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ASSESSMENT OF THE SENIOR DENTAL STUDENTS' ACCEPTANCE OF THE USE OF ROLE-PLAY MODEL AS PART OF PEDIATRIC DENTISTRY CURRICULA IN EGYPT

Ghada M. Mahmoud*, Heba Youssef**, Rabab K. ElGhandour***, Nancy R. Bedwani****, Ali T. Aboelsoud***** *and* Rehab Samir Salma*

ABSTRACT

Introduction: Behavioral and attitudinal competencies are essential components in instructing dentistry undergraduate students in behavior management. The intricacy of these skills renders clinical education via didactic methods insufficient for fostering a profound attitude to learning. The implication of role play may present an opportunity to foster such learning outcomes. Aim: The aim was to assess experiences and acceptance of Egyptian dental students of the role-play model as a learning pedagogy for pediatric dentistry.

Material and Methods: Students were recruited from the senior level of the bachelor program in dentistry for two consecutive years (n=554)

Results: Students' performance and satisfaction were very satisfactory towards role-playing. In total, 77.4% of students responded favorably to the role-play and the more preferred type of role-play was video filming (79.4%). A total of 86.6% of students stated that role-play model helped them in making behavior management subject easier for them to apply clinically in the future. Male students expressed higher favorable views of this teaching modality.

Conclusions: The application of role-play in pediatric dentistry could be an effective way of educating Egyptian dental senior students and can be beneficial for their transition from students to dentists.

KEYWORDS: Behavior management, Pediatric dentistry, Role-play, teaching-learning method, Senior dental students

* Associate Professor of Pediatric Dentistry, College of Dentistry ElAlamein, AAST
** Lecturer of Material Science, College of Dentistry ElAlamein, AAST
*** Lecturer of Pediatric Dentistry, Faculty of Dentistry, Pharos University in Alexandria
**** Lecturer of Community Dentistry, Faculty of Dentistry, Pharos University in Alexandria
***** Dental Intern, Faculty of Dentistry, Pharos University in Alexandria

INTRODUCTION

The teaching strategies used in medical education today have remained unchanged for centuries, employing a teacher-centric approach where educators provide instructions and visual aids, as well as textbooks and references, for students to memorize and be tested on [1-3]. The traditional method is admittedly both effective and simple to utilize as students are enabled by it to develop an organized way of thinking and recall basic information. It is well-accepted by both the provider and recipient of the information and generally bears minimal risks for teachers and professors [4]. Lectures also play a key role in introducing new information to students for the first time [3].

On the other hand, said teaching methods have come under scrutiny in recent years for their effectiveness in certain aspects of medical education. The traditional lecture-based approach treats students as machines to be fed knowledge, actively suppresses creativity and individuality, and fails to acknowledge the diverse learning styles of students [4,5]. The sheer volume of information combined with lacking interpersonal relationships with peers can also lead to high levels of stress, which may in turn cause higher rates of anxiety, depression and interpersonal sensitivity among dental students compared with students in other fields of study [6]. As such, there has been a push in recent decades to transition away from traditional learning techniques in favor of a more active approach, namely student-centered learning. This approach encourages shifting focus from the instructor to the learner and treating the latter as a co-creator in the teaching and learning process [7]. Encouraging active learning skills leads students to develop self-learning skills and increases their overall engagement in coursework. It also embraces dynamism, creativity, critical thinking and interpersonal communication. A variety of active learning methods have been introduced, such as team-based learning, workshops, flipped classrooms, and role-playing [4].

Role-playing (RP) is an established method of active learning employed in all levels of education and covering a wide range of topics. The strategies employed in this model rely on various pre-existing theories for the effective dissemination of knowledge and acquisition of skills which suggest learning is most effective when it is applied in a practical situation, or when it utilizes multiple senses. In a dental setting, RP can also be valuable as a tool to help students develop the key soft skills required to professionally manage a clinic and communicate with patients [8]. In its simplest form, role-playing is an activity in which a participant is asked to pretend to either be themselves or another person in a made-up scenario, and to behave as that person would [9]. In doing so the participants, as well as the onlookers, are given a chance to take part in a controlled social environment with their peers where they can test out or observe various behaviors and responses to the simulated situations provided by their instructors [10].

The benefits and challenges of employing role-play models as an active learning technique are well-documented. When employed effectively, role-play can help students to develop initiative, confidence, problem-solving skills, communication skills, and improve their ability to work as members of a team. However, lack of resources or time can prevent students from benefitting equally [11]. Additionally, acceptance of this technique may depend on personality types, as previous studies have shown that some students did not enjoy or benefit from role-playing due to a perceived lack of confidence [12].

While there has been an uptick in the number of studies conducted on role-playing and other forms of active learning for dental students around the world, there is little to indicate that its use has significantly increased in dental curricula [13]. Furthermore, there is a lack of published data concerned with measuring the effectiveness and impact of the role-play model as

a learning strategy with dental students. So, the aim of this study was to assess Egyptian dental students' experiences and acceptance of the role-play model as a learning pedagogy for pediatric dentistry, in order to develop criteria and guidelines for future use of this method in the formative assessment of senior dental students. The null hypothesis was that senior dental students' acceptance of role-play learning method would not differ than accepting previous well-established methods.

MATERIALS AND METHODS

Study design, settings and ethics approval

This is a descriptive cross-sectional questionnaire-based study involving senior dental students of the Bachelor of Dental and Oral Surgery program. It was conducted at College of Dentistry El Alamein, Arab Academy for Science, Technology, and Maritime Transport (AAST). Ethical approval was obtained from the Research Ethics Committee, AAST, #1212.004.23.REC. The study was following the Declaration of Helsinki, and the STROBE guidelines were followed in reporting all steps. Students' participation was voluntary and anonymously secured. The purpose of the study and participants' consent were added as the cover page of the questionnaire.

Sample size calculation

Sample size was determined by an online calculator based on the following: 95% confidence level, 5% margin of error. Assuming that 50% of the senior dental students would prefer this learning method, the minimum required sample size was 548 participants [14].

Eligibility criteria

554 senior dental students were recruited from College of Dentistry El Alamein, Arab Academy for Science, Technology, and Maritime Transport (AAST) during two consecutive academic years: 2023-2024 and 2024-2025. All senior students enrolled in the clinical pediatric dentistry course were recruited. While senior students who refused to participate or were with prior experience with role-play in any other courses were excluded

Questionnaire design

Data was collected by means of a questionnaire that was developed to measure self-reported satisfaction of students on using role-play model as a learning method. It was developed according to guidelines described by Artino et al. [15]. It composed of two main parts; cover page containing explanation, consent, filling duration and the choice to participate or not. second part: the assessment which included 4 sections: Personal information and preferred teaching methods, foundational knowledge, gained skills and interests. Before starting the study, content validity of all items was assessed by 3 dental professors to evaluate the relevance on a 4-point scale ranging from 1. not relevant to 4. highly relevant. The calculated content validity index score was 0.9 indicating accepted validity.

Data collection

The context of this study is a 5th year pediatric dentistry course, which contains a topic involving behavior management of the child dental patients. The topic was taught in class through lectures ensuring that students had prior information, basic understanding so as to be familiar with behavior management techniques of young dental patients. A formative assessment was designed in which students were asked to create a simulation of one of several possible scenarios (videotaped) in which a dentist "interviews and manages" a child dental patient and parent at the child's first dental visit including basic techniques of behavior management and maternal anxiety reduction. To create the different scenarios, various combinations of pediatric patient personality types, and parent types

were selected. For example, a fearful toddler with an overprotective parent, or a fearful preschooler accompanied by an authoritative parent…etc. Every four students teamed up. Each team was asked to perform the roles detailed in the scenario including the child patient, parent, dentist, and narrator who filmed and narrated the simulation. In the narration, the group was asked to describe the events taking place, attitudes of the child and parent, as well as the correct management technique that is being used by the dentist.

After submission of their work, students were asked to fill a structured and self-administered questionnaire that included questions on teaching-learning methodology, acceptance, interest, environment related to studying, and assessment pattern. A 3-Likert scale was used for marking their responses on questions; agree, neutral and disagree. The questionnaire was made in an electronic google form and was distributed through social media platforms either by direct link (https://forms.gle/htM4XmLymadciW4N9) or Quick Response (QR) code. The primary outcome was assessment of students' experiences and acceptance of role-play model as a teaching/learning pedagogy. The secondary outcome is to assess the difference in acceptance of this learning pedagogy according to gender.

Statistical analysis

The results were tabulated and statistically analyzed using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). Categorical data were summarized as numbers and percentages. Quantitative data were described using range (minimum and maximum), mean, standard deviation. The mean score was calculated by averaging the options agree (3), neutral (2), and disagree (1) for each item. Student t-test was administered to compare male and female responses to each section of the questionnaire. p values of 0.05 were considered statistically significant

RESULTS

Five hundred fifty four students of total 566 responded to the questionnaire (response rate=97.9%). Fifty two percent were at the age of 22 years, 52.7% were female and 47.3% were male students, 77.4% preferred role-play model teaching method and the more preferred type of role-play was video filming (79.4%) (Table 1). Table 2 shows that the foundational knowledge gained by using role-play model significantly affected the senior dental students in understanding, active engagement, more interest and easier application of the topic ($p<0.001$). No significant difference in their confidence in their abilities was encountered performing the role-play model ($p=0.804$). Table 3 shows that the gained skills during role-play model (language, communication, problem-solving skills) were perceived as a significant improvement among senior dental students ($p<0.001$). Table 4 shows a significant increase in interest of using role-play model ($p<0.001$). Table 5 represents the relation between gender and questionnaire scores of the three sections. Scoring was significantly higher in male students than female students as regards the foundational knowledge and as regards the overall scoring ($p <0.001$ and $p=0.008$ respectively).

TABLE (1) Characteristics of participants

Characteristics of participants	No.	%
Age (years)		
21	48	8.7
22	289	52.2
23	189	34.1
24	28	5.1
Gender		
Male	262	47.3
Female	292	52.7
The preferred teaching method		
Role-play model method	429	77.4
Traditional teaching method	125	22.6
The preferred type of role-play model		
Video filming	440	79.4
Mobile animation app	114	20.6

TABLE (2) Foundational knowledge among senior dental students (n = 554)

Q	Foundational knowledge	Agree		Neutral		Disagree		P
		No.	%	No.	%	No.	%	
1	Role-play model helped me more to understand the assigned topic	461	83.2	80	14.4	13	2.3	<0.001*
2	Using role-play model was satisfying	464	83.8	82	14.8	8	1.4	<0.001*
3	Through role-play model, I actively engaged and participated in the assigned topic	497	89.7	51	9.2	6	1.1	<0.001*
4	It gave me more confidence in my abilities during dental clinical encounters with children	456	82.3	84	15.2	14	2.5	<0.001*
5	After role-play model, I'm more familiar with behavior management of pediatric dental patients	477	86.1	66	11.9	11	2.0	<0.001*
6	It helps making behavior management subject easier for me to apply in the future	480	86.6	63	11.4	11	2.0	<0.001*
7	I feel more interested in the topic discussed in the role-play model	181	32.7	181	32.7	192	34.7	0.804
8	I feel that role-play model is not a suitable way as a teaching method	154	27.8	95	17.1	305	55.1	<0.001*

***c^2:* Chi square test for goodness of fit**
p: p value for Chi square (2×1 contingency table) (Goodness of fit)
****: Statistically significant at p ≤ 0.05***

TABLE (3) Gained skills among senior dental students (n = 554)

Q	Gained Skills	Agree		Neutral		Disagree		P
		No.	%	No.	%	No.	%	
1	Role-play model was a pleasant and practical way of learning my capabilities	465	83.9	71	12.8	18	3.2	<0.001*
2	Role-play model was a useful tool, to evaluate and upgrade my management and communication skills	454	81.9	83	15.0	17	3.1	<0.001*
3	My language and communication skills improved as a result of participation in role-play model production	452	81.6	85	15.3	17	3.1	<0.001*
4	My problem-solving skills were improved by participating in video generation	468	84.5	73	13.2	13	2.3	<0.001*

c2: Chi square test for goodness of fit
p: p value for Chi square (2×1 contingency table) (Goodness of fit)
****: Statistically significant at p ≤ 0.05***

TABLE (4) Interests among senior dental students (n = 554)

Q	Interests	Agree		Neutral		Disagree		P
		No.	%	No.	%	No.	%	
1	I liked creating role-play model	444	80.1	93	16.8	17	3.1	<0.001*
2	My interest in behavior management of pediatric dental patients was increased after using role-play model	439	79.2	100	18.1	15	2.7	<0.001*
3	I'll recommend role-play model to other courses	413	74.5	106	19.1	35	6.3	<0.001*

c2: Chi square test for goodness of fit
p: p value for Chi square (2×1 contingency table) (Goodness of fit)
****: Statistically significant at p ≤ 0.05***

TABLE (5) Relation between Gender and questionnaire scores (n = 554)

	Gender		p
	Male (n = 262)	Female (n = 292)	
	Mean ± SD	Mean ± SD	
Foundational knowledge	11.11 ± 2.59	10.34 ± 2.52	<0.001*
Gained Skills	4.91 ± 1.80	4.70 ± 1.54	0.127
Interests	3.86 ± 1.43	3.71 ± 1.32	0.189
Overall	19.89 ± 5.26	18.74 ± 4.83	0.008*

SD: Standard deviation
t: Student t-test
p: p value for comparison between the studied categories
****: Statistically significant at p ≤ 0.05***

DISCUSSION

In recent years, interactive pedagogies have been increasingly prioritised to improve student engagement, critical thinking, and communication skills [10, 16]. Our study evaluated the acceptance of a cohort of Egyptian dental students on the implementation of role-play as a pedagogical approach in paediatric dentistry. In medical education, role-play models are extensively utilised as a pedagogical approach, facilitating observation, rehearsal, debate, and integration with other curriculum components [17]. Furthermore, the knowledge gained through role-play has been shown to enhance students' retention of information relative to traditional lectures [18]. Khalifa et al. [19] indicated that videos created by students effectively facilitated implementation of soft skills. Engaging in video production projects and employing student-centered learning fosters a sense of responsibility and enhances self-esteem among students [20]. Omar et al. [21] examined the responses of undergraduate dental students to the use of student-generated videos for imparting professionalism in Malaysia. The authors indicate that most students believed the films enhanced their collaboration and communication abilities, as well as their understanding of the dentist's role in delivering dental care.

The findings of the present investigation indicated a preference for role-play compared to conventional lecture-based approaches. Students valued the dynamic and participatory aspects of role-play, highlighting its difference from the more passive learning typically found in conventional lectures. This is backed by the calls for curricular reform in dental education to shift from mere information transmission to active, student-centered methodologies [16]. This highlights the importance of simulation in dental education, particularly in areas that necessitate the cultivation of behavior management skills [22]. Pediatric dentistry is a domain that often presents challenges, such as addressing dental anxiety in children and effectively

communicating with both young patients and their caregivers. Furthermore, role-play offers a secure setting for dental students to develop these skills without the stress or unpredictability associated with real interactions with young patients [23,24].

Students indicated that the role-play model enhanced their performance and deepened their comprehension of behavior management topics, equipping them to implement various strategies in future scenarios. This preparation is essential for real-world clinical interactions with pediatric dental patients, as they improved a well-rounded set of competencies encompassing knowledge, skills, and attitudes. Comparable observations were noted by Suzanne et al. [25], who stated that role-play is engaging, dynamic, and effective in alleviating monotony. This aligns with Kolb's experiential learning theory [26], which asserts that the most effective learning occurs when students participate in concrete experience, reflective observation, abstract conceptualisation, and active experimentation. Manzoor et al. [27] have indicated that role-playing video assignments serve as a significant educational instrument, as the act of role-playing can enhance learning experiences by fostering emotional engagement, physical movements, and diverse variations. Conversely, Peets et al.[28] suggested that engaging in tasks that are tangentially associated with learning, such as role-playing, could produce an extrinsic cognitive load that might impede the learning process. Furthermore, it has been noted that students' discontent with the lack of structure or planning in role-playing activities hampers the process of active learning [29].

A majority of students reported that the role-play model significantly boosted their self-confidence during their initial dental clinical interactions with children. This aligns with the findings from existing literature on medical and dental education, which indicates that simulation-based learning, including role-play models, enhances self-efficacy and preparedness for practice [10, 30]. The psychological impact is considerable, as dental students often express anxiety regarding the management of pediatric patients, primarily due to concerns about potential behavioral challenges [23].

The perceptions of students regarding role-play video teaching models exhibited a notable divergence based on gender, with male students demonstrating a more favorable disposition towards this pedagogical approach. The observed gender disparities can be attributed to varying preferences in learning styles among dental students. This aligns with the findings of El Tantawi et al [9], which indicate that males expressed a higher level of enjoyment regarding the Health Care Simulation Model compared to females. This phenomenon was ascribed to the tendency of males to appreciate the social dimensions of activities and engage in interactions with their peers. A further investigation conducted by Topping [31] determined that male students exhibited more favorable attitudes towards peer assessment and learning activities in comparison to their female counterparts.

The study's findings indicated that a majority of students acknowledged the significance of role-play model learning by the conclusion of the research. Nonetheless, various constraints and limitations require attention. The current research is derived from a cohort of dental students collected over a single academic level at one institution. Furthermore, our research did not evaluate objective indicators of skill acquisition or the retention of skills over an extended period. The possibility exists that favorable perceptions might not directly correlate with enhanced clinical performance. Nonetheless, it serves as an appropriate outcome measure for an intervention focused on fostering independent lifelong learning skills. Future studies should incorporate performance-based assessments to critically evaluate the real-world impact of role-play models. Moreover, the implementation of role-play necessitates substantial faculty dedication regarding scenario preparation, facilitation, and the provision of feedback. Without proper training for instructors and a lack of standardization in scenarios,

there exists a potential risk for variability in the quality of education [10]. This holds significant importance in environments with limited resources, where high student populations and a shortage of teaching personnel can hinder the broad implementation of role-play activities. We assert that perhaps video-assisted learning can address these limitations, allowing students to engage with a diverse range of scenarios through role-play while minimizing the need for faculty involvement and reducing time constraints.

This study contributes to the expanding body of evidence advocating for the integration of role-play models as an educational strategy in pediatric dentistry education. The favorable experiences and acceptance noted by students highlight its ability to improve communication skills, boost confidence, and prepare for the management of pediatric patients. For optimal effectiveness, role-play must be carefully crafted, sufficiently supported, and incorporated into a wider context of investigative learning. Role-play can significantly enhance the development of soft skills such as empathy, listening, and persuasive communication, which are essential in pediatric dentistry but frequently overlooked in traditional curricula. In conclusion, role-play can serve as an important educational resource for dental students. Role-play can be suggested by educators as an innovative teaching approach, as it provides a platform for active student engagement and the application of learned concepts in practical scenarios.

In order to facilitate students' critical evaluation of their communication behaviors, we suggest that a blended approach that incorporates role-play with other active learning strategies, including video feedback, peer assessment, and the use of standardized patients, may provide a more comprehensive educational experience. Future research could also explore cultural factors that may affect students' receptivity to role-play in the Egyptian context, as educational preferences and communication styles can differ across cultures.

REFERENCES

1. Zinski, A.; Blackwell, K.T.P.W.; Belue, F.M.; Brooks, W.S. Is lecture dead? A preliminary study of medical students' evaluation of teaching methods in the preclinical curriculum. Int. J. Med. Educ. 2017, 8, 326–333.
2. Sundbom, M.; Hellstrom, P.; Graf, W. A new hybrid concept, combining lectures and case-seminars, resulted in superior ratings from both undergraduate medical students and teachers. Adv. Med. Educ. Pract. 2021, 12, 597–605.
3. Wynter, L.; Burgess, A.; Kalman, E.; Heron, J.E.; Bleasel, J. Medical students: What educational resources are they using? BMC Med. Educ. 2019, 19, 36.
4. Schiel KZ, Everard KM. Active Learning Versus Traditional Teaching Methods in the Family Medicine Clerkship. Fam Med. 2021 May;53(5):359-361.
5. Fernández-Rodríguez CA, Arenas-Fenollar MC, Lacruz-Pérez I, Tárraga-Mínguez R. Teaching methods in medical education: an analysis of the assessments and preferences of students. Sustainability. 2023 Jun 3;15(11):9044.
6. Basudan S, Binanzan N, Alhassan A. Depression, anxiety and stress in dental students. International journal of medical education. 2017 May 24;8:179.
7. Barr, R., & Tagg, J. (1995, Nov/Dec.). From teaching to learning—A new paradigm for undergraduate education. Change, 13-25.
8. Ganji KK, Nagarajappa AK, Sghaireen MG, Srivastava KC, Alam MK, Nashwan S, Al-Qerem A, Khader Y. Quantitative evaluation of dental students' perceptions of the roleplay-video teaching modality in clinical courses of dentistry: A pilot study. InHealthcare 2023 Mar 2 (Vol. 11, No. 5, p. 735). MDPI.
9. El Tantawi MM, Abdelaziz H, AbdelRaheem AS, Mahrous AA. Using Peer–Assisted Learning and Role–Playing to Teach Generic Skills to Dental Students: The Health Care Simulation Model. Journal of dental education. 2014 Jan; 78(1):85-97.
10. Nestel D, Tierney T. Role-play for medical students learning about communication: guidelines for maximising benefits. BMC medical education. 2007 Dec;7:1-9.
11. Keezhatta MS. Efficacy of Role-Play in Teaching and Formative Assessment for Undergraduate English-Major Students in Saudi Arabia. Arab World English Journal. 2020 Sep;11(3):549-66.

12. Wulandari AT, Pratolo BW, Junianti R. Students' perception on the use of role-play to improve students' communicative competence. InThe 5th UAD TEFL International Conference (5th UTIC). https://doi. org/10.12928/utic. v2 2021 (Vol. 5748).

13. Khalifah AM, Celenza A. Teaching and assessment of dentist-patient communication skills: a systematic review to identify best-evidence methods. Journal of dental education. 2019 Jan;83(1):16-31.

14. Sample Size Calculator. https://www.calculator.net/sample-size-calculator.html Accessed 15 May 2023.

15. Artino, A.R., Jr.; La Rochelle, J.S.; Dezee, K.J.; Gehlbach, H. Developing questionnaires for educational research: AMEE Guide No.87. Med. Teach. 2014, 36, 463–474.

16. Licari, F. W., & Evans, C. A. (2017). Practical strategies to promote student engagement. Journal of Dental Education, 81(3), 276–283. https://doi.org/10.21815/JDE.016.014

17. Yardley-Matwiejczuk, K.M. (1997). Role-play. Theory & practice. London: Sage.

18. Tawfik MMR, Fayed AA, Dawood AF, Al Mussaed E, Ibrahim GH. Simulation-Based Learning Versus Didactic Lecture in Teaching Bronchial Asthma for Undergraduate Medical Students: a Step Toward Improvement of Clinical Competencies. Med Sci Educ. 2020 Jun 29;30(3): 1061-1068.

19. Al-Khalifa, K.S.; Gaffar, B.O. Dental students' perception about using videos in teaching professionalism: A Saudi Arabian experience. J. Dent. Educ. 2021, 85, 197–207.

20. Prud'homme-Généreux, A. Student-produced videos for the flipped classroom. J. Coll. Sci. Teach. 2016, 45, 58.

21. Omar, H.; Khan, S.A.; Toh, C.G. Structured student-generated videos for first-year students at a dental school in Malaysia. J. Dent. Educ. 2013, 77, 640–647.

22. Ali, K., Raja, M., Sethi, A., & Khurshid, Z. (2020). Simulation-based learning in dentistry: The need for curricular change. Journal of Taibah University Medical Sciences, 15(6), 432–437.

23. Townsend, J. A., Wells, M. H., & Brown, C. (2014). A comparison of behavioral management techniques employed by pediatric dentists and general dentists in treating children. Pediatric Dentistry, 36(2), 112–117.

24. Koukourikos K, Tsaloglidou A, Kourkouta L, Papathanasiou IV, Iliadis C, Fratzana A, Panagiotou A. Simulation in clinical nursing education. Acta Inform Med. 2021;29(1):15-20.

25. Suzanne MD, Muthukumar, Navin R , Anandarajan B. Perception of medical students in India about the use of role-play as a teaching-learning method in physiology. International journal of biomedical and advanced research 2013; 4(4):227-232

26. Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Prentice-Hall.

27. Manzoor, I.; Mukhtar, F.; Hashmi, N.R. Medical students' perspective about role-plays as a teaching strategy in community medicine. J. Coll. Physicians Surg. Pak. 2012, 22, 222–225.

28. Peets AD, Coderre S, Wright B, et al. Involvement in teaching improves learning in medical students: a randomized cross-over study. BMC Med Educ 2009;9:55.

29. 37. Fertleman C, Gibbs J, Eisen S. Video improved role play for teaching communication skills. Med Educ2005; 39:1155-6.

30. Kneebone, R. (2005). Evaluating clinical simulations for learning procedural skills: A theory-based approach. Academic Medicine, 80(6), 549–553.

31. Topping KJ. Methodological quandaries in studying process and outcomes in peer assessment. Learn Instr 2010;20:339-43.