overarching category. The reviewers considered reflection skills as the underlying competence and personality, viability and soci choice for WHU; achievement and ability to study; Main categories are the motivation for the job and the commonly used evaluation criterion in both focus groups. Reflectivity was confirmed as the most reviewers. Focus group analysis revealed four main overarching category of outstanding importance to WHU, GPA, and reflection. Analysis of interviews identified extreme groups were found in these categories: school motivation letters. Significant differences between the categories in the selection process at WHU identifies candidates with both a broad scientific knowledge base and social skills and who are above all capable of self-reflection.

5CC2 (1766) validity and psychometric properties of a novel competence-based assessment tool for 1rst and 2nd year medical students

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Patrícia Barata, Covilhã, Portugal
Isabel Neto, Covilhã, Portugal

Presenter: Ana Mafalda Fonseca, Faculty of Health Sciences, University of Beira Interior (FCS-UBI), Covilhã, Portugal

Background: Medical students must acquire and master knowledge, skills, attitudes and professional behaviors to be competent professionals in the future. We found that was important to develop an instrument to assess different domains of competence in an integrated manner based in real world situations for 1rst and 2nd year medical students.

In the first two years of the medical curriculum students learn disciplines included in the domains of Biological, Humanistic and Community Health Sciences. To assess students’ ability to integrate those different domains of knowledge we implemented in 2014 an OSCE-based examination. Our objective was to evaluate this novel assessment tool in terms of content validity related to the learning objectives and internal structure (item difficulty/discrimination and reliability).

We analyzed the tool for 3 consecutive academic years. Three different persons analyzed content validity of the stations (N=16-21). Knowledge domain was assessed differently in the 3 main cognitive levels: up to 13% of the stations evaluated memorization, 85% application and 17% resolution. Also, up to 20% assessed practical skills, 25% communication and 25% professional attitudes. Stations reliability (Cronbach’s alpha) ranged 0.64-0.80, difficulty 0.17-0.9 and discrimination achieved a maximum of 0.26. The psychometric analysis of our competence-based assessment tool demonstrated moderate item difficulty (mean=0.64), low discrimination power, and satisfactory reliability. These acceptable psychometric parameters indicate that this tool is sufficiently valid and reliable for the purposes that were planned. Also, it captured students’ attention for the importance of an integrated learning during the first 2 years of studies and strengthened the links between theoretical concepts and
future application. This analysis has allowed us to see the strengths and weaknesses of the instrument in order to make improvements. Although it is a laborious and time consuming task to implement this kind of competence-based assessment it seems that it fulfills the goal of assessing skills not included in other tools used along the learning process.

5CC3 (2724)
Validity evidence for programmatic assessment in competency-based education

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Thomas O'Neill, Department of Psychology, University of Calgary, Canada
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Kent Hecker, Veterinary Clinical and Diagnostic Sciences, Faculty of Veterinary Medicine, University of Calgary, Canada

Presenter: Harold Bok, Faculty of Veterinary Medicine, Utrecht University, Utrecht, Netherlands

Background: Competency based education (CBE) is now pervasive in Health Professions Education. A core purpose of CBE is to assess and identify the progression of competency development. Together with emphasis on sustained evidence of professional competence this calls for new methods of teaching and assessment. A model for programmatic assessment has been proposed that simultaneously optimizes assessment for learning and high-stakes decision making.

Scores from three assessment methods were combined to assess the same and different competencies to provide a holistic overview for both formative and summative purposes. We performed a retrospective quantitative analysis using hierarchical linear modeling of individual assessment data points collected by 962 learners to assess variation in scores due to repeated measures, competency, assessment method and student.

The results showed a sigmoidal learning curve when mean scores over time were collapsed for learner, method and competency domain. Random coefficient modelling indicated that variance due to inter-student performance differences was highest (40%). The reliability coefficients of scores from assessment methods ranged from .86 to .90. Method and competency variance components were in the small-to-moderate range.

The results indicate that students start at different competency levels (scores) and scores increase over time as students advance through their clinical rotations. This finding provides supporting evidence for the program of assessment working effectively as it is designed. The current validation evidence provides cause for optimism regarding the explicit development and implementation of a program of assessment within CBE. The majority of the variance in scores appears to be student-related and reliable, supporting the psychometric properties as well as both formative and summative score applications.

We provide preliminary validation evidence from both descriptive and modeling analyses to support the explicit development and implementation of a program of assessment meant for both student learning and summative decision purposes.

5CC4 (2097)
Faculty Perceptions of Grading Practices and Innovations in Medical Education

Authors
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Anne Zinski

Presenter: Scott Snyder, University of Alabama at Birmingham, AL, USA

Background: While standardized exams remain crucial, the grades that students earn during preclinical and clinical training are essential components of evaluating medical students. Hanson et al (2013) posited, “medical education... depends more upon grading schemas than on actual assessment [of competencies] that define a competent physician.” Innovations in grading practice have emerged during the past ten years, yet few studies investigate the attitudes of medical school course directors about grading or innovative grading practices. We disseminated a 50-item survey of grading practices to medical education faculty at a comprehensive medical college in the southeastern US. We received responses from 42 pre-clinical, clerkship, or co-enrolled elective course directors within the institution.

Key findings include:
- 100% agreed that grades should reflect the degree to which students mastered course objectives, and nearly half agreed that effort should also contribute
- 74% agreed that grades should be predictive of content application in “the real world”
- 79% agreed that grades mean different things depending on instructor, but 74% indicated that grades should mean the same thing across courses and instructors
- 64% agreed that improving clarity of grades’ meaning would influence their decision to adopt a new grading approach
- Of respondents interested in grading innovation, the majority (%) wanted to learn more about specifications grading and standard-setting procedures to determining grade cut scores on assessments.

Results revealed challenges to achieving consensus about the meaning of grades, promoting the predictive validity of grades, and understanding attitudes toward innovation and grading. Specifications grading and Angoff-based standard setting methods were the most interesting innovations. Expanded efforts related to developing consensus on the meaning of grades are necessary. Further investigation using a survey of this type should be implemented at this and other schools of medicine. Research and training regarding specifications- and Angoff cut-score methods warrant consideration.
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5CC5 (1741)
A Lesson Learn from Formative Assessments

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Background: In the course ‘infection’ of preclinical medical students, we had 2 summative assessments (S1&S2) to evaluate the student’s knowledge of 2 content units. Prior to S, we gave 2 formative assessment (F1&F2) to monitor student learning. The F questions covered all the content as S’s. The F scores were announced on the same day after the exams. The students gave feedback and some were interviewed after the course. The difference between the first and second formative exams were the content, time interval on F to S exam and the explanation the answers after F1 exam but not in F2. The purpose of unexplain the answer in F2 was to stimulate the self attempt in seeking the answer. The students’ score, feedback and interview were evaluated. The students (83%) liked the formative exam (83.2%) and prepared themselves before F (68.9%). They thought F helped to understand the course content (78.2%) and improved their summative scores (69.8%). The difference between each F and S scores were classified as worse, same level and better. Surprisingly, we found that most of the students (69.94%) got same level of F1-S1 and same level of F2-S2; F1-S1 worse than F2-S2 scores (16.67%). These results implied non significant effect of explanation of the F answer. The students’ feedback suggested that the effectiveness of F were the time interval between the last lecture, F and S exams. In addition, the explanation of the test was good but its effect on the summative scores and improvements of learning acquisition were depended on each individual students’ attitude and behavior.

Utilization the formative exam to improve the student knowledge outcome is influenced by many factors such as timing, types of exam and student attention. Students who got good grade mostly pay attention on formative exam and gain the benefits of this activity which contrast to the lower grade group.

Formative exam is a good way to improve the students’ knowledge but the process is important for its benefit.

5CC6 (937)
Using Modified Oxford Non-Technical Skills scale to evaluate simulation and clinical performance of emergency residents

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Presenter: Chih-Chun Huang, Mackay Memorial Hospital, Taipei, Taiwan

Background: Simulation-based training is a new teaching tool for improving the performance of medical students and residents. A modified Oxford Non-Technical Skills (NOTECHS) scale (score range, 1-4) is used to evaluate resident ability of communication, leadership, teamwork, decision making, problem solving, and situational awareness. We used NOTECHS scale to assess resident performance in simulation and clinical presentation. This study was a prospective study during October to December 2017. Simulations were conducted in a medical center-based simulation center in Taiwan. A total of 16 emergency residents (resident year 1, 2, 3 and 4) participated in 3 clinical scenarios (short of breath, altered mental status and shock). A simulation scenario was conducted in 15-20 minutes and followed by 10 minutes debriefings. NOTECHS scale (score range, 1-4) was used to assess emergency resident performance in simulation. In emergency room, we asked 6 senior attending emergency physicians to evaluate clinical performance of residents with the scale.

The clinical performances of senior residents were significantly better in communication, leadership, teamwork, decision making, problem solving, situational awareness and cumulative score. Senior residents also had higher score of teamwork, problem solving and cumulative score in simulation. Simulation sessions may be used to evaluate the level of each individual residents in communication, leadership, teamwork, decision making, problem solving, and situational awareness. NOTECHS score was a good tool for evaluating simulation and clinical performance of the residents. The simulation performance can reflect clinical performance of the residents.

Table 1. Emergency Resident Performance in Simulation

<table>
<thead>
<tr>
<th></th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>P value</th>
</tr>
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<tr>
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<td>2.5</td>
<td>3</td>
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<td>2.875</td>
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<td>0.06</td>
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<tr>
<td>problem solving</td>
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<td>2.375</td>
<td>2.875</td>
<td>3.125</td>
<td>0.02</td>
</tr>
<tr>
<td>situation awareness</td>
<td>2.625</td>
<td>2.375</td>
<td>2.625</td>
<td>3</td>
<td>0.26</td>
</tr>
<tr>
<td>NOTECHS*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative score</td>
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<td>12</td>
<td>14.25</td>
<td>16</td>
<td>0.03</td>
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Table 2. Emergency Resident Performance in Clinical Presentation

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<th>R3</th>
<th>R4</th>
<th>P value</th>
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</thead>
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<td>2.67</td>
<td>3.25</td>
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<tr>
<td>teamwork</td>
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<td>2.42</td>
<td>3.08</td>
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<tr>
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<td>2.17</td>
<td>2.83</td>
<td>3.17</td>
<td>0.01</td>
</tr>
</tbody>
</table>
situation awareness  2.08  2.25  2.83  3.33  0.01
NOTECHS* Cumulative score 10.33 10.67 13.67 15.75 0.01

SCC7 (3076)
Digital vs. Analog Assessment: Analyzing Students’ Preferences

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Background: The German ‘Masterplan Medizinstudium 2020’ [1] sets the agenda towards competency-based medical education. To better meet the requirements of competency-based assessment we introduced tablet computer-based exams in our clinical curriculum to allow for new quality assurance processes and assessment formats. In three consecutive pilot runs, students were asked to choose between paper-based and tablet computer-based exams that otherwise were identical in content and structure. Factors influencing students’ preferences were assessed using a facultative questionnaire containing both Likert-scaled and free-text questions. 105 students took the three consecutive exams in pathology, human genetics and radiology. 11, 11 and 25 chose to use a tablet computer, respectively. 69 of the 105 students returned the completed questionnaire. 49/69 of students stated that they can handle tablet computers very well or well (1.85 ± 1.1, mean ± SD on a five-point Likert-scale: 1=very good, 5=bad). 36/69 own a tablet computer and 66/69 own a smartphone. 44/69 students felt very well or well prepared (2.24 ± 0.75), 62/69 assumed that they mastered the exam-subject at least reasonably (2.54 ± 0.66). Primary reasons for the preference of paper-based over tablet-based exams were 1. habit, 2. possibility to use a highlighter pen and 3. lack of technical risks. Although the majority of students stated that they are proficient in handling tablet computers and own a tablet and/or a smart phone, only few chose the tablet over the classical paper-based exam. Exam subjects influenced selection as tablets were chosen more than twice as often in the radiology exam, i.e. a subject relying on images. Otherwise, as paper- and tablet-based exams were identical in structure and content, students apparently saw no benefit in using the novel tablet-based exam and went for the method they were familiar with. This can be related to findings of other studies that the design of e-assessments should be in line with the subject area which is assessed [2, 3]. More innovative competency-based assessments formats should be used in future computer-based exams, in order to clarify benefits of digital assessment to students.

SCC8 (2564)
Students’ perceptions of online assessment with their own devices

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Presenter: Sanna Siirilä, University of Helsinki, Finland

Background: The Faculty of Medicine in Helsinki has since 2013 provided the students with iPads. The survey data from the iPad project showed that students were seldom assessed online. They wished for more electronic tests and feedback. In 2017, we started a Digital leap project developing your own device (BYOD) online assessment. This study explores the students’ perceptions of and attitudes towards online examinations. (49)

The Digital leap project started in 2017 by focusing on summative online assessment. We aimed at comparing the 1st year students’ perceptions of three platforms for summative online examinations where access to the Internet and hard disk were blocked (Abitti, Inspera and UNiwise). The research data consisted of web-based and paper questionnaires, interviews and observations in 2017 and 2018. 31/200 students voluntarily participated in the pilot in high stake examinations.

Few students had experience in online assessment. 31 volunteers were pleased with electronic examinations and did not want to return to paper exams. However, they needed support in new assessment practices, especially in the BYOD context. Students who did not participate in the pilot felt safer taking examination in paper format and were afraid of technical problems. They reported that the most important aspect in digital examinations was to have an easy-to-use platform. Most of the students in both groups replied that online assessment could improve their learning results by providing instant feedback.

As modern technology is incorporated into medical education in Helsinki, assessment should not lag behind. Students’ perceptions of the digital platforms piloted are important, since the shift from paper-based to electronic assessment should not cause the students additional stress nor hinder their learning.

Quality assessment is vital for students’ learning. Students need support in adapting to the assessment technology. Teachers and administration require efficient technical and pedagogical support.
Technology enhanced learning requires update in assessment practices. The development of summative online assessment requires piloting and support for the teachers and administration. The students need tailored support and training for online assessment.

5C9 (1090)
The Global Performance Assessment Form as a formative Workplace-Based Assessment Tool in the Singapore Radiology Residency Programme – Has it been effectively utilized?

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Background: The American Accreditation Council for Graduate Medical Education (ACGME) Residency Program was adopted for Radiology training in Singapore beginning in 2011. It comprises 6 clinical competencies - Patient Care, Professionalism, Interpersonal&Communication Skills, Medical Knowledge, Practice-Based Learning&Improvement and Systems-Based Practice. The Global Performance Assessment Form (GPA) is one of the few Workplace-Based Assessment (WBA) tools able to assess trainee doctors in all 6 dimensions. The purpose of this study is to evaluate the effective utilization of this form for all trainees belonging to one of the 3 local Radiology training centres. The form comprised 22 specific questions. Each question used a 9-point Likert scale with a space for comments. A trainee was assessed by a single rater and completed 1 GPA form at the end of each 3 month posting. The rater was a senior doctor who may or may not be a member of the Residency faculty. Internal raters were those who belonged to the parent institution whereas external raters were those in peripheral hospitals the trainee rotated to. Data for all trainees was collated from 2011 to 2017. There were 297 GPA forms from 42 trainees. The Exploratory Factor Analysis results indicated only one latent structure underlying the 22 questions. Internal raters (M=6.0040, SD=0.80) gave significantly lower scores compared to external raters (M=6.9638, SD=0.77). There was no significant difference between scores given by faculty (M=6.49, SD=0.92) versus non-faculty (M=6.3548, SD=0.91) raters. Comments were provided only 5.4% of the time.

Raters were not able to distinguish between these 6 competencies. This may be due to the influence of the preceding British system whereby the rater would pass a trainee once he/she felt that “Total Patient Care” had been delivered. The rater would then retrospectively fill in the 6 competency scores to justify the end result. The added good intention of a WBA in providing formative feedback was under-utilized. Again, this may be related to the pervasive mindset that negative comments will affect the resident’s future, wrongly assuming this to be a summative rather than formative task.

Rater training is necessary to enable them to differentiate and assess in these 6 dimensions as well as be comfortable giving qualitative feedback.

5CC10 (866)
The Application of Milestone and Entrustable Professional Activity in Clinical Skills Training-the First Year Result

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Ying-Ying Yang
Chin-Chou Huang
Ling-Yu Yang
Jen-Feng Liang

Presenter: Chia-Chang Huang, Taipei Veterans General Hospital, Taipei City, Taiwan

Background: Clinical Skills is one of the Minimum 7 Essential Core Competences of the Institute for International Medical Education (IIME) Core Committee. In recent years, Milestone and Entrustable Professional Activity (EPA) were applied in postgraduate medical education training programs at the United States and Canada. The undergraduate year (UGY) training has the clinical skills training in the division of clinical skills training or in the ward. The Objective Structured Clinical Examination (OSCE), Direct Observation of Procedural Skills (DOPS), and Modified mini- clinical evaluation exercise (Modified mini-CEX) were used to do the assessment in clinical skills. The application of milestones and EPAs is the first attempt in UGY training programs. During January – March 2017, we invited 5 clinical teachers to form a "Clinical Skills Training Milestone and EPA Working Group". They listed the Milestone of procedure skills include male urinary catheterization, blood sampling and blood culture, wound dressing, and intravenous catheterization. In April 2017, we invited another 5 clinical teachers to validate the content of EPA and milestones of these 4 procedure skills. Then, we conducted a pilot test based on the EPA and milestones of the clinical skills. Finally, we collected the questionnaires from medical students about the application of Milestone and EPA in Clinical Skills Training.

We had created the good validity (1-5) EPAs and Milestone in these 4 procedure skills, include male urinary catheterization (4.13), blood sampling and blood culture (4.09), wound dressing (4.12), and intravenous catheterization (4.31). The pilot test in medical student showed the EPA’s mean scores(1-9): male urinary catheterization (6.7), blood sampling and blood culture (5.6), wound dressing (5.7), and intravenous catheterization (6.0). Most of the participants’ were positive feedback and suggested to demonstrate the effectiveness of clinical skills training with milestones and EPA through rigorous research. Most students had the positive attitude to face the application of Milestones and EPA in Clinical Skills Training. The application of Milestones and EPAs in Clinical Skills Training need good validity contents and pilot tests with a rigorous research to proved the effectiveness.
5CC11 (562)
Satisfied students are not necessarily well educated students

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Presenter: Erik Hulegårdh, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Sweden

Background: There is no correlation between the students’ assessment of the teaching and the final exam results. Other methods must be used in order to evaluate the true quality of a course and its teachers. The general belief is that there is a positive correlation between the medical student’s course evaluation and the results on the examination. It is hypothesized that students learn more if they enjoy the education, the teachers and the course as a whole. There are institutions, which use the students rating as a quality index of their university and teachers for use in grant applications.

To investigate this hypothesis, we performed a study at the 6th term course, i.e. internal medicine of the medical programme, Sahlgrenska Academy, University of Gothenburg, Sweden.

The student’s course evaluations were correlated with the results at the final written exam. The participation rate was n=91 (60%).

The correlation coefficient (Pearson) between the question “I am in general satisfied with the clinical tutoring and education and what I have learned” and the written examination score was r= 0.30 (p=0.38). The correlation between the question “The pedagogic which was used during the course facilitated the optimal learning for me” was as low as r= 0.0072 (p=0.84).

The study clearly showed that there was no correlation between the course evaluation and the results at the written examination. It is most probable that the students’ subjective evaluation is not a reliable tool, neither for measuring students’ learning, nor for the quality of teaching. The results are in line with those at a technical programme at the University of Linköping, Sweden (Öberg et al.).

Hence, there is no reason to draw any firm conclusion based on the students’ course evaluation and gained knowledge, or the quality of the education, academic environment or the competence of the teachers, respectively. However, it is positive to offer a programme that is well accepted by the students.

5CC12 (1366)
The effectiveness of OSCE mentorship for Passing on OSCE UKMPPD: an Experience from School of Universitas Muhammadiyah Yogyakarta (UMY) in Indonesia

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Winny Setyonugroho, UMY, Yogyakarta, Indonesia
Galuh Suryandari, UMY, Yogyakarta, Indonesia
Akhmad Ikliludin, UMY, Yogyakarta, Indonesia

Presenter: Nur Shani Meida, UMY, Yogyakarta, Indonesia

Background: Qualified and competent doctors in Indonesia has been produced for at least six years. At the end of their study they must be assessed by a High-Stakes National level examination called UKMPPD (Uji Kompetensi Mahasiswa Program Profesi Dokter) to assure national health quality services. There was many ways to enhance skills and OSCE UKMPPD passing score. One of effort from school of medicine UMY is using mentorship. This study was conducted to analyze whether OSCE mentorship can be effective to pass on OSCE UKMPPD.

This study used a pre-post experimental design with 153 participants who followed OSCE UKMPPD for period Januari-Oktober 2017. Pre-test has been held 1 month before final exam with local comprehensive OSCE. The mentorship conducted in 1 month with 20 times departmental expert lectures, 40 times regulated independent learning OSCE and one time for formative simulated OSCE with direct feedback. OSCE UKMPPD result has been recorded as a post-test. The data was analyzed using chi-square. There were significantly increased between pre and post test (p 78) successfully passed this exam with lower increase of pre and post result (0,52;0,73). Generally there was improvement in passing score between local comprehensive OSCE and OSCE UKMPPD which was 54% to 98%.

Students must prepare for exams. This should include preparation countdown with keydates and preparation on finals. Therefore, School of Medicine UMY has conducted mentorship and the result showed that OSCE mentorship was effectively improves for passing on OSCE UKMPPD. A small discussion group, mentorship could bring motivational environment with constructive feedback and closely relationship between mentor and mentee. You can try this method or combination of this.
Team Work Competency Assessment (TWCA) during the first year medical school LifeStages course

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Bradford Fischer, Cooper Medical School of Rowan University, New Jersey, USA
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Presenter: Anuradha Lele Mookerjee, Cooper Medical School of Rowan University, New Jersey, USA

Background: Teamwork is a critical competency for health care professionals. There is lack of assessment tools to measure teamwork among medical students.

Summary of Work: We piloted Team Work Competency Assessment (TWCA) for 71 students. Nine active learning groups of eight students worked as a team for ten days to develop a clinical case with learning objectives and a structured facilitator’s guide on an assigned topic from our LifeStages curriculum based on the biopsychosocial model. The case and facilitators guide were assessed by the course directors using a three-category rubric and was 40% of TWCA grade. Each active learning team conducted anonymous peer assessments using the Carnegie rubric which accounted for 20% of TWCA grade. The developed case was assigned to a different student team, charged with executing the case by developing their own learning objectives and corresponding content in a two hour CBL/PBL session. This case discussion was assessed by faculty facilitators using a 4-point rubric and was 40% of TWCA grade. A formative feedback and reflection session by the developer and executor teams closed the loop in the assessment process.

Summary of Results: The student scores ranged from 70 to 95%. Student reports showed that the challenge of case development and execution fostered a rich educational exercise in teamwork and empowered them as student teachers.

Discussion & Conclusion: The students benefited from this cooperative learning process. The students acted as cohesive team players and showed commitment to this practice. The multifaceted assessment rubric assessed higher order thinking and problem solving skills as a functional team.

Take home message: TWCA identifies communication, problem solving, and decision-making skills. Team Work exercise inspires cooperation, collaboration and partnership. Team work can be assessed in basic science courses in medical schools.