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From Assessment Cocktail to Assessment Symphony: The Development of Best Assessment Practices

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Abstract

Introduction of the best possible assessment practices is a requirement for any institution seeking to foster excellence in its students. Assessment practices have been assumed to drive students' learning. However the extent of which this driving role of assessment negatively or positively influences attainment of curriculum objectives and educational outcomes is not well known. In an effort to improve assessment practices, assessment has moved from an era of strict implementation of assessment *of* learning and a dominance of the psychometric theory into a focus on assessment *for* learning. In the latter view, a cocktail of assessments is proposed to enhance students' learning. In this paper, we are suggesting that well-planned assessment, summative and formative, may contribute to a positive effect of assessment on student learning and may result in desired educational effects. This practice of assessment should take into consideration the implemented curriculum, the institution culture, and the practiced health care setup. We call this well planned assessment an "assessment symphony". The successful implementation of such assessment symphony requires the willingness of an institution to critically look at its assessment and further efforts that are beyond the power of an individual medical school; such as modifying the provision of job opportunities and a change in the national educational culture.

Despite the proven positive effects of formative compared to summative assessment on students' learning, most examinations in medical schools are still summative. Even assessment that is meant to be formative, is often used for summative decision making. The question therefore is: Are we reversing back to the psychometric era?

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Keywords: Formative assessment; Summative assessment; Psychometric; Students' learning; Education outcome

1. Introduction

The assumption that assessment drives student learning is shared by many educators.¹ Educators claim that students are driven by their exam's style and purpose.^{2,3} Students' effort is usually directed and tailored to fulfill exam requirements without focusing on its educational gain. In fact, the nature and contents of examinations do determine the learning activities of students to a large extent. In their learning activities,

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students tend to focus on what will be asked during the examination at the expense of paying less attention to what might be an equally important subject-matter that they are not being tested on. For instance students may not put serious effort on their assessment if its results are not affecting their final grades and progress. On the other hand, the same students will work very hard and invest extensive study effort to achieve the best possible marks in their summative exams. Their acts will be even more prominent whenever their obtained mark carries an effect on their progress and achievements.^{2,3}

Educators raised the importance of students' own effort on their learning approaches and achievements. Students' academic progress, motivation and application of learning objectives were perceived as the students'.^{4–7} Based on earlier inventories, students' learning approaches were recognized to range between three main styles⁸: surface learning; involving “repetition of analyses already carried out”; deep learning, using “a greater degree of cognitive analysis” and “assessment driven category”. The last approach was named as a strategic approach of learning.⁹ Further work on students' learning approaches showed that students utilize unstable learning approaches swinging between superficial, deep and strategic approaches.¹⁰ This variation was affected by different influences in particular those related to students' assessment and its resulting consequences.^{11–13} Therefore, the third learning approach or the strategic approach that describes well-organized studying influenced by students' motivation for specific achievement was re-named as “effort and achievement motivation learning approach”. While superficial and effort and achievement learning approaches are commonly practiced by students, a deep learning approach has been linked in the literature to better students' performance and better educational impact.¹⁴

Putting all these facts together, it appears that when we design an educational curriculum, particularly its assessment component, on top of guaranteeing the assessment of the intended curriculum objectives and its educational outcomes, our assessment should support students' learning and motivate them to practice a deep learning approach.¹⁴

2. From assessment of learning to assessment symphony

Reviewing assessment history, educators have focused for decades on various psychometric quality assurance tools aiming to improve assessment quality

(e.g. validity, reliability).¹⁵ Educators have assumed that simply improving the reliability and validity of assessment would improve students' learning and support curriculum implementation. This emphasis on psychometric quality of assessment has had a number of perhaps less than desirable consequences. First, it has led to the use of measurable outcomes of which assessment quality indicators can be calculated. This tendency was at the expense of more relevant formative measures where determining psychometric quality is more difficult. Second, end-of course assessment has been given more emphasis as compared to assessment aimed at improving learning within the course subject.^{16,17} Third, educators have focused more on test quality than on the educational impact of the test.¹⁵ And fourth, the strong focus on psychometric implementation hindered teachers to recognize and respond to students' learning needs and wishes.¹⁸ Therefore, during the heavy use of psychometric methods or the psychometric era, assessment tools have become a method for passing or failing students rather than being an instrument to enhance their learning.

A subsequent distinction has been made between end-of-course, or summative assessment aimed at giving final marks to students and deciding on their progress represented by “assessment of learning”, and formative assessment aimed at giving students information about their strengths and weaknesses, with the goal of helping them improve their performance represented by “assessment for learning”. During the psychometric era, the focus has always been on assessment of learning with rigid implementation of quality tools rather than on assessment for learning that focuses on students' gains and educational impacts.¹⁹ Researchers have shown that in the presence of adequate education culture and appropriate implementation, formative assessment may enhance students' learning to a larger extent than giving them equivalent additional time for self-study²⁰ and have a powerful effect on their achievement.^{21,22}

Assessment for learning moves the educational focus from single instrument into the use of cocktail of assessments.²³ Based on this principle, it is not necessary to replace the old assessment tools with new ones, rather you supplement the already utilized tools with others in order to achieve the test's educational goals.²⁴ Therefore, you may for example continue using multiple choice questions (MCQ) and objective structured clinical examination, but, you also add other tools that assess the students in real life such as the use of Mini clinical examination (Mini-CEX) and case based discussion (CBD). Overall, each of the

utilized assessment instruments should aim at assessing certain aspect of the intended educational goals. The combination of the collected information will result in assessment of the curriculum objectives. Upon practicing multiple assessment approach, we have to program our assessment by carefully matching between the implemented educational objectives, methods of curriculum delivery and the assessment tools utilized, performing what is called a constructive alignment.²⁵ For example, if the objective of the curriculum is to graduate the students able to measure patients' blood pressure, and we have delivered this particular skill to the students through real patient encounter teaching, then the assessment of this particular objective has to be in the work place through work-place based assessment on real patients as well.

Multiple assessment instruments are needed to assess the various aspects of the curriculum's objectives and enhance students' learning. In fact, assessment *for* learning requires a shift of our thinking of assessment as a method to make decision on students' performance through using one instrument, into utilizing multiple assessment instruments that formulate an assessment program or what is called "programmatic assessment".^{26,27} In programmatic assessment, we move beyond the dominance of psychometric decision with its focus on an individual instrument, towards a system approach to assessment.²⁸ Each of the multiple assessment tools utilized within the program is aimed to cover a certain aspect of the intended educational objectives,^{23,26,27} determine students' strengths and weaknesses and optimize their learning activities,^{15,28} while the goal of the implemented program is to pass or fail students. For example, we may use several assessment tools for the same subject examination to help us reach our assessment decision; MCQ to assess students' cognitive skills, objective structured clinical examination to assess their hand and communication skills, and work-place based assessment to assess their performance in real life situations. Each exam data can be used for educational purposes, while the aggregated data of these several exam tools can be used for higher stake pass or fail decisions. The higher the stake, the more data aggregation is required or more data sampling across the curriculum is needed.²⁸

To further enhance the positive effects of assessment on students' learning, assessment that is planned for a certain curriculum should be programmed in accordance to the curriculum's objectives and its methods of delivery. Not only that, but rather it should be timed and varied according to the curriculum delivery sequence. Careful selection of assessment tools,

implementing assessment rules and regulations, and designing an organizational system that governs the practice of assessment are needed to succeed in achieving the intended educational outcomes. Furthermore, the utilized assessment instruments and functions have to be played in a timely manner, taking into consideration the various affecting or contributing factors on students' perception of their assessment and the resulting learning approaches. We called this carefully planned and tailored method of assessment practice as "assessment symphony". To reach this goal, each instrument is played separately and jointly with others to shift the assessment performed from merely a program of assessment to formulate a symphony of different assessment tools and functions. Formative tools, summative tools, traditional, new tools and others characterized by high technology, all of which should fit with the assessment needs of a certain institution, its culture and its students.

3. Assessment symphony: hypothetical example

To get an insight on assessment symphony, let us propose a hypothetical obstetrics block that is planned to be implemented for male undergraduate medical students in their fourth year of six years Problem Based Learning (PBL) medical curriculum in Saudi Arabia. Both educators and block coordinator in the institution believe that there are practical, financial and social/religious obstacles that may contribute to obstetrics block conduction within a conservative religious culture. The planned objectives of this block include several theoretical and practical aspects such as "*students are required to be able to communicate effectively with female patients, obtain a full history from a pregnant woman, perform a proper obstetric examination, knows mechanism of labor and attend at least three spontaneous vaginal deliveries (SVD). Moreover students should be able to undertake and interpret routine antenatal investigations, distinguish normal from abnormal cardiotocography (CTG) traces, conduct appropriate antenatal care, manage normal labor and perform a normal delivery.*"

In preparation for the block conduction, both the medical educator and the block coordinator have visited the university simulation lab to identify the available obstetric simulators. They also consulted the financial department about the available budget assigned to the block and have reviewed carefully assessment unit and ministry of higher education (MHE) credit hours and assessment roles and regulations. To follow, medical education department has

surveyed a cross section group of Saudi pregnant women attending the institution's antenatal clinic on their perception of exposure to male medical students. Medical education department has also surveyed the medical students concerning their experience in and perception of dealing with female patients. The department of Obstetrics and Gynecology has explored with the clinical supervisors the number of students they can teach in the different related clinical areas without compromising patients' care. The midwifery supervisor was consulted regarding the possibility of medical students attendance with the midwives in labor and delivery; to train them on obstetric vaginal examination and to give them a chance to observe and assist in SVDs.

It appeared that there are social and religious barriers for many women to allow male students to examine them or attend their deliveries. Supervisors and midwives are seriously worried of the number of attending male students on patients' care and satisfaction. Therefore, it was decided to train the students on simulated patients and simulators as long as this training can fulfill the needed objectives. It was decided also to limit direct patients' contact to the objectives that cannot be fulfilled otherwise. For example, the objective of being able to deal with female patients will be delivered while students are attending their supervisors clinics on real patients and assessed through direct observation of practical skills (DOPS), while students' training on vaginal examination and delivery will be fulfilled on high and low fidelity obstetric simulators and assessed through a structured checklist. Those who pass the simulation aspect of the training will be allowed to attend and assist in three SVDs under the supervision of a midwife. Concerning assessment, it was decided that what is taught on simulator in vitro has to be assessed the same way; objective structured clinical examination (OSCE) and objective structured practical examination (OSPE) were selected as suitable instruments. Moreover, what is delivered on real patients in vivo has to be assessed on them; Mini CEX, CBD and DOPS were selected as suitable instruments. There was an agreement that the block theoretical aspect will be delivered through lectures and PBL sessions and are assessed on top of the PBL structured evaluation form by MCQ. The block coordinator had to communicate with the financial department to check the possibility of purchasing some costly simulators after confirming its suitability to the curriculum objectives and students' assessment.

Students' perception of summative and formative assessment and under which circumstances they are

likely to utilize deeper approaches to learning was explored. Majority of the students felt summative assessment very stressful and have preferred formative to summative assessment however, they complained of the deficient feedback process. In response, it was decided to implement more of formative assessment and work-place based assessment with formative feedback compared to summative. Moreover, it was decided that less emphasis/weight will be given to end-of course assessment as compared to continuous assessment aimed at improving learning within the course subject.^{16,17} Extensive workshops to all clinical supervisors on feedback process were decided to be a prerequisite.

After collecting these data and taking these decisions, suitable assessment schedule was created following the curriculum conduction sequence and utilizing the different assessment tools in their summative and formative functions. Students' assessment was timed based on the curriculum delivery while maintaining the decided portions of continuous and end of block assessment. Each assessment event is planned to assess certain aspect of students learning and to give timely feedback while the aggregation of all the assessment events results will be utilized to decide the pass or fail of the students. A criteria for this decision was established and agreed upon between the medical education department and the block coordinator.

4. Where does assessment symphony lead?

Assessment, have been perceived by the students differently and resulted in their swinging between different learning approaches.³ Summative and formative assessments may induce superficial approach to learning for some students, while for others they may result in deeper approach. Generally speaking, summative assessment is likely to result in superficial approach to learning while formative assessment is likely to result in deep or achievement motivating learning approaches. The different effects concerning summative and formative assessment are possibly related to the presence of affecting factors that are contributing to students' learning approaches in response to their assessment rather than the assessment practiced on its own.^{17,29–35} Significant part of the affecting factors are related to the effect of students' summative achievements and grades on their future opportunities and chances.³⁶ For example when future job offers, scholarships and promotions are related to students obtained GPA, they will be more liable to practice surface or achievement motivating learning

approaches and become “mark hunters”. Another important example of affecting factors on students' learning approaches is the teachers' effect; teachers' personality, availability, training and effectiveness as a role model carry strong impact on students' learning strategies and their response to their assessment.³⁷ Contrary to their students, teachers tend to prefer summative assessment to formative. The differences in perceiving assessment between the teachers and their students may function as a negative factor contributing to students' perception of their assessment and the resulting learning approaches and learning outcomes.

It is difficult to find a unified formula of assessment symphony that suits all circumstances, all students, all teachers and all cultures alike. Each institution should explore the correct assessment program characteristics that fit their students, faculties, and resources. Based on the collected information in each institution, educators can suitably balance between summative and formative assessment and decide on the preferred instruments to be utilized. The resulting symphony should be good enough to promote students' learning and induce a rather deep than a superficial approach to learning without compromising other important goals of assessment, such as assessing students' accountability, ranking, and guaranteeing the achievement of planned competences.

It is interesting to imagine teachers and students playing the assessment instruments and formulate the orchestra that plays the assessment symphony. In this symphony, each instrument is used at a certain time for a certain purpose and with a limited known effect within the planned symphony. The end result would be a homogenous work that creates a high standard symphony where the maestro's role is played by the medical educators who have designed the assessment program, or the symphony, based on careful analysis of their own students, teachers, and educational setup. Repeating the same work will result in repetitively playing the same note, which fits with certain tastes and moods and might not be suitable to be played for others no matter how much effort was put in playing it.

5. Are we heading back towards the psychometric era?

Reaching this high level of assessment practice through implementing assessment symphony requires a lot of effort that is sometimes beyond institutional power. However, in high stakes exams, summative assessment is commonly practiced to guarantee metric exam integrity, validity and reliability.^{38–41} In such

decision making situations, even formative assessment is likely to be given summative metric impacts.^{39,42} It appears that despite all the positive effects of formative assessment on students' learning,^{3,39,42,43} the power of summative assessment is still dominating, and the implementation of assessment symphony is yet difficult. The question that comes to the mind of readers is; are we reversing back towards another psychometric era?

Research has proved that giving formative assessment tools a summative value will increase students' anxiety and shift their interest from the assessment's educational aspect into its summative effect.^{3,44,45} Students' focus, relation with their supervisors, and preparation will be directed by what comes in the exam rather than the exam's educational impact. Therefore, similar to summative, even formative assessment might turn the students into “mark hunters” when we link assessment results to their progress. It was repeatedly claimed that proper implementation of formative assessment requires a culture change. However, when formative assessment is provided with summative impact, it results in effects similar to summative assessment no matter how good you prepare the implementation culture, how accurate it was practiced, and how perfect the feedback process was. On the other hand, when formative assessment is used without any impact on the students' progress, students tend to neglect it, ignore serious preparation and feedback consideration.³ As a result, formative assessment's desired effect on students' progress and their development will be compromised. In fact, solving this complex issue related to formative and summative assessment is difficult. The solution may require changes at a higher level than simple institutional planning or needs assessment. It may require effective plans to reduce the summative impact on students' progress and more power to the formative assessment on students' progress and achievements. Therefore, we may need some modifications in the requirements for students' future job opportunities or even scholarship chances, and more importantly enhancement in the educational culture, particularly teachers' accommodation of formative assessment.^{46,47}

6. Conclusion

Best assessment practice is not yet achieved in the medical education world. Further researches and explorations of the effects of different assessment functions and contributing factors on students' learning are still needed. A need fulfilling health care system

and medical education assessment program should be designed and implemented as a single program that aims to achieve the health care outcomes as desired by the health care planners. Through tailored balance of both assessment functions and tools implementation, we may succeed in goals achievement where assessment functions and tool are played timely and sufficiently, resulting in best assessment practice.

Conflict of interest

The author declares no conflict of interest.

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