

**Assessing “EPA 6: Provide an Oral Presentation of a Clinical Encounter” during an OSCE**

**Station**

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THESIS

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## **LIST OF ABBREVIATIONS**

AAMC	Association of American Medical Colleges
AS	Annoir Shayya
CBME	Competency-based medical education
EPA	Entrustable Professional Activity
ICS	Interpersonal and Communication Skills
IRB	Institutional Review Board
IV	Intra venous
LAU	Lebanese American University
NY	Nazih Youssef
OSCE	Objective Structured Clinical Examination
P	Professionalism
PBLI	Practice-Based Learning and Improvement
PC	Patient Care
PPD	Personal and Professional Development
SD	Standard Deviation
SP	Simulated Patient
Sub-C	Sub-Competency
UIC	University of Illinois at Chicago
UTI	Urinary Tract Infection

## SUMMARY

The psychometric evidence supporting the use of a Post-Clerkship OSCE designed to measure entrustment in an oral presentation of a patient with post-op fever, targeting Year 3 medical students was investigated. The assessment of the newly introduced 13 Core Entrustable Professional Activities for Entering Residency by AAMC was partly studied. “EPA 6: Provide an oral presentation of a clinical encounter” was never assessed in a summative way. The twenty-six medical students who completed their surgery clerkship during the second half of the academic year 2017-2018 were assessed in two parallel similar stations using checklists developed according to the 8 sub-competencies related to EPA 6. The quality of the stations was evaluated by measuring seven metrics.

The internal consistency “reliability”, The association between the analytic and holistic scores, and the inter-grade discrimination were of value. Moreover, the number of failures was acceptable. Furthermore, there were no significant difference between assessors in providing grades, and no effect of gender and religion on scores. Finally, the behavior of the simulated patients was appropriate in rating students. Therefore, Implementing an OSCE station for a summative assessment of EPA 6 using checklists according to the related sub-competencies is efficient, and the generated scores are reliable and valid.

## I. INTRODUCTION

Competency-based medical education (CBME), encourages developing medical curricula using predetermined outcomes needed for proficient graduates.<sup>1,2</sup> CBME outcomes are defined by different competencies in knowledge, skills, and attitudes that should be earned during training in order to satisfy the societal and patient demands.<sup>1,3,4</sup> The use of competencies as a framework in medical education has been favored by the latter demands.<sup>5,6</sup> The application of the competencies' framework has its limitations; improvement in individual competencies does not mean an enhancement in medical practice and patient care outcomes,<sup>2</sup> and the independence between competencies and the theoretical aspect of some of them made the teaching and mainly the assessment challenging in choosing how to teach and how and what to assess.<sup>4,7-13</sup> In order to fill the gap and to improve the efficacy of CBME, different competencies should be integrated into tasks that represent the day-to-day physicians' job.<sup>1,14-17</sup>

Entrustable Professional Activities (EPAs), which were first described in 2005, are concrete tasks that are observed and measured when performed by medical trainees who can be entrusted by their supervisors to perform them without any supervision once they achieve an appropriate level of competence.<sup>18</sup> Faculty should then focus on the daily clinical tasks rather than on the individual competencies.<sup>19</sup> Since competencies are related to the qualities of individuals and the EPAs are associated with the medical practice, using the EPAs' framework to assess medical trainees allows the assessors to focus on the global picture at the macro-level respecting the integrated competencies and their importance at the micro-level.<sup>20</sup> Therefore, the EPAs' framework in CBME and mainly in trainees' assessment is a potential solution for all the concerns raised for the competencies' framework.<sup>16,21</sup>

The EPAs, which were initially used in the curricular development and assessment of postgraduate medical trainees,<sup>18-20</sup> are nowadays used as well for undergraduate medical education.<sup>22</sup>



Concerns raised by program directors about the lack of preparedness of medical students to enter residency programs<sup>23-25</sup> prompted the Association of American Medical Colleges (AAMC) to publish the Core Entrustable Professional Activities for Entering Residency during the year of 2014.<sup>26</sup> This guide includes 13 EPAs, which represent the main professional tasks that medical students should be entrusted to perform unsupervised upon their graduation.

Checking these EPAs, the majority are relevant and applicable in our settings.<sup>27</sup> An important task that our medical trainees frequently do, but was never assessed in our school, is “EPA 6: Provide an oral presentation of a clinical encounter”.<sup>26</sup> Reviewing the literature using PubMed, Web of Science, and Scopus as portals, no papers were found discussing any assessment tool related to EPA 6 in any clerkship. However, three publications were found on MedEdPORTAL discussing the teaching methods<sup>28,29</sup> and the development of the “Patient Presentation Rating Tool” as a formative assessment<sup>30</sup> of the skill “EPA 6: Provide an oral presentation of a clinical encounter”.

Knowing that assessment using simulation is an appropriate way to provide entrustment for any task,<sup>27</sup> we developed an Objective Structured Clinical Examination (OSCE) station within the surgery clerkship to assess this particular EPA using the AAMC guide,<sup>26</sup> and particularly EPA6 with its related sub-competencies as content conceptual framework. The quality of the OSCE station will be measured using “Pell, et al. guidelines”<sup>31</sup> as process conceptual framework. Therefore, this paper addresses the following question: What are the psychometric evidence supporting the use of a Post-Clerkship OSCE designed to measure entrustment in oral presentation of a patient with post-op fever, targeting Year 3 medical students?

This study was approved by the Lebanese American University (LAU) Institutional Review Board (IRB) on the 10<sup>th</sup> of April 2018 under the IRB number LAU.SOM.NY1.10/Apr/2018, then by the University of Illinois at Chicago (UIC) IRB on the 18<sup>th</sup> of April 2018 under the research protocol number 2018-0448 as exempt.

## II. CONCEPTUAL FRAMEWORKS

### A. Content Conceptual Framework

In order to identify what should be assessed and avoid missing important components needed for our OSCE station,<sup>27</sup> the different sub-competencies related to “EPA6: Provide an oral presentation of a clinical encounter”,<sup>26</sup> and the expected behavior for entrustment were used to develop the concerned checklists for faculty assessors and simulated patients (SPs) (Appendix A and Appendix B). These sub-competencies are:

1. Patient Care 2 (PC 2): “Gather essential and accurate information about patients and their condition through history-taking, physical examination, and the use of laboratory data, imaging, and other tests.”<sup>26</sup>
2. Practice-Based Learning and Improvement 1 (PBLI 1): “Identify strengths, deficiencies, and limits in one’s knowledge and expertise.”<sup>26</sup>
3. Interpersonal and Communication Skills 1 (ICS 1): “Communicate effectively with patients, families, and the public, as appropriate, across a broad range of socioeconomic and cultural backgrounds.”<sup>26</sup>
4. Interpersonal and Communication Skills 2 (ICS 2): “Communicate effectively with colleagues within one’s profession or specialty, other health professionals, and health-related agencies.”<sup>26</sup>
5. Professionalism 1 (P 1): “Demonstrate compassion, integrity, and respect for others.”<sup>26</sup>
6. Professionalism 3 (P 3): “Demonstrate respect for patient privacy and autonomy.”<sup>26</sup>
7. Personal and Professional Development 4 (PPD 4): “Practice flexibility and maturity in adjusting to change with the capacity to alter behavior.”<sup>26</sup>

8. Personal and Professional Development 7 (PPD 7): “Demonstrate self- confidence that puts patients, families, and members of the health care team at ease.”<sup>26</sup>

In addition to what has been considered of the expected behaviors mentioned in the AAMC guide,<sup>26</sup> the “EPA 6 Toolkit: Provide an Oral Presentation of a Clinical Encounter”<sup>32</sup> was reviewed for a better understanding of behavior development from ones needing corrective action in to expected ones for entrustable learners.

### **B. Process Conceptual Framework:**

The data gathered during the OSCE station was studied as per “Pell, et al. guidelines”,<sup>31</sup> including the metrics, in order to measure the quality of the newly implemented station. Having reasonable values could indicate the appropriateness of the developed checklist, the good quality of teaching, the satisfactory alignment between the assessment and the instructions, the adequacy of assessors training in choosing the grades according to same standards, and the correctness of simulated patients’ behavior. The different metrics that were measured include:

1. Metric 1: “Cronbach’s alpha”,<sup>31</sup> assesses the internal consistency “reliability”.
2. Metric 2: “Coefficient of determination  $R^2$ ”,<sup>31</sup> assesses the relationship between the analytical and holistic assessment scores generated respectively by the checklist items and the overall performance.
3. Metric 3: “Inter-grade discrimination”,<sup>31</sup> identifies the average increase in the analytical scores when the holistic ones increase by 1 point.
4. Metric 4: “Number of failures”,<sup>31</sup> defines the number of students who failed the OSCE station.
5. Metric 5: “Between-group variation (including assessor effects)”,<sup>31</sup> determines the difference in the average of the grades between the groups.

6. Metric 6: "Between group variance"<sup>31</sup> (other effects; gender and religion); determines the difference in the average of the grades between the subgroups, same gender and same religion.
7. Metric 7: "Standardized patient ratings";<sup>31</sup> measures the number of students who were failed by the SPs.

### III. METHOD

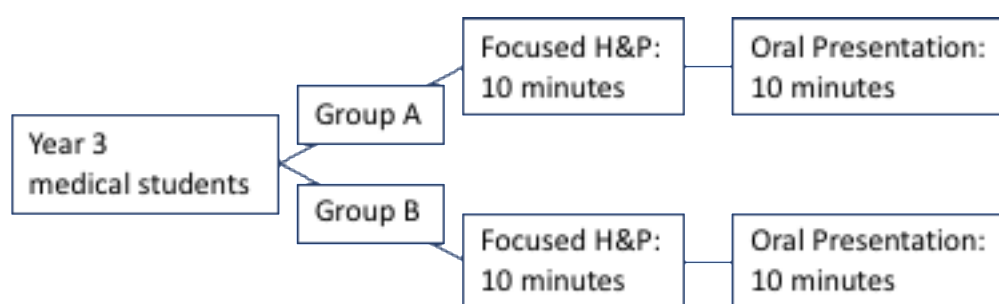
Our station included a case of post-operative fever prepared in reference to the "Medical Student Core Curriculum" extracted from the American College of Surgeons - Division of education, under the title: "Postoperative Fever"<sup>33</sup> excluding the differential diagnosis of malignant hyperthermia. The case was written by the main investigator (NY). Developing the case was done with the help of the Internal Medicine chief resident, the co-investigator (AS), who happens to have a peculiar interest and enthusiasm for medical education, proving himself to be a proficient clinical teacher during the year of his chief residency. Malignant hyperthermia was deliberately excluded due to the patient's age and the type of surgery. The scenario of the case is as follows:

The patient is a 30-year-old previously healthy, single man who does not smoke or drink alcohol. He presents with fever the 3<sup>rd</sup> day after an elective laparoscopic cholecystectomy. On admission to the hospital, the patient's physical examination was completely normal. Furthermore, the procedure was smooth, occurred under general anesthesia, and was uneventful with minimal blood loss. Moreover, the patient's Foley catheter was removed on the next day of the procedure (day 1). In addition to that, the patient was doing well, and his I.V. line was removed on day 2 post cholecystectomy. On the evening of day two, the patient was allowed to drink water only. On day 3 at 8:00 AM, he was started on a progressive diet. At 6:00 PM of the same day, the student was called by the floor nurse who reported that the patient spiked a high-grade fever. His vital signs during days two and three were attached to the scenario. In our scenario, ten minutes are given to students, who were expected to take a history from the SP and perform a physical examination to construct a differential diagnosis for the patient's fever. Students should maintain a professional behavior and address the SP's concerns by showing empathy.

Our settings include two parallel stations that each administers an SP encounter. Between the two stations, an isolated room with mirrored windows contains one faculty member and one senior resident who monitor the performance of students during their interaction with the SP.

The year 3 medical students, who completed their surgery clerkship within the last six months were randomly divided into two groups (Group A and Group B) in order to assess all students on the same day and during the time allocated for the end of clerkship OSCE. The groups were assessed in one of the two parallel identical stations respectively (Figure-1).

**FIGURE-1: Student distribution**



For both stations, students had 10 minutes to collect pertinent history findings and perform a focused physical exam in an attempt to find the reason for the patient's fever. Furthermore, an assessor entered the room where the student had 10 minutes to orally present and discuss the case by introducing themselves, stating the patient's name, and listing all positive and negative symptoms and signs that they have gathered in a structured manner beginning with the chief complaint. At the end of the interview with the simulated patient, the assessors had each student present what is stated earlier and interacted with each medical student in a sense that probed them towards their missing findings ultimately assessing the student's capability to critically run through the case and prove their

understanding of it. The SP's presence remained of great importance as they certified or disputed what was being mentioned by the medical students.

It is worth mentioning that (NY) - the faculty member involved in our station- is an expert in the field and has been an OSCE assessor for the last 5 years. As the main investigator, he was helped by the second assessor (AS) during the entire process in developing the stations and their related checklists. Moreover, the two assessors were trained on identifying the behaviors expressed during oral presentation by thoroughly reviewing those requiring correction and those expected for entrustment. Moreover, in an attempt to improve the consistency of raters' assessment, the reliability of the scores generated by the predetermined checklist, and the inter-rater reliability, scoring rubrics were developed (Appendix C) and reviewed extensively by the two assessors mentioned earlier. Furthermore, both SPs have been practicing their roles as SPs for the last seven years and were trained sufficiently using the details mentioned in appendix D. Moreover, the SPs met the following requirements:

- 1) Had their shorts above the knees with the medical gown covering their chests only.
- 2) A small red point (less than 0.5 mm) were drawn on the left forearm marking the entrance site for the IV line.
- 3) On the abdomen, three small Band-Aids were placed indicating the surgical scars.

The checklists that were marked by the assessors and SPs were developed using the sub-competencies related to EPA 6. The PC 2 sub-competency (which is case-specific) is exclusively assessed in the assessor's checklist, and the related items are different conditions of the ACS/ASE - Medical Student Core Curriculum: postoperative fever;<sup>33</sup> Atelectasis, Pneumonia, Catheter-related complications (IV-phlebitis, Foley-UTI), Intra-abdominal abscess, Anastomotic Leak, and Wound infections excluding Malignant hyperthermia for the reasons mentioned above. The PBLI 1 sub-

competency is assessed entirely in the faculty assessor's checklist during the discussion of the reported data to find out the differential diagnosis and the potential reasons behind the patient's fever. The ICS 1 and ICS 2 sub-competencies are solely assessed in the SP's and faculty checklists respectively. Whereas the P1 and P3 sub-competencies are assessed mainly in the SP's checklist; the P1 sub-competency is assessed in the faculty assessor's checklist during the case discussion and the immediate feedback of the SP. In addition to that, PPD 4 and PPD 7 sub-competencies are assessed in both checklists. Finally, the overall performance will be evaluated as such: 1= No Entrustment, 2= Entrustment with caution, 3= Entrustment with important supervision, 4= Entrustment with minimal supervision, 5= Full Entrustment. To further elaborate on such scores, a full entrustment was established if the student highlighted the patient's case details before any intervention from the assessor and if no concerns were present regarding related sub-competencies. Entrustment with minimal supervision was established if the student clarified case details after probing once, again without concerns related to sub-competencies. Furthermore, entrustment with important supervision was established when the student was probed twice without sub-competency related concerns. Moreover, entrustment with caution was given to students when their case details lacked a global understanding or minimal concerns were held regarding related sub-competencies. Finally, no entrustment was granted to students when their case details were unclear or when major concerns regarding related sub-competencies were present. Minimal and major concerns are the developing behaviors and the behaviors requiring corrective response respectively as stated in the "EPA 6 Toolkit: Provide an Oral Presentation of a Clinical Encounter".<sup>32</sup>

Appendices-1 and 2 highlight the different items mapped to their related sub-competencies. In summary, the eight sub-competencies of EPA 6 are assessed with different weights during the stations.



After the encounter with each medical student, the assessor's checklist (appendix 1) was marked and was completed as per the scoring rubric (appendix 3). The SP's checklist (appendix 2) was also filled following the encounter with the medical students to avoid distraction within the encounter. Moreover, all the data were entered on an excel sheet by the administrative assistant and sent anonymously to the investigators. The data was analyzed using the "IBM SPSS Statistics 25".

#### IV. RESULTS

The seven metrics described by Pell, et al<sup>31</sup> are as follows:

Twenty-six (26) students, who completed their surgery clerkship during the second half of the academic year 2017-2018, were assessed during the station implemented in the end of clerkship OSCE that is performed twice per academic year. The minimum, maximum, mean, and standard deviation (SD) of their scores are 60.79, 97.37, 84.18, and 9.82 respectively. The majority of students were granted either entrustment with minimal supervision or full entrustment (TABLE I).

**TABLE I**  
**DESCRIPTIVE STATISTICS**

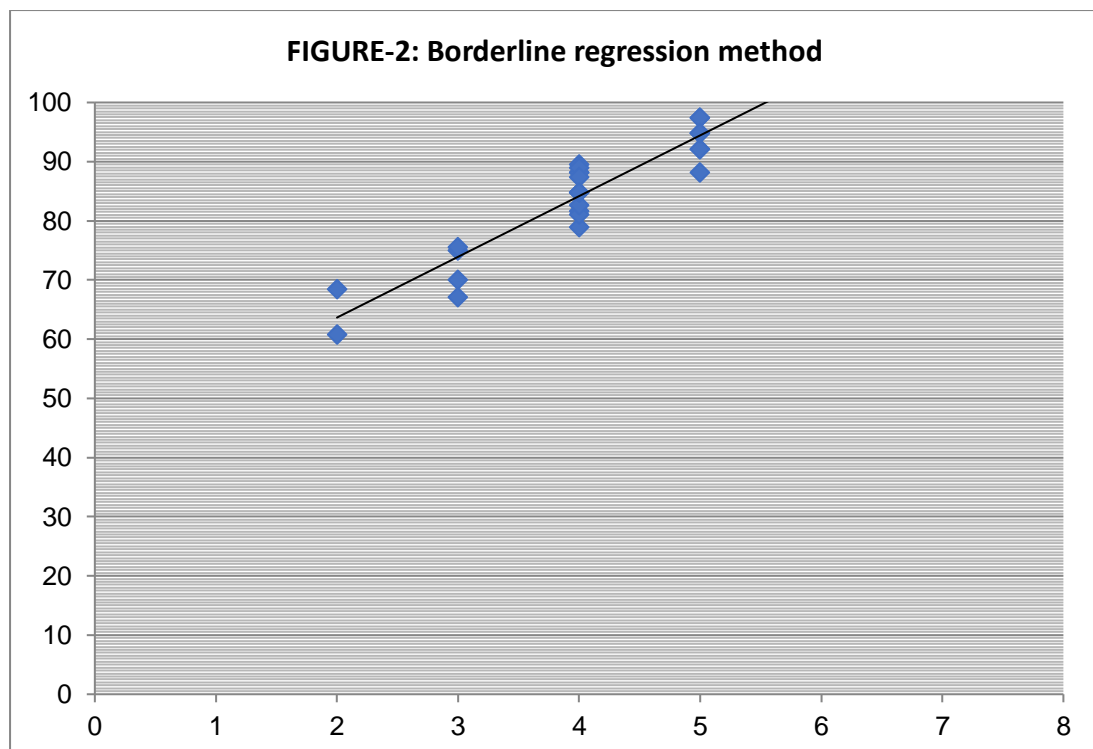
Global Rating	Frequency	Percent	Mean	SD	Difference in mean scores between levels
1	0	0	NA	NA	NA
2	2	7.7	64.61	5.40	NA
3	4	15.4	71.91	4.06	7.30
4	12	46.2	85.04	3.45	13.14
5	8	30.8	93.91	3.06	8.87
<b>Total</b>	26	100	84.18	9.82	9.77

Metric 1: "Cronbach's alpha";<sup>31</sup> in order to assess the reliability of the OSCE station, Cronbach's alpha was calculated and estimated to be 0.963. This high value (>0.7) is appropriate for this type of high stakes assessments.<sup>31</sup>

Metric 2: "Coefficient of determination  $R^2$ ";<sup>31</sup> in order to identify the association between the analytic and holistic score, the coefficient of determination  $R^2$ , which is the squared Pearson correlation coefficient, was measured and estimated to be 0.87 (0.935)<sup>2</sup>. This result is more than 0.5, thus indicating an appropriate association between the checklist scores and the global grades.<sup>31</sup>

Metric 3: “Inter-grade discrimination”;<sup>31</sup> in order to identify the average increase in the analytical scores when the holistic ones increase by 1 point, the average scores of students with same level were measured. The difference between the average scores of consecutive levels were then calculated. The average of the differences, which is the inter-grade discrimination, is estimated to 9.77% (TABLE I). Since it is almost the 10<sup>th</sup> of the maximum score, which happens to be 100, it is considered as an acceptable discrimination between grades.<sup>31</sup>

Metric 4: “Number of failures”;<sup>31</sup> by employing the borderline regression method,<sup>34</sup> the passing score is estimated to 63.5 (figure-2). Therefore, only one student (3.8%) failed the OSCE station. This small number of failures indicates that the teaching of this skill was appropriate during the clerkship.<sup>31</sup>



Metric 5: “Between-group variation (including assessor effects)”;<sup>31</sup> in order to identify the effect of the different stations’ settings on the scores. Knowing that our study includes only 2 groups, the difference in the average of the grades between the groups was calculated using the independent t-test<sup>31</sup>. The difference between the mean scores provided by the two assessors to their respective groups, which is only 0.26, is not statistically significant;  $p=0.947$ , indicating no significant difference between raters.

Metric 6: “Between group variance (other effects)”;<sup>31</sup> in order to determine the effect of gender and religion on the scores, the independent t-test was also employed to calculate the difference in the average of the grades between subgroups,<sup>31</sup> same and different gender, and same and different religion. The difference between the mean scores provided by the two assessors for students with similar ( $N=10$ ) and different ( $N=16$ ) gender, which is only 1.12 in favor of similar gender, is not statistically significant;  $p=0.784$ . Similarly, the difference between the mean scores provided by the two assessors for students with similar ( $N=5$ ) and different ( $N=21$ ) religion, which is only 3.48 in favor of different religion, is not statistically significant;  $p=0.487$ .

Metric 7: “Standardized patient ratings”;<sup>31</sup> the passing score of the SPs’ checklist was arbitrarily chosen to be 70%. The number of students who were failed by the SPs= 3 (11.54%). This number is higher than the number of failures determined by the faculty/ resident assessors and the reasonable value of failing students per SPs that correlates to 10%.<sup>31</sup>

## V. DISCUSSION

Following their implementation for graduate medical education,<sup>18-20</sup> the EPAs were then recently introduced to undergraduate medical education<sup>22</sup> with the aim of filling the gaps created by the competencies' framework<sup>16,21</sup> in teaching and mainly assessing medical trainees. The EPAs were adopted by AAMC and translated in to the development of "the Core Entrustable Professional Activities for Entering Residency".<sup>26</sup>

One of the 13 EPAs included in the latter guide, EPA 6: Provide an oral presentation of a clinical encounter,<sup>26</sup> is continuously taught to and practiced by our medical students during their Surgery clerkship without being ever assessed in a summative way. To our knowledge, there are a few publications on how to teach and formatively assess this task.<sup>28-30</sup>

With the purpose of implementing a summative assessment of this skill, an OSCE station was included in the end of Surgery clerkship OSCE to assess the performance of our year 3 medical students during their presentation of a patient with post op fever. The analytic rating was based on checklist items directly mapped to the different sub-competencies related to EPA 6.<sup>26</sup> The holistic rating was based on different levels of entrustment synthesized from the expected behaviors mentioned in the AAMC guide<sup>26</sup> and the EPA 6 Toolkit.<sup>32</sup> The validity of the implemented station was studied using the psychometrics described by Pell, et al.<sup>31</sup>

The reliability of the scores generated by the assessors' checklists (Metric 1) was assessed using Cronbach's alpha. The value of the latter is high (0.963) and could indicate the good quality of the designed items, their alignment with the instructions, their efficacy in assessing what has been taught during the clerkship, and the common scoring rubrics used by both assessors.<sup>31</sup> Values higher than 0.9 are worrisome. Since we couldn't find any redundant items to explain it, our only

interpretation could be the long checklist with 22 items that measures the different sub-competencies related to EPA 6.<sup>31</sup>

The relationship between the analytical and holistic assessment scores (Metric 2) was assessed using the coefficient of determination  $R^2$ . The latter turned to be 0.87 indicating a valuable association between the checklist scores and the global ratings. This value, which is higher than 0.5, could indicate also the good quality of the designed checklist and the sound assessors' behavior in choosing the grades following the predetermined scoring rubrics.

The average increase in the checklist's scores along with the increasing level of global performance, which is the inter-grade discrimination (Metric 3), was also identified to be 9.77%. In the absence of clear guidelines on what is the best number to consider as good discrimination, it was suggested that tenth of the total checklist's score is a suitable discrimination index.<sup>31</sup> Therefore, our value is satisfactory and could reveal the appropriateness of the checklist items and the assessors' behavior, as is the coefficient of determination.<sup>31</sup>

With the employment of the borderline method to define the passing score, only one out of the 26 students failed the OSCE station. This number of failures (metric 4) could explain the appropriateness of teaching this skill through the surgery clerkship.<sup>31</sup>

Since we have the same settings in both stations with the exception of different assessors, and in order to pinpoint the effect of the assessors on the scores, between-group variation was assessed (Metric 5). The difference in the average of the grades between the groups turned out to be 0.26% only, which is not statistically significant,  $p=0.947$ . This value indicates that there is no assessor effect on providing scores for their respective group. Moreover, this could also signal the uniformity of assessors in assigning individual item grades following the detailed scoring rubrics.

Similarly, the effect of assessor-student gender and religion on grades' provision was judged by assessing the between group variance (Metric 6). The differences in the mean scores between the subgroups associated with gender and religion are 1.12% and 3.28% respectively; both values are not statistically significant,  $p = 0.784$  and  $0.487$  respectively. Therefore, there is no assessor effect on granting grades according to the gender or religion. This also could imply the homogeneity of assessors' behavior.

The performance of the SPs and the quality of teaching were also evaluated by the SP ratings (Metric 7). Three out of 26 students (11.54%) were failed by the SPs. Despite the fact that this number is higher than the number of failures concluded by the faculty/ resident assessors, it could be considered an acceptable value with appropriate performance of the SPs and adequate training during the clerkship due to the small sample size.<sup>31</sup>

Knowing that the quality of an OSCE station could never be assessed using only one psychometric measurement, the values generated by the seven metrics mentioned above support the use of a Post-Clerkship OSCE designed to measure entrustment in an oral presentation of a patient with post-op fever, targeting Year 3 medical students. This could have never been achieved without developing checklists respecting the related sub-competencies, and training assessors using scoring rubrics based on the different expected behaviors. However, the limitations to our study remain to be the relatively small number of students within our OSCE stations in a single institution making the generalizability of the results difficult. Furthermore, the number of stations and scenarios required to confirm the mentioned entrustment is not yet documented, and therefore, was also considered to be a limitation. In addition to that, choosing the labels and their significance, and assigning different weights for different sub-competencies was arbitrary and was based on a consensus between the investigators. Finally, the P1 and ICS1 sub-competencies are mainly assessed in the SPs' checklist which could be an important limitation to the final entrustment decision that should be granted only

to assessors with greater expertise in the medical field. In summary, OSCE stations are good tools for EPAs summative assessment. The quality of these stations dedicated to assessing EPAs should be ensured by developing checklist items in accordance to related sub-competencies, and by employing scoring rubrics fitting the acquisition of behaviors required for entrustment in training assessors. After their validation in the simulated and controlled environment, these checklists could be used to assess the same EPAs in the workplace.



#### IV. CONCLUSION

Implementing a well-designed station within the end of the surgery clerkship OSCE in order to assess “EPA 6: Provide an oral presentation of a clinical encounter”,<sup>26</sup> using checklist items derived directly from the related sub-competencies, is effective. The success of the implementation is directly associated with the training of assessors on providing grades for individual items according to predetermined scoring rubrics, and on granting the suitable entrustment level based on the expected behaviors of entrusted learners. Clinical teachers should be aware of the importance of making medical students reach the appropriate behavior required for entrustment in providing an oral presentation of a clinical encounter on day 1 of their residency. They should focus their instructions on the different sub-competencies related to EPA 6, and aim the assessment of the latter to the global picture that is enriched by demonstrating proficiency in the integrated sub-competencies. Furthermore, the entrustment should never be granted when there is a lack in the development of behavior required for one sub-competency because failure in demonstrating proficiency in one of the combined sub-competencies should reflect on the overall performance of the task at hand. However, the entrustment provided to medical students for an oral presentation of a clinical case in a simulated environment should be studied in order to understand how often are we expected to provide the entrustment in a controlled environment, and predict which level of entrustment should be attained in order to have an appropriate transfer of this skill to the workplace.

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## APPENDICES

### Appendix A: Faculty checklist and mapping

Nb	Score				Item	Sub-C
1	0	0.25		0.5	Presenting themselves	ICS2/ P1
2	0	0.25		0.5	Stating the patient's name	P3
3	0	0.25		0.5	Stating the chief complaint	PC2
4	0	0.3	0.6	1	No chest (cardio-pulmonary) symptoms and signs	PC2
5	0	0.25		0.5	No urinary symptoms and signs	PC2
6	0	0.3	0.6	1	No abdominal/ GI symptoms and signs	PC2
7	0	0.25		0.5	No inflammation symptoms and signs at the site of the IV line	PC2
8	0	0.25		0.5	No DVT symptoms and signs	PC2
9	0	0.5		1	Unnecessary information were not reported	PC2
10	0	0.5		1	The communication was clear	ICS2
11	0	0.5		1	The flow of ideas was appropriate	ICS2
12	0	0.5		1	Involve the patient in the presentation	P3
13	0	0.5		1	Medical jargon	ICS1
14	0	0.5		1	Patient's preferences were solicited and respected	P3
15	0	0.5		1	Interactive and engaging presentation	ICS2
16	0	0.5		1	Medical terms were used appropriately	ICS2
17	0	0.5		1	Modification in communication style and behavior when addressing the patient or the examiner (flexibility)	PPD4
18	0	0.5		1	Calm down the patient when needed	PPD7
19	0	0.5		1	Demonstrate confidence during presentation to make the patient and the faculty feel at ease	PPD7
20	0	0.5		1	When faced with a question that the student did not ask or a PE step that wasn't performed, did the student admit to the matter in question?	P1
21	0	0.5		1	During the case discussion, the student acknowledges the limitations in knowledge and skills	PBLI1
22	0	0.5		1	While confronted to ask the patient about additional information during the presentation, no defensive behavior was demonstrated	PPD4
	Overall performance				1= No Entrustment, 2= Entrustment with caution, 3= Entrustment with important supervision, 4= Entrustment with minimal supervision, 5= Full Entrustment	

**Appendix B: SP checklist and mapping**

Score		Item (SP)	Sub-C
No=0	Yes=1	Did the student present him/herself?	P1
No=0	Yes=1	Did the student use or ask about your name?	P1
No=0	Yes=1	Did the student take your consent?	P1
No=0	Yes=1	Did the student maintain good eye contact?	ICS1
No=0	Yes=1	Did the student listen carefully to your complaints?	ICS1
No=0	Yes=1	Did the student pay attention to your nonverbal cues and modify their behavior appropriately?	PPD4
No=0	Yes=1	Did the student avoid using medical jargon?	ICS1
No=0	Yes=1	Did the student comfort you during the encounter?	PPD7
No=0	Yes=1	Did the student explain the physical examination steps?	P1
No=0	Yes=1	Did the student avoid uncovering you when it was unnecessary?	P3

**Appendix C: scoring rubrics**

Nb	Score			Item	Sub-C	
1	0	0.25	0.5	Presenting themselves	ICS2/ P1	
	Score 0.5 if they presented their name and level of education; 0.25 if they presented their name or level only; 0 if none					
2	0	0.25	0.5	Stating the patient's name	P3	
	Score 0.5 if they presented patient's full name; 0.25 if they used only first or last name; 0 if none					
3	0	0.25	0.5	Stating the chief complaint	PC2	
	Score 0.5 if the student stated the chief complaint clearly at the beginning; 0.25 if the student stated the chief complaint later and/ or was unclear; 0 if the chief complaint was not stated.					
4	0	0.3	0.6	1	No chest (cardio-pulmonary) symptoms and signs	PC2
	Score 1 if near complete H&P were reported; 0.6 if incomplete H&P were reported only but in a comprehensive way; 0.3 if H only or PE only were reported; 0 if none apply even after probing.  Expected symptoms and signs to report: No shortness of breath or difficulty in breathing, No cough, No chest pain, Normal heart sounds, Normal lung sounds					
5	0	0.25	0.5	No urinary symptoms and signs	PC2	
	Score 0.5 if near complete H&P were reported; 0.25 if incomplete H&P were reported only but in a comprehensive way; 0 if none apply even after probing.  Expected symptoms and signs to report: Urinating freely without any difficulties, No burning with urination, No frequency in urination, No palpable bladder, No hypogastric pain					
6	0	0.3	0.6	1	No abdominal/ GI symptoms and signs	PC2
	Score 1 if near complete H&P were reported; 0.6 if incomplete H&P were reported only but in a comprehensive way; 0.3 if H only or PE only were reported; 0 if none apply even after probing.  Expected symptoms and signs to report: No abdominal pain (or discomfort), No pain of the wounds, No nausea (or loss of appetite), No vomiting, No bowel movement, Normal flatus, Normal abdominal skin and scars, Normal bowel sounds, Normal percussion sounds at the four abdominal quadrants, No pain while palpating the four abdominal quadrants					
7	0	0.25	0.5	No inflammation symptoms and signs at the site of the IV line	PC2	
	Score 0.5 if near complete H&P were reported; 0.25 if incomplete H&P were reported only but in a comprehensive way; 0 if none apply even after probing.  Expected symptoms and signs to report: No pain (or burning sensation) at the site of the IV line, Normal left forearm on inspection (no redness at the IV line site), No hotness of the left forearm at the IV line site, No pain of the left forearm at the IV line site					



**Appendix C: scoring rubrics (continued)**

Nb	Score			Item	Sub-C
8	0	0.25	0.5	No DVT symptoms and signs	PC2
	<p>Score 0.5 if near complete H&amp;P were reported; 0.25 if incomplete H&amp;P were reported only but in a comprehensive way; 0 if none apply even after probing.</p> <p>Expected symptoms and signs to report: No leg pain or discomfort, Ambulating (walking), Normal legs' exam bilaterally (Normal lower limbs on inspection, No pain of the calves bilaterally, Negative Homan's sign)</p>				
9	0	0.5	1	Unnecessary information were not reported	PC2
	<p>Score 1 if student remained coherent and reported relevant &amp; accurate positives and negatives; 0.5 if 1- 2 unnecessary elements were reported; 0 if &gt;2 unnecessary information were added just to show off additional work</p>				
10	0	0.5	1	The communication was clear	ICS2
	<p>Score 1 if probing for clarification was required once or less; 0.5 if probing for clarification was required up to 2 times; 0 if probing for clarification was required &gt; 2 times</p>				
11	0	0.5	1	The flow of ideas was appropriate	ICS2
	<p>Score 1 if the student was systematic while reporting; 0.5 if essential ideas were reported in a disorganized manner; 0 if neither apply</p>				
12	0	0.5	1	Involve the patient in the presentation	P3
	<p>Score 1 if the student continuously interacted with the SP during the presentation; 0.5 if SP was partly involved; 0 if no involvement was made</p>				
13	0	0.5	1	Medical jargon	ICS1
	<p>Score 1 if no medical jargon was used with SP; 0.5 if 1-2 terms used; 0 if &gt; 2 terms used</p>				
14	0	0.5	1	Patient's preferences were solicited and respected	P3
	<p>Score 1 if SP's preferences were solicited and respected; 0.5 if SP's preferences were solicited only; 0 if none</p>				
15	0	0.5	1	Interactive and engaging presentation	ICS2
	<p>Score 1 if student initiates interaction/ probes assessor <u>AND</u> answers questions promptly; 0.5 if student does one of the two; 0 if neither</p>				
16	0	0.5	1	Medical terms were used appropriately	ICS2
	<p>Score 1 if all terms used during presentation are correct medical terms; 0.5 if 1-2 non-medical terms were used; 0 if &gt; 2 terms</p>				
17	0	0.5	1	Modification in communication style and behavior when addressing the patient or the examiner (flexibility)	PPD4
	<p>Score 1 if student's behavior was appropriate while shifting communication from assessor to SP (including appropriate terminology); 0.5 if behavior <u>OR</u> terminology were modified; 0 if neither</p>				

**Appendix C: scoring rubrics (continued)**

Nb	Score			Item	Sub-C
18	0	0.5	1	Calm down the patient when needed	PPD7
	Score 1 if student paid attention <u>AND</u> act upon SP's concerns; 0.5 if student does one of the two; 0 neither				
19	0	0.5	1	Demonstrate confidence during presentation to make the patient and the faculty feel at ease	PPD7
	Score 1 if presentation to assessor <u>AND</u> explanation to SP were reassuring; 0.5 if student does one of the two; 0 neither				
20	0	0.5	1	When faced with a question that the student did not ask or a PE step that wasn't performed, did the student admit to the matter in question?	P1
	Score 1 if no invention of facts; 0.5 if 1 fact or answer was invented; 0 if > 1 fact or answer was invented				
21	0	0.5	1	During the case discussion, the student acknowledges the limitations in knowledge and skills	PBL1
	Score 1 if the student continuously confirms that missing reported data is related to the limitation in knowledge and skills; 0.5 if confirmation was not done once; 0 if confirmation was not done at least twice				
22	0	0.5	1	While confronted to ask the patient about additional information during the presentation, no defensive behavior was demonstrated	PPD4
	Score 1 if defensive behavior was not demonstrated; 0.5 if behavior demonstrated once; 0 if > 1				
	Overall performance			1= No Entrustment, 2= Entrustment with caution, 3= Entrustment with important supervision, 4= Entrustment with minimal supervision, 5= Full Entrustment	
	Score 5 if student highlighted patient's case details before any intervention done by assessor <u>AND</u> no concerns regarding related sub-competencies; 4 if case details were clarified after probing once <u>AND</u> no concerns; 3 if probing was done twice <u>AND</u> no concerns; 2 if case details lacked a global understanding <u>OR</u> minimal concerns regarding related sub-competencies; 1 if case details were unclear <u>OR</u> major concerns regarding related sub-competencies				

**Appendix D: Case details**

S.P. should have their shorts above the knees with the medical gown covering their chests only. A small red point (less than 0.5 mm) will be drawn on the left forearm marking the entrance site for the IV line. Moreover, on the abdomen, three small Band-Aids will be placed indicating the surgical scars.

When the medical student enters the room, the SP should anxiously say: “Hello doctor, I have been doing well for the last 2 days. The nurse just told me that I have a fever. What is going on?” The student should calm the patient down, present him/herself and identify the patient by at least using his name or asking about his name. The student should explain to the SP that he/she was called to assess him in order to see what is going on and take his consent.

The student should wash his hands when he enters the room or at least before starting the physical examination.

Questions and Answers:

Student: Do you have any other additional symptoms? (Or any similar question).

SP: I have only chills

Student: Do you have any shortness of breath or difficulty breathing?

SP: No

Student: Do you have any cough?

SP: No

Student: Do you have any chest pain?

SP: No

Student: Are you able to urinate freely without any difficulties?

SP: Yes

Student: Do you have any burning with urination?

SP: No

Student: Do you have any frequency in urination?

SP: No

Student: Where was the IV line inserted?

SP: Points out to the left forearm and says “here”

Student: Do you have any pain (or burning sensation) at the site of the IV line?

SP: No

Student: Do you have any abdominal pain (or discomfort)?

SP: No

Student: Do you have any pain at the surgical site?

SP: No

Student: Do you have any nausea (or loss of appetite)?

SP: No

## Appendix D: Case details (continued)

Student: Do you have any vomiting?

SP: No

Student: Did you have any bowel movement?

SP: No

Student: Did you pass any flatus?

SP: Yes

Student: Do you have any leg pain or discomfort?

SP: No

Student: Are you ambulating (walking)?

SP: Yes

Any other questions should be answered “No”

Expected Physical examination to be done by the student:

- 1- Auscultation of the heart in at least one area
- 2- Auscultation of the lungs, at least posteriorly
- 3- Auscultation of the lungs anteriorly
- 4- Inspection of the left forearm
- 5- Palpation of the left forearm
- 6- Inspection of the abdomen (including looking under the Band-Aids)
- 7- Auscultation of the four abdominal quadrants
- 8- Percussion of the four abdominal quadrants
- 9- Palpation of the four abdominal quadrants
- 10- Inspection of lower limbs
- 11- Palpation of the calves bilaterally
- 12- Performance of Homan's sign

This portion of the case detail will focus on what is expected of the SP to track during the student's oral presentation. The SP should note if the student presented him/herself, stated the patient's name, stated the chief complaint, and presented the different positive and negative signs and symptoms they had already asked them. In addition to that, the SP should keep note of the extent of their involvement by the medical student during the oral presentation. Furthermore, modification in communication style and behavior when addressing the patient or the examiner is of utmost importance and plays in the student's favor; the SP should not deduct grades from the student's checklist if they were using medical jargon when addressing the assessor but does have the right to ask for an explanation as needed. Moreover, the SP will also assess the behavioral commands done by the student in attempt to calm them down when addressed with a concern and the demonstration of confidence during the presentation. Finally, both the assessor and the SP should keep note of any defensive behavior from the student in case confronted with the use of wrong information during the oral presentation.

### VITA

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