

### Introduction of a New Standard Student-to-academic-staff Index and Its Evaluation in Mashhad University of Medical Sciences

**Background:** in order to evaluate educational courses, usually different criteria of student and academic staff are being used. These criteria for students include their number, fields, the ratio of post-graduate students to all students, and for staff, they are composed of their number, their rank in the academic pyramid, as well as the ratio of students to academic staff classified based on their academic degrees. Introducing a Standard student-to-academic-staff Index including all the above-mentioned factors can help rank these courses.

**Methods:** A standard student-to-academic-staff Index is introduced based on the educational load of each and every student at different levels and the weekly length of time allocated to education or academic activity by each staff at a certain rank. The values of this index were calculated for students and staff of Mashhad University of Medical Sciences, classified according to its faculties, and through the results of which, the educational status of the university and each faculty has been, thus, analysed in terms of the ratio of students to academic staff.

**Results:** The educational status and the ratio of students to associate professors and professors in MUMS medical and dentistry faculties, using student-to-academic-staff Index, was determined to be very good. This status was considered quite good for the school of Pharmacy, no good for the schools of Nursing, Health and Traditional medicine, and not acceptable for the Para-medical faculty.

**Conclusions:** Using student-to-academic-staff Index, which takes into account the ratio of post-graduate students to all, can help rank the educational status of different faculties in order of very good, good, no good and not acceptable. The Standard student-to-academic-staff Index can also be used in the national project for educational ranking of universities (RAD).

**Keywords:** Standard student-to-academic-staff Index, Educational ranking, Ratio of Post-graduate to all students

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### تعریف معیار الطالب بالنسبه للريسته العلميه و تقييم ذلك في جامعه مشهر للعلوم الطبيه

**التصميم و الهدف:** استخدام معيار الطالب بالنسبه للريسته العلميه بدل المعايير الكثيره مثل عدد الطلاب و عدد المجالات الدراسيه و نسبة الطلاب انتراادات العليا الي الكل. عدد افراد الريسته العلميه. نسبة الطلاب الي عدد الريسته العلميه على اساس تفكيك الرتب في الريسته العلميه. إن هذا الإستبدال يساعد على ترتيب الوحدات التعليميه.

**المواد و الالهياب:** يتم تعيين معيار الطالب بالنسبه للريسته العلميه على اساس الجرم التعليمي إذا كل طالب فة المقاطع المختلفه و مستوى تدريس كل مدرس فة مرتبه معينه عبر معادله. تم تعيين هذا المعيار للطلاب و الريسته العلميه في جامعه مشهر للعلوم الطبيه على اساس تفكيك الكليات و تم من خلال هذا المعيار تحليل المستوى التعليمي في كل كليه و في الجامعه.

**النتائج:** كان مستوى معيار الطالب بالنسبه الي المساعده و الطالب بالنسبه الي الاستاذ جيد في كليه الطب و كليه طب الأسنان و كان المستوى التعليمي فة كليه الصيد له متوسط و كليه التمريض و الضمه ذومستوى متدني.

**الإستنتاج:** إن تقييم معيار الطالب بالنسبه الي الريسته العلميه مع احتساب نسبة طلاب المراحل العليا على كل الطلاب. يعطي الرتب التاليه: جيد. متوسط. متدني و غير مقبول. إن مقدار هذا المعيار يستطيع ان يستعمل فة مقارنة المستويات التعليميه فة الجامعات.

**الكلمات الرئيسييه:** معيار الطالب بالنسبه للريسته العلميه. الترتيب التعليمي. نسبة طلاب المراحل العليا على كل الطلاب.

### مشهد يونيورسٹی آف میڈیکل سائنس میں اکیڈمیک کونسل اور طلباء کی نسبت کے معیار پر عمل درآمد اور اس کا جائزہ

**بیک گراؤنڈ:** تعلیمی اداروں میں طلباء کی تعداد، موضوعات کی تعداد تمام طلباء کی نسبت پوسٹ گریجویٹ طلباء کی تعداد، اکیڈمیک اسٹاف کی تعداد اور اکیڈمیک اسٹاف کی نسبت تمام طلباء کی تعداد جیسے معیارات کے استعمال کیے جائے اگر ان تمام امور کو ایک جامع اصول میں شامل کر دیا جائے تو تعلیمی مرکز کے معیار کو سمجھنے میں آسانی ہوگی۔

**روش:** اکیڈمیک اسٹاف کی نسبت طلباء کی نسبت کا معیار پر طالب علم کی علمی صلاحیت کو مد نظر رکھ کر نیز خاص مدت میں مدرسین کی تدریسی ذمہ داریوں کی تکمیل کے پیش نظر اس کا جائزہ لیا جاتا ہے۔ مشهد یونیورسٹی آف میڈیکل سائنس میں فیکلٹیوں کو الگ الگ کر کے اس معیار کے مطابق ہر فیکلٹی کی تعلیمی سرگرمیوں کا جائزہ لیا گیا ہے۔

**نتیجہ:** جنرل میڈیسن اور ڈینٹل میڈیسن کی فیکلٹیوں میں طلباء اور اسٹنٹ پروفیسر اور طلباء اور لکچرار کی نسبت مطلوب رہی ہے۔ دوا سازی کی فیکلٹی میں یہ صورتحال نسبتاً مطلوب ہے۔ نرسنگ، صحت عامہ اور یونانی میڈیسن کے شعبوں میں طلباء اکیڈمیک اسٹاف کی نسبت کی صورتحال مناسب نہیں، پیرا میڈیکل شعبے میں یہ صورتحال نہایت نامطلوب ہے۔

**سفارش:** اس معیار کے مطابق ہم یونیورسٹیوں اور دیگر علمی مراکز کی علمی کارکردگی کا جائزہ لے سکتے ہیں۔ اس معیار کو یونیورسٹیوں میں استعمال کیا جانا چاہیے۔

**کلیدی الفاظ:** معیار، طلباء اور اکیڈمیک اسٹاف کی نسبت، تعلیمی معیار۔

### معرفی شاخص استاندارد دانشجوی به هیات علمی و ارزیابی آن در دانشگاه علوم پزشکی مشهد

**زمینه و هدف:** در ارزیابی واحدهای آموزشی بجای استفاده از شاخصهای تعداد دانشجوی، تعداد رشته ها، نسبت دانشجویان تحصیلات تکمیلی به کل و تعداد هیات علمی، هرم اعضاء هیات علمی و نسبت دانشجوی به کل هیات علمی به تفکیک مرتبه علمی چنانچه از یک شاخص استاندارد شامل تمامی این شاخص ها استفاده شود می تواند در رتبه بندی واحدهای آموزشی کمک نماید.

**مواد و روشها:** شاخص استاندارد دانشجوی به هیات علمی بر مبنای بار آموزشی ایجاد شده بازا هر دانشجوی در مقاطع مختلف و میزان تدریس موظف هر مدرس در مرتبه معین طی رابطه ای معرفی می شود. مقادیر این شاخص برای دانشجویان و هیات علمی دانشگاه علوم پزشکی مشهد به تفکیک دانشکده ها محاسبه و با استفاده از آن وضعیت آموزشی هر دانشکده و دانشگاه از نظر نسبت دانشجوی به هیات علمی بررسی و تحلیل گردیده است

**یافته ها:** وضعیت آموزشی دانشکده دندانپزشکی و پزشکی با استفاده از شاخص استاندارد دانشجوی به دانشیار و دانشجو به استاد مطلوب می باشد. دانشکده داروسازی در وضعیت آموزشی نسبتاً مطلوب، دانشکده های پرستاری، بهداشت و طب سنتی در وضعیت آموزشی نامطلوب و نهایتاً دانشکده پیراپزشکی در وضعیت آموزشی غیرقابل قبول رتبه بندی می شوند.

**نتیجه گیری:** رتبه بندی شاخص مذکور با لحاظ نمودن نسبت دانشجویان تحصیلات تکمیلی به کل دانشجویان می تواند وضعیت واحدهای آموزشی را از نظر تعداد دانشجوی به عضو هیات علمی مورد نیاز با رتبه مشخص بصورت های مطلوب، نسبتاً مطلوب، نامطلوب و غیرقابل قبول نشان دهد. مقدار این شاخص می تواند در طرح راد جهت مقایسه وضعیت آموزشی دانشگاهها استفاده شود.

**واژه های کلیدی:** شاخص استاندارد دانشجوی به هیات علمی، رتبه بندی آموزشی، نسبت دانشجوی تحصیلات تکمیلی به کل دانشجویان.

**INTRODUCTION**

For evaluation of educational courses, different criteria are usually taken into account for students and academic staff. These criteria for student are their numbers, fields, the ratio of post-graduate to all students; and for academic staff are their numbers, their rank in the academic pyramid, as well as the ratio of students to academic staff classified based on their academic degrees. These criteria are presented annually to the trust committee of the universities [1] illustrating several tables for analysing the educational status of the academic courses. Comparison of these criteria among faculties or universities leads to no strict or applicable results, due to their multiplicity and variety; besides, students at various levels and academic staff at various ranks must also be taken into account. In this paper, a standard student-to-academic-staff Index is introduced, including all those criteria regarding the students, their levels, the staff, and their rank. This index can then be used for ranking the educational status of courses and for analysing their need for certain academic staff with certain academic degrees. It can also be used for national educational ranking of universities (the RAD project), which is designed by education vice minister of the MOHME.

**METHODS**

Standard student-to-academic-staff Index has been introduced, based on the educational load of each student at their level and weekly length of time allocated to academic activities by each staff with a certain degree. In this index, students at different levels have been compared with decisive factors of student levels, which is certain based on the capacity of staff, i.e. ratio of students to staff. Presumably, the educational load of 2 PhD or 6 MSc students is equal in terms of the weekly academic activities of a staff member during a semester or a year; we can, then, compare any PhD student with 3 MSc student, or define a decisive factor for student levels as 1:2 for a PhD and 1:6 for a MSc student and similarly for other student levels.

Staff with different degrees can also be compared, using their weekly educational activities. Suppose the educational activity of a professor, associate and assistant professor is 10, 12 and 14 hour/week, respectively. A professor is then 1.2 times an associate professor, and 1.4 times an assistant professor. In other words, the ratio of weekly educational activities of a professor to an associate professor and that of a professor to an assistant professor are 10:12 and 10:14 respectively. Based on these decisive factors, a Standard student-to-certain-staff-degree Index can be introduced as:

$$S.S. \text{ to defined } S.D. \text{ Index} = \frac{\sum_i \text{No. of student at level}_{(i)} \times \text{decisive factor of student level}_{(i)}}{\sum_i \text{No. of staff with degree}_{(i)} \times \text{Ratio of certain staff degree}_{(i)}}$$

Where:

$$\text{Ratio of certain staff degree} = \frac{\text{weekly academic activity of a certain } S.D.}{\text{weekly academic activity of any staff degree}}$$

The data for the calculation of this index have been gathered by Ministry of Health and Medical Education and instructed to be used at universities.

The index value would be 1, if the number of students and staff members are exactly the same as the designated conditions, and would increase by increasing the number of students or decreasing the number of staff members. The educational status of a faculty or a university can be analysed using this index in terms of different staff degree while ranking using the Likert Scale[2]. The index values of less or more than 1, show that there are extra staff or fewer members than the ones assigned by the instructions, respectively. When the index is less than 1, for each 0.1 decrease, there would be 10% extra staff.

The educational status and variation range of students & staff of an academic course can be analysed using ranking index values which are illustrated in table 1. This ranking can help managers and planners to categorize the status of the ratio of students to staff of an educational course.

Table1: Ranking Standard Standard student-to-academic-staff Index value and their educational status and variation range			
Index value	Educational status	Variation range of student & staff members	rankings
1 to 2	student /staff the same as instructions	Up to two times the number of students or half staff or 33% student increase and staff decrease	Very Good
2 to 3	student/staff twice the number of the ones mentioned in the instructions	Up to 50% student increase or 33% staff decrease or 20% student increase and staff decrease	Good
3 to 4	student/staff 3 times the number of the instructions	Up to 30% student increase or 25% staff decrease or 15% student increase and staff decrease	No Good
> 4	student/staff more than 4 times the number of the instructions		Not Acceptable

**RESULTS**

Data for calculation of standard student-to-staff-degree Index were extracted from actual instruction and regulations of Ministry Of Health and Medical Education and Mashad University of Medical School. The number of students per each staff member for different academic levels, presented in table 2, has been issued by education vice minister of MOHME [3]. Based on these data, a student decisive factor can be defined as shown in table 2.

Education Levels	Students per staff member	Decisive factor
Ph.D & post assistant	2	1:2
Medical, dental assistance & Fellow	3	1:3
MSc, MPH, Mphil	5	1:5
General practitioner	6	1:6
BSc	15	1:15
HND	18	1:18

Units	Staff member's Degree
10	Professor
12	Associate Professor
14	Assistant Professor
16	Instructor

Weekly academic activity or teaching hours of the staff members with defined degrees, extracted from academic staff employment regulations[4], have also been presented in table 3.

The number of students at different levels[5] and academic staff members at different degrees[6] in Mashad University of Medical Science and its faculties are presented in table 4. SS to SD Index of MUMS and the faculties have been calculated for defined degrees of professor, associate professor, and assistant professor separately, using student and staff data on Table 2,3 and 4. Results are, thus, represented in table 5.

As the pre-requisite of post-graduate admission in any educational course is the attendance of staff with degrees of professor, or associate professor, to analyse the student-to-staff status, the ratio of post-graduate to to all students should be somehow included. We suggest introducing the effect of different staff members' degree via ranking the index, using one of the three SS to assistant, SS to associate and SS to professor Index, when the ratio of post-graduate to to all students of an educational course is less than 20%, 20-40% and more than 40%, respectively. The educational status ranking of MUMS and the faculties, based on the ranking indexes of table 1 and above-mentioned suggestion, is shown in table 5.

**DISCUSSION**

The results of table 5 shows that educational status of dentistry faculty, providing the use of SS-to-assistant Index, includes extra staff, but with regards to both SS-to-associate and to-professor Indices, it is in status of VeryGood. Therefore, using SS-to-associate and to-professor Indices respectively, dentistry and medical faculty with the ratio of post-graduate to to all students in the range of 20-40% and more than 40% can be ranked as VeryGood.

faculties	Student Levels						Academic Staff Degrees			
	faculties			Post-graduate			Instructor	Assistant prof.	Associate Prof.	Prof.
	hnd.	BSc.	General pract.	MSc, MPH, Mphil	Med & dent assistance & Fellow	Ph.D & post-assist.				
Dentistry			414		107	1	3	50	36	16
Medicine			1577	523	776	217	14	249	173	61
Pharmacy			538	22		73	1	17	11	15
Nursing	1	1020		233		47	49	4	3	
Traditional Medicine						35		7		
Health	27	518		122			6	5	6	
Para-medical	1	953		29			5	5	1	3
Mashad University of Medical Science	29	2491	2529	929	883	373	78	337	230	95
			7234					740		

Table 5. Educational ranking of MUMS &amp; its faculties based on Standard Student-to-Staff Index

faculties	Post-graduate to all student Ratio	S. Student to Asisstant Prof. Index	S. Student to Associate Prof. Index	Standard Student-to-prof. Index	Educational status ranking
Dentistry	20.7	0.9	1.0 ®	1.3	VeryGood
Medicine	49.0	1.3	1.6	1.9 ®	VeryGood
Pharmacy	15.0	2.5 ®	2.9	3.5	Good
Nursing	21.5	2.9	3.4 ®	4.0	NoGood
Traditional Medicine	100.0	2.5	2.9	3.5 ®	NoGood
Health	18.3	3.6 ®	4.2	5.0	NoGood
Para-medical	3.0	4.8 ®	5.6	6.7	NotAcceptable
Mashad University of Medical Science	30.2	1.6	1.8 ®	2.2	VeryGood

®- Index used for educational ranking

Faculty of farmacy with ratio of post-graduate to all student less than 20% using SS to assistant Index and will be graded to Good educational situation. Using SS-to-associate, SS-to-assistant and SS-to-professor Indices respectively, faculties of nursing, health and traditional medicine with different ratios of post-graduate to to all students are in the status of NoGood.

Paramedical faculty with 3% post-graduate to to all students and considering the SS-to-assistant Index is ranked as NotAcceptable.

Finally, the educational status of of MUMS with 7 faculties and post-graduate to all students of about 30% is ranked as Good, using SS-to-associate Index.

## DISCUSSION

Standard Student-to-Staff Index could be calculated based

on the number of students at different levels as well as the academic staff's degree. Index value of courses shows that the number of students and staff are the same as regulation criteria. Index value of less than 1 shows existance of extra staff and more than 1 indicate shortage of academic staff. Student-to-staff status of educational courses could be ranked as VeryGood, Good, NoGood and NotAcceptable, drawing upon this Index and the ratio of post-graduate to all students. This Index can also be used in RAD project in order to rank student-to-staff ratio of the universities.

## ACKNOWLEDGEMENTS

The autours would like to thank all personnel of the student affair and academic staff affair offices of the MUMS.

## REFERENCES

1. Shabestari M. Annual activity report of Mashad University of Medical Science. Secreteriate of MUMS trust committe, 2014.
2. Albaum G. The Likert scale revisited: an alternate version. *J Market Res Soc* 1997; 39(2): 331.
3. Mohagheghi. Education Vice Chancellor of Ministry of Health and Medical Education. Letter No. A/1/19310. [cited 14 Oct 2000].
4. Act-104. Academic staff employment regulations for university and research centers. Ministry of health and medical educations, sep.2011.
5. Ghavami H. Student affair of MUMS. [cited 2013]. Available from: URL; <http://stu.mums.ac.ir/stcrss/authenticate.php>
6. Hajizadeh-Saffar M. Staff affair manager of MUMS. [cited 2013]. Available from: URL; <http://emp.mums.ac.ir/itmanagment/PersoneliSystem.aspx>. Academic