolidate the observations and discuss the conclusions drawn from the role-play.

Step 4: small-group learning (45 minutes). Students were divided into subgroups of four, each supervised by a resident. Teaching covered the epidemiology, clinical features, diagnosis and treatment of hydatid cyst disease. Students remained in their subgroup, while the residents rotated from one subgroup to the next in a set direction (Figure 2), answering questions and facilitating discussion.

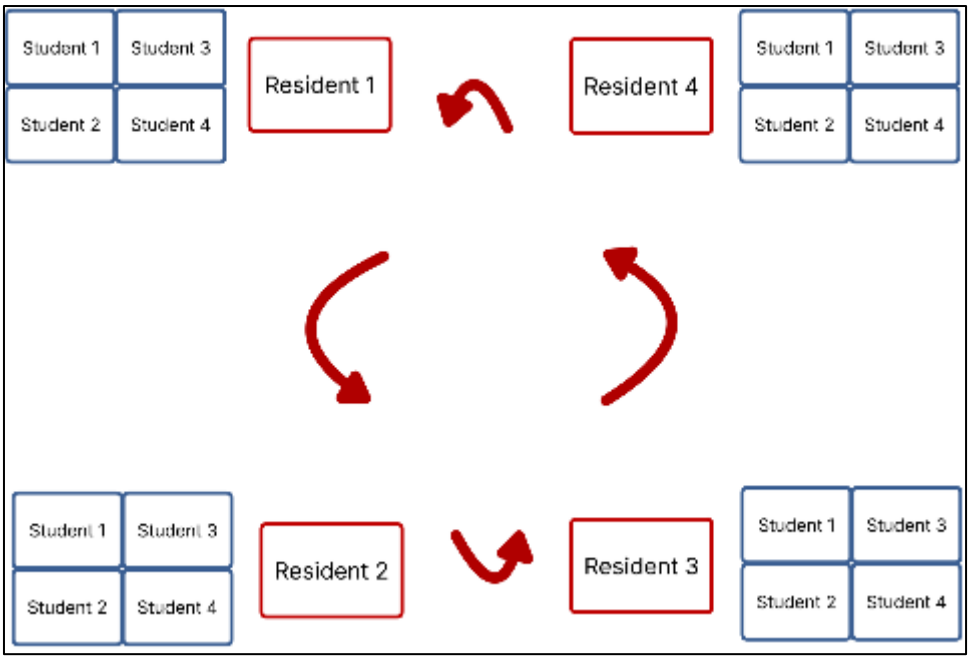


Figure 2: Direction of rotation between the student subgroups and the four residents during small-group learning

Step 5: collaborative assessment (30 minutes). The assessment had two parts. During the first 15 minutes, each student individually answered five multiple-choice questions (MCQs) on the epidemiological, clinical, diagnostic and therapeutic aspects of hydatid cyst disease, which made it possible to gauge individual understanding. During the following 15 minutes, students worked in pairs to compare and discuss their answers. This phase encouraged the exchange of ideas, the clarification of concepts, self-assessment and the mutual correction of errors.

2.4 Data collection tool

At the end of the session, students completed an anonymous fifteen-item questionnaire entitled "Teaching scenario evaluation grid". The items were grouped into six dimensions: description of the activity, elements of active learning, objectives, assessment, technological tools and completeness of the scenario (Table 2). The progression of objectives was assessed with reference to Bloom's revised taxonomy [14]. Each item was rated on a four-level scale: insufficient, poor, good and excellent.

Table 2: Structure of the teaching scenario evaluation questionnaire

Dimension	Items
A. Description	Q1: match between the chosen methods and the identified challenges; Q2: clarity of the description of the activity steps
B. Elements of active learning	Q3: learner-centred methods, teacher as guide; Q4: output produced by the learners; Q5: positive interdependence; Q6: alternation of teamwork and individual work; Q7: recall of prior knowledge and return to class
C. Objectives	Q8: appropriate wording; Q9: taxonomic progression and high level; Q10: active nature of the targeted learning
D. Assessment	Q11: methods for judging whether objectives were achieved; Q12: precise and relevant criteria; Q13: metacognitive and self-assessment mechanisms
E. Technological tools	Q14: varied and relevant tools, suited to their teaching purpose
F. Completeness of the scenario	Q15: all sections present (general information, challenges, objectives, methods, assessment, tools)

2.5 Statistical analysis

Data were entered and analysed using SPSS software; IBM Corp., Armonk, NY, USA). Results are expressed as percentages for each level of the scale. A "favourable" rating was defined as the sum of "good" and "excellent" responses.

2.6 Ethical considerations

Participation in the questionnaire was voluntary and anonymous, and no data that could identify students were collected. The questionnaire dealt only with students' views of the teaching scenario and played no part in their assessment.

3 RESULTS

3.1 Overall rating

All 123 students completed the questionnaire. The teaching scenario was rated very favourably: for each of the fifteen items, at least 94% of students gave a "good" or "excellent" rating (Table 3, Figure 3). The proportion of "excellent" ratings ranged from 61.8% (technological tools) to 87% (clarity of the description of the steps). "Insufficient" ratings were exceptional (0.8%, i.e. one student, for two items).

Table 3: Students' ratings of the fifteen questionnaire items (n = 123), in percent

Item	Excellent	Good	Poor	Insufficient	Favourable †
A. Description					
Q1: methods matched to challenges	74	26	–	–	100
Q2: clear description of the steps	87	13	–	–	100
B. Elements of active learning					
Q3: learner-centred methods	77.2	22	0.8	–	99.2
Q4: output produced by the learners	65.9	32.5	1.6	–	98.4
Q5: positive interdependence	74	25.2	0.8	–	99.2
Q6: alternation of team and individual work	66.7	27.6	5.7	–	94.3
Q7: recall of prior learning and return to class	78	18.7	3.3	–	96.7
C. Objectives					
Q8: appropriately worded objectives	79.7	15.4	4.1	0.8	95.1
Q9: taxonomic progression	67.5	28.5	4.1	–	96
Q10: active targeted learning	80.5	17.9	1.6	–	98.4
D. Assessment					
Q11: appropriate assessment methods	79.7	17.9	2.4	–	97.6
Q12: precise and relevant criteria	78.9	18.7	2.4	–	97.6
Q13: metacognition and self-assessment	73.2	23.6	3.3	–	96.8
E. Technological tools					
Q14: varied and relevant tools	61.8	35	2.4	0.8	96.8
F. Completeness of the scenario					
Q15: all sections complete	78.9	20.3	0.8	–	99.2

† Favourable: sum of "good" and "excellent" ratings. –: no response.

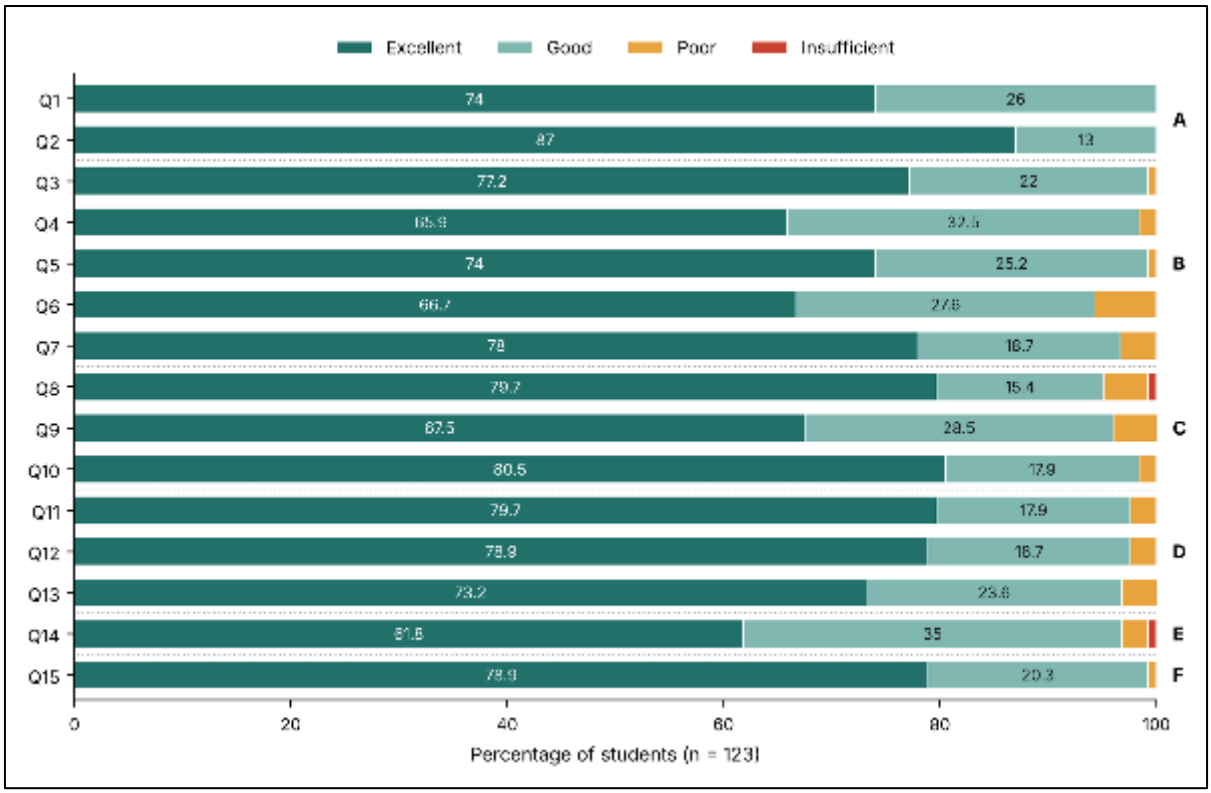


Figure 3: Distribution of students' ratings for each of the fifteen items (A to F: questionnaire dimensions)

3.2 Results by dimension

The description of the activity received the best ratings: all students rated both of its items favourably, and the clarity of the description of the steps obtained the highest proportion of excellent ratings in the survey. Among the elements of active learning, the learner-centred nature of the methods, the recall of prior knowledge and positive interdependence were well rated, whereas the output produced by the learners and the alternation between teamwork and individual work were rated less highly; the latter received the highest proportion of poor ratings. For the objectives, the active nature of the targeted learning was the best-rated item and the taxonomic progression the least well perceived. The assessment methods and criteria were rated excellent by nearly four in five students, while metacognitive and self-assessment mechanisms were rated slightly lower. Technological tools were the lowest-rated item, although most ratings remained favourable, and the completeness of the scenario was well rated (Table 3, Figure 3).

4 DISCUSSION

4.1 Main findings

This study shows that a teaching scenario combining role-play, small-group work and collaborative assessment can be delivered in a two-hour parasitology-mycology session and is very well received by students. Almost all ratings were favourable, and around three quarters of students rated most aspects of the scenario as excellent. These results are consistent with the literature on active learning, which associates these methods with greater student engagement and a better understanding of complex concepts [1,3,4]. The value of combining several techniques is that a single session draws on different types of learning: theoretical knowledge, reasoning, communication and teamwork.

4.2 Clear instructions as a condition for engagement

The description of the activity steps received the highest rating (87% excellent). Explicit and well-structured instructions reduce students' uncertainty and allow them to focus on the learning task rather than on its organisation [15]. This is particularly important in role-play, where poorly defined roles or an unclear objective can make participants uncomfortable and make the exercise feel pointless [6,7]. The preparation step, during which the roles and scripts were explained in detail to the student actors, probably contributed to this result.

4.3 Role-play to support reasoning in medical biology

By putting students in the shoes of the patient, the relative and several specialists, role-play makes visible the place of the clinical biologist in the diagnostic process for hydatid cyst disease and the need for dialogue between disciplines.

According to Mucchielli, role-play rests on three elements: a problem situation to be solved collectively, roles that shape each player's actions, and a facilitator who supports and regulates the exchanges [5]. In our scenario, the facilitator role was taken by the teacher and the residents, and the audience's input after the role-play turned the experience into an opportunity for immediate feedback. The role-play thus provides a concrete experience that students, both actors and observers, then analyse, in line with the experiential learning cycle [8]. Recalling prior knowledge and applying it to a new situation, rated excellent by 78% of students, promotes meaningful and lasting learning rather than rote memorisation [16].

4.4 Small groups and positive interdependence

Organising students into subgroups of four, supervised by residents who rotated from one subgroup to the next, multiplied both supervision and interaction. Positive interdependence, rated favourably by 99.2% of students, is a core principle of cooperative learning [10]. Studies of team-based learning in the health sciences point out that its effectiveness depends on appropriately formed and supervised groups, on each student's accountability for individual and collective learning, and on regular feedback from supervisors [17,18]. On the other hand, the alternation between teamwork and individual work was the least favourably rated aspect (5.7% poor ratings), and the output produced by the learners was among the lowest-rated items. In our scenario, individual work only took place at the last step, with the MCQs. Introducing a short individual task earlier, such as a personal reflection question at the start of small-group learning, and asking each subgroup for a brief written output, would help balance these two dimensions [9,11].

4.5 Collaborative assessment

The assessment methods and criteria were rated excellent by nearly 80% of students. The chosen format, an MCQ answered first individually and then discussed in pairs, combines individual accountability with peer discussion: students must justify their answers, discover their own errors and correct those of their partner. A systematic review of studies in medical students showed that peer feedback during collaborative learning improves professional behaviour and student accountability [19]. Group work can also be assessed by observing discussions and individual contributions, and through self-assessment or peer assessment [20]. Transparent criteria help students understand what is expected of them and assess themselves constructively [13], and co-assessment develops critical judgement and autonomy [12]. Metacognitive mechanisms, however, received a slightly lower rating (73.2% excellent, 3.3% poor). Providing explicit tools, such as a self-assessment grid or a few reflection questions at the end of the session, could strengthen this dimension [21].

4.6 Technological tools

The use of technological tools was the lowest-rated item. To be useful, digital tools need to be planned and aligned with the learning objectives. In a teaching scenario based on direct interaction, such as role-play, the choice of simple tools (a projected case presentation, ultrasound and CT images of the cyst, hydatid serology results, online MCQs with immediate display of answers) and a short introduction to these tools beforehand could improve this perception.

4.7 Practical recommendations

Based on this experience and on the areas for improvement identified by students, several recommendations can be made for teachers who wish to reproduce this teaching scenario:

- Announce the objectives and the assessment from the start: present explicit objectives that progress taxonomically, and state at the outset what the end-of-session MCQs will cover;
- Write the roles down: give each actor a role sheet stating the information they have and the information they need to find out, to limit improvisation and discomfort;
- Make observers active: give them a simple observation grid (questions asked during history-taking, tests requested, communication with the patient), which then serves as a basis for feedback;
- Harmonise supervision: prepare a shared facilitation guide with the residents, with the same key messages and the same way of giving feedback;
- Balance individual and group work: begin each small-group period with a short individual reflection question, and ask each subgroup for a brief written output, for example the diagnostic approach to hydatid cyst disease;
- Keep the two-step assessment: individual MCQ followed by discussion in pairs, completed by a short final self-assessment in which each student notes what they have understood and what they need to review;
- Integrate simple digital tools: ultrasound and CT images, serology results, online MCQs with immediate display of answers;
- Keep a record of the MCQs: collect the answers given individually and after discussion in pairs, to measure the effect of the teaching scenario on knowledge.

4.8 Limitations and perspectives

This study has several limitations. First, it measures students' perceptions, that is, the first level of Kirkpatrick's model, without measuring knowledge acquisition or transfer to practice [22]. The five knowledge MCQs were used as a formative assessment tool during the session, but their answers were not used for research purposes; no objective measure of learning is therefore available. In the absence of a control group receiving conventional teaching, the favourable ratings cannot be attributed with certainty to the teaching scenario itself.

Second, the questionnaire was not psychometrically validated. Its items, all worded positively, and its four-level scale without a neutral option may favour positive responses. Because it was completed immediately after the session, in context, it is exposed to social desirability bias and a novelty effect. The lack of open-ended questions does not allow us to understand the reasons for the less favourable ratings. The responses of the eight student actors and those of the observers, whose experience differs, were not analysed separately, and facilitation by four residents may have varied between subgroups. Finally, the study was conducted at a single centre and on a single topic.

Future studies could compare this teaching scenario with traditional teaching using a knowledge test before and after the session, analyse how MCQ answers change between the individual phase and the pair phase, measure long-term retention, use a validated questionnaire supplemented by open-ended questions or a focus group, and extend the experience to other topics and other faculties.

5 CONCLUSION

Combining role-play, small-group work and collaborative assessment in parasitology-mycology teaching is feasible within a two-hour session and very well perceived by students. Immersion in a clinical scenario centred on hydatid cyst disease encourages the application of theoretical knowledge to a concrete situation, small-group work creates a dynamic of collaboration and discussion, and collaborative assessment stimulates critical thinking and self-assessment. The balance between group and individual work, the progression of objectives and the integration of technological tools are the main areas for improvement. This teaching scenario can be transferred to other topics and to other medical biology disciplines.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

Statement of ethical approval

Approval was not sought from an ethics committee because the study evaluated a routine teaching activity through an anonymous questionnaire, with no intervention on patients and no collection of identifying data. Participation in the questionnaire was voluntary and anonymous, no identifying data were collected, and the questionnaire played no part in student assessment.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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