Preparation of teachers to use mini-Cex with undergraduate students: workshops and faculty’s perceptions

Iêda Aleluia[2], Mario Rocha[2], Caroline Seidler[3], Lila Ramos[4]

Corresponding author: Prof Iêda Aleluia iedaaleluia@yahoo.com.br
Institution: 2. Escola Bahiana de Medicina e Saude Publica, 3. Hospital Geral Roberto Santos, 4. Maternidade Escola Villa Nova Cachoeirinha
Categories: Assessment, Medical Education (General), Teachers/Trainers (including Faculty Development)

Received: 17/03/2017
Published: 22/03/2017

Abstract

Introduction: We understand faculty development as an important aspect of medical education, because it can improve the teacher-learning process in the faculty practice. The need of a good and uniform practical assessment was the motivation to carry out this project: to prepare a faculty development program for student assessment with mini-Cex.

Methodology: We created a faculty development program to prepare teachers to use mini-Cex as practical student assessment: two workshops focused on mini-Cex and feedback; teachers (10/14) answered pre- and post-tests about their knowledge of the subject, they sent reports about the use of mini-Cex and participated in a Focal group at the end of each year. We used the Wilcoxon test to analyze the quantitative data between score tests and descriptive statistics with the program SPSS 17.0. We analyzed the qualitative data by content analysis.

Results: Faculties (10/14) recognized the positive value of the faculty development program to improve their practice. They showed cognitive improvement, as demonstrated by the scores in the pre- and post-tests (p<0,001). They reflected on their faculty practice and the value of mini-Cex as a formative assessment tool in the qualitative data.

Conclusion: The program had a positive impact on the faculty practice, besides this evidence, permanent stimulation is necessary to ensure changes are sustainable.

Keywords: faculty development; mini Cex; clinical skills; student assessment
Introduction

Student assessment is a very important subject for educators and, instead all studies performed in this field, there are still many questions to be answered. In 2010, we sent a survey to the clinical skills teachers to gauge their interest in participating in a faculty development program. They were also required to indicate which subjects would be most beneficial for them. The teachers confirmed that student assessment is a very important theme. We started the program with a training workshop in OSCE assessment, and the teachers evaluated it highly; they participated effectively in the assessment creation.

This initiated a review of all the practical assessments in our discipline, since the students' assessment in the hospitals was not carried out uniformly. The clinical skill discipline occurs on the fourth, fifth and sixth semesters of the medical course in our school. During the fifth semester, the students go to hospitals and have practical activities with patients, twice week, under teachers' supervision.

We chose mini-Cex as an assessment tool, because it is practical, links with the discipline and involves feedback. Today, we recognize Feedback as a potential tool for learning and reflection, as well as for strengthening the learning process and facilitating the formative assessment. Another reason was the little evidence present in the literature about its effective use in the undergraduate setting.

The project to prepare a faculty development program for student assessment with mini-Cex had its motivation in the need for a better, and more uniform practical assessment. This paper is one element in the whole process of a PhD project lasted from 2013 until 2015, and had as objectives to train teachers to:

1. Use the mini-Cex as an assessment tool with undergraduates
2. Provide effective feedback to students and to their peers
3. Reflect on the practical assessment and their own praxis

Methods

We created a faculty development program to prepare teachers to use mini-Cex as practical student assessment. We gave two, four hour, workshops in the first and second year of the project; during this time, we evaluated the impact of this initiative by assessing the students' perceptions and listening to reflections from the faculties. We used the Wilcoxon test to analyze the quantitative data between teacher score tests and descriptive statistics with the program SPSS 17.0. We analyzed the qualitative data from Focal Groups by content analysis.

Here we show ten steps (separated in two stages) to prepare mini-Cex workshops for a faculty development program, and the results and analyses from teachers’ data.

A) First stage:

1. Pre-test (20 minutes)

The workshop begins with a pre-test. This is necessary to ascertain the group's prior knowledge and create a reference point to enable a comparison at the end of the workshop. It is also an interesting way to start a discussion inside the faculty group.
2. Use of an active methodology (90 minutes)

The use of an active methodology is more beneficial as it involves the group and keeps the teachers interested and curious.

We chose to present the theoretical framework about mini-Cex using a TBL (Team based learning) methodology. This methodology allows for the interaction between people and stimulates the discussion. It works equally well with small groups or a big group divided in small groups. In this case we had three groups of 3-4 participants.

3. Simulation (20 minutes for each situation)

We prepared two simulated situations with the mini-Cex assessment. Two teachers participated as volunteers, used the checklist to assess the student in the clinical situation, and provided feedback. Two actors played the role of student and patient.

4. Talking about the situation (10 minutes)

After the performance, each simulation participant talks about his or her feelings and perceptions: whether they struggled in the simulation, what was easy, if it was realistic etc.

5. Feedback by peers (10 minutes)

The teacher receives feedback from the other members in the room about his/her performance, in each situation.

The actors also provide feedback to the faculty teachers.

6. Reflection moment (20 minutes)

At the end of the workshop, participants make comments about the activity and the faculty’s role during the simulation. We ask that they make a link between what they learned and what they do, reflecting on their own practice.

7. Post-test (10 minutes)

The post-test is the same as the pre-test, but the answers are usually very different. The differences in the answers are then shown to the group.

8. Faculty teacher evaluation (10 minutes)

The teachers answer a five point Likert scale questionnaire to evaluate their knowledge after the workshop and also respond to an open question about the future use of the assessment tool.

B) Second stage: After the workshops

9. Mini-Cex use
The faculties have to use the mini-Cex in a practical situation throughout the semester. In our case, it was a modified mini-Cex used with undergraduate students in the fifth semester of the medical course, during the Clinical Skills discipline.

The use was as following:

1. Introducing mini-Cex in the middle of the semester on two different occasions: taking into account patient history assessment and physical examination. 15 minutes for the observation and 5-10 minutes for the individual feedback.
2. Monitoring the students’ evolution during the semester and providing final feedback.
3. The same teacher carries out student observations in the hospital, with real patients.
4. Reporting on mini-Cex use

Teachers sent reports at the end of each semester about the use of mini-Cex, relating strengths and weaknesses found during the process.

As part of the research, teachers also participated in Focus Group at the end of the first and the second years of the study. The key questions were about their perceptions about their own capacity to assess and give effective feedback after the training; if they noticed some impact on their practice, if something had changed and how they evaluated the whole process (training, practical application and reflection).

Results

Ten of 14 clinical skills teachers (08 women) participated in the first training session, and 08 in the second (02 men). Seven faculty members were present in both. After the workshops, the teachers answered a self-evaluation Likert questionnaire and 100% confirmed that their knowledge had increased. The test scores’ analyses (Wilcoxon test) showed a difference between pre and post-test during the workshops (Figures 1 and 2).

| Grades in workshops [1 and 2] | z       | P       | Mean/SD Pre | Post    |
|-------------------------------|---------|---------|--------------|---------|
| Gradepre1/post1               | -2.94   | <0.003  | 1.30 ± 1.93  | 8.40 ± 1.56 |
| Gradepre2/post2               | -1.63   | <0.102  | 7.62 ± 1.21  | 8.16 ± 1.20 |

*Gradepre1/post1: grade of pre test 1 and post test 1; Grade pre2/post2: grade of pre test 2 and post test 2.*

Figure 1.
There was a significant improvement between tests throughout the training sessions ($p<0.001$). This data had a positive correlation with the faculty members' self-evaluation after the workshops; they recognized their improvement as "much better" (88%) and "better" (22%) after the first workshop and 100% "better" after the second (Figure 3).

### Teachers' perceptions about their knowledge after participation in the workshops

| Training | Perception | N/\% | N/\% |
|----------|------------|------|------|
| Workshop 1 (N=10) | Much Better | 2/22 | 8/88 |
| Workshop 2 (N=08) | Better | 8/100 |

N=number of participants

Figure 3.

All 14 teachers used mini-Cex as a formative assessment tool, but only 06 sent reports in the 1º semester and only 09 in the second semester of 2013. In these reports, they wrote about the strengths and weaknesses they experienced with the method. They considered mini-Cex to be a good way to link the student to the learning process, fostering the concept of assessment.

They identified, as weaknesses, student anxiety and stress; the length of time needed to do the test was the principal difficulty perceived.

The results of Focus Groups showed that feedback has to involve students and teachers, and must continue throughout the course to give meaning to the assessment process.

Another perception was that the faculty development program has the capacity to change the empirical nature of the faculty to create a more consolidated practice. Faculty members felt able to assess the students and give feedback
after their participation in the workshops. They recognized the role of mini-Cex, and the value of feedback in formative assessment, especially the role of positive feedback on the student's growth. In 2014, after a year using the tool, the faculty group starts to engage in a more mature and reflexive dialogue. They analyze their teaching practices and recognize the importance of training and the theoretical framework to enhance themselves as individuals and as professionals. They perceived the assessment as being more organized than before, but identified areas that needed to be improved, like: provide individual feedback to students systematically and maintain an assessment culture between teachers. As a result, they asked for more training.

Discussion

This study, along with others in the literature\textsuperscript{6,7,8}, has some limitations: it was carried out in just one school, with a specific group of teachers and this reduces the ability to make generalizations. However, when it combined quantitative and qualitative data, using triangulation process for methods and sources of information, it gave strength and depth to the subject.

After analyze the data, we could see a positive impact on knowledge acquisition by teachers in the first workshop. When we compared the marks of pre-tests of the two workshops, we saw a significant difference, maybe because the knowledge was not completely internalized and there was a gap to fix, but the analysis between both post-test had no significant difference. The difference between these results of pre-post tests in the workshops 1 and 2 could mean that teachers attained a level of stability or entered in a new comfort zone. The literature shows the need for frequent stimulation to maintain the level of knowledge achieved\textsuperscript{9,7}.

With this data we can think that medical experience does not prepare the doctor pedagogically to be a good teacher; and the literature confirms this finding\textsuperscript{10,4,11,7,12} It reinforces the need for faculty development programs to stimulate teachers to reflect on their practices.

In this study, the mini-Cex was modified and had fewer encounters (two/semester), with the same faculty. The intention was to provide an organized and formative practical assessment, not only use the tool to judge a student as able or not. In this way, the study differs from others in literature, but can give new reasons to reinforce the use of mini-Cex as a good instrument of assessment and learning\textsuperscript{13}.

The Focus Group allowed feelings and perceptions to be part of the analysis of assessment methods and teacher’s role. However, it also promoted a reflection about faculty practice and the impact of the faculty development program within the group of teachers.

This study showed that the use of mini-Cex, with effective feedback is both possible and desirable at an early stage of the medical course\textsuperscript{13,14}. Previous studies demonstrate its use on the clerkship and residency programs, but it is not common with young students. There are few studies to show the impact of the use of mini-Cex in this context.\textsuperscript{5,6} This faculty group brings a reflection close to the literature, that suggests that mini-Cex can be a useful formative assessment tool for undergraduates\textsuperscript{12,6,13,14,15,16,17}.

Conclusions

These results empower teachers to think more about their practices and the new possibilities that present themselves after their participation in a faculty development program.
The study also highlights about some difficulties observed by teachers as the time needed to perform the assessment during the real life, and the need of frequent training to sustain changes and improve the faculty development.

**Take Home Messages**

Teachers's participation in a faculty development program is very important to reinforce their capacity to make a deeper reflexion about their practice and the importance of recognize that be a good doctor is not a garantie to be a good teacher.

**Notes On Contributors**

Iêda Aleluia: pulmonologist, PhD in medicine, teacher at Escola Bahiana de Medicina e Saude Publica.

Mario Rocha: cardiologist, PhD in medicine, teacher at Escola Nahiana de Medicina e Saude Publica.

Caroline Seidler: intern in surgery.

Lila Ramos: intern in gynecology and obstetrics.

Both interns were medical students during the study.

**Acknowledgements**

**Bibliography/References**

1. Hanan M. Al-Kadri; Mohammed T. Al-Kadi; Cess P.M. Van Der Vleuten. Workplace-based assessment and students' approaches to learning: a qualitative inquiry. Medical Teacher, 2013; 35: S31–S38.  
[https://doi.org/10.3109/0142159X.2013.765547](https://doi.org/10.3109/0142159X.2013.765547)

2. Aleluia, IMB; Menezes, MS; Rocha, M. Build an OSCE and Improve Faculty Development: A Good Experience. Journal of Modern Education Review, January 2014, Volume 4, No. 1, pp 34–41.  
[https://doi.org/10.15341/jmer(2155-7993)/01.04.2014/005](https://doi.org/10.15341/jmer(2155-7993)/01.04.2014/005)

3. Norcini, J. The power of feedback. Medical Education, 2010, 44: 16-17.  
[https://doi.org/10.1111/j.1365-2923.2009.03542.x](https://doi.org/10.1111/j.1365-2923.2009.03542.x)

4. Norcini J. The Mini Clinical Evaluation Exercise (mini Cex). The Clinical Teacher, June, 2005, Vol 2, nº 1: 25-30.  
[https://doi.org/10.1111/j.1743-498X.2005.00060.x](https://doi.org/10.1111/j.1743-498X.2005.00060.x)
5. Hill, F; Kendall, K; Galbraith, K; Crossley, J. Implementing the undergraduate mini-CEX: a tailored approach at Southampton University. Medical Education, 2009; 43: 326–334.

https://doi.org/10.1111/j.1365-2923.2008.03275.x

6. Nesbitt A, Baird F, Canning B, Griffin A, Sturrok A. Student perception of workplace-based assessment. The Clinical Teacher 2013; 10:3399–404.

https://doi.org/10.1111/tct.12057

7. Liao K, Pu S, Liu M et al. Development and implementation of a mini-Clinical Evaluation Exercise (mini-Cex) program to access the clinical competencies of internal medicine residents: from faculty development to curriculum evaluation. BMC Medical Education, 2013, Vol 13, nº 1: 1-7.

https://doi.org/10.1186/1472-6920-13-31

8. Milan FB, Parish SJ, Reichgott MJ. A Model for Educational Feedback Based on Clinical Communication Skills Strategies: Beyond the "Feedback Sandwich". Teaching and Learning in Medicine, 2006, 18 (1), 42-47.

https://doi.org/10.1207/s15328015tlm1801_9

9. Cutolo LRA, Delizoicov D. Caracterizando a Escola Médica Brasileira. Arquivos Catarinenses de Medicina, 2003, Vol 32, nº 4: 24-34.

10. Foster, K., Laurent, R. How to make good doctors into good teachers: A short course to support busy clinicians to improve their teaching skills. Medical Teacher, 2013, Vol 35:4-7.

https://doi.org/10.3109/0142159X.2012.731098

11. Cantillon P, Sargeant J. Giving feedback in clinical settings. BMJ, 2008; 337:a1961.

https://doi.org/10.1136/bmj.a1961

12. Pelgrim EAM, Kramer AWM, Mokkink HGA, Van der Vleuten CPM. Quality of written narrative feedback and reflection in a modified mini-clinical evaluation exercise: an observational study. BMC Medical Education, 2012, 12:97.

https://doi.org/10.1186/1472-6920-12-97

13. Daelmans, H.E.M; C. Mak-van der Vossen, M; Croiset, G; Kusurkar, RA. What difficulties do faculty members face when conducting workplace-based assessments in undergraduate clerkships? International Journal of Medical Education. 2016; 7: 19-24.

https://doi.org/10.5116/ijme.5689.3c7f

14. Weston, P S. J; Smith, C. A. The use of mini-CEX in UK foundation training six years following its introduction: Lessons still to be learned and the benefit of formal teaching regarding its utility. Medical Teacher, 2014; 36: 155–163.

https://doi.org/10.3109/0142159X.2013.836267
15. VuMc Kogan JR, Bellin LM, Shea, JA. Implementation of the Mini-CEX to Evaluate Medical Students' Clinical Skills. Academic Medicine, November 2002, Vol. 77, nº 11: 1156-1157

16. Hauer, KE. Enhancing Feedback to Students Using the Mini-CEX (Clinical Evaluation Exercise). Academic Medicine, May 2000, Vol. 75, no. 5: 524.

17. Koogan JR, Hauer KE. Brief report: use of the mini-clinical evaluation exercise in Internal Medicine core clerkships. Journal of General Internal Medicine, 2006, 21, 501-502.

https://doi.org/10.1111/j.1525-1497.2006.00436.x

Appendices

A. Pre and post test

Name:__________________________________________________________

Age: _______ Time teaching (years):_______ Speciality:_______________

Answer with your own knowledge. Do not worry about grade.

1. Briefly define mini-Cex.
2. In Miller’s pyramid, where is mini-Cex positioned?
3. In what scenarios can mini-Cex be used?
4. What is the focus of mini-Cex in the assessment? What are its advantages?
5. How long should the assessment take, and how many times should it be carried out?
6. How should we provide effective feedback?

B. Survey - Teachers

a. After your participation in the faculty development workshops, how do you measure your performance?

Workshop 1: Much better ( ) Better ( ) Worse ( ) Without change ( ) Did not participate ( )

Workshop 2: Much better ( ) Better ( ) Worse ( ) Without change ( ) Did not participate ( )

Other reflections about the workshops, about your practice and prepare an individual working plan:

C. Report about mini –Cex and Feedback use

1. Students: (group)
2. Report ‘s number (01: take clinical history or 02: physical examination)
3. Facilities:
4. Difficulties:
5. What did you think about the assessment method: (your personal considerations about effectiveness, the students’ impact and its impact on faculty)

6. How was the feedback process to the student and to the teacher?

**Declarations**

*The author has declared that there are no conflicts of interest.*

*This has been published under Creative Commons "CC BY 4.0" ([https://creativecommons.org/licenses/by-sa/4.0/](https://creativecommons.org/licenses/by-sa/4.0/))*

AMEE MedEdPublish: rapid, post-publication, peer-reviewed papers on healthcare professions' education. For more information please visit [www.mededpublish.org](http://www.mededpublish.org) or contact [mededpublish@dundee.ac.uk](mailto:mededpublish@dundee.ac.uk).