

Quantification of Efficient Research Space Usage and its Impact

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I am sure that there have been several attempts here and elsewhere to find some simple solution to research space distribution problem. We know whenever there is debate on Research Space it raises lots of passion and most of the time such debate ends into pointing finger at each other but little progress towards a just solution. So this discussion will be another attempt to find simple solution or at least take debate on this issue in constructive direction which may yield a stable solution.

- Current ad hoc system of space allotment often leads to difficulties like some feel that they have too little while other has plenty of underutilized space.
- Major disadvantage of this system is that it does not clearly identify underutilized research space, as there are no attempts to quantify Efficient Research Space Usage.
- Any good solution to space problem should identify efficient user of research space and also pinpoint most underutilized research space.
- So the Question is: - Can we solve this problem in quantitative manner which will lead to better research space usage in the department and also help HOD to take quick decision in transparent manner?

Possible solutions:

- To start with one can have list of all rooms in the Department and their respective area in square meters and name of faculty posses them.
- BUT, Will this be sufficient in a situation where lab is converted to office space or vice versa, some have their corridors, stores, discussion rooms, secretary room etc.?
- How to characterize **Research Space with Individual Faculty (RSIF)**?
- Solution could lie between taking Research lab, discussion room, secretary room or any room you hold the key as Research Area while fraction (say half) of area of corridors which one might have blocked form common excess etc. This data on area will give us amount of area with individual faculty.
- If we divide area with individual faculty with mean area per faculty we will get relative area in possession with individual faculty. This list will provide distribution of research space among various faculties.
- Some will point out how one can use this list of relative area allotment as it does not reveal if this area is used efficiently or not! Think of an extreme situation just a lock in hanging on door forever!
- So, we are still left with question without answer - Are we using our research space efficiently or productively?
- What are factors that can be used to define research efficiency/productivity for research space purpose? Existence of Faculty itself is a part of it as he/she has potential to take research students and must be doing some work (**F**), Number of registered Ph.D. and M.Phil. students working with him/her (**N_s**), Number of publications (**N_p**), Number of Projects (**N_{pr}**) and Number of Patents (**N_{pt}**) etc. This data can be obtained in averaged manner-where average is taken over a period say last five years. Each factor contributing will be allotted a weight, as all are not equally important. This list will make a list of **Research Productivity Number (RPN)** for each faculty.

- How to formulate **Efficient Research Space Usage Factor (ERSUF)**?
Answer: Efficient Research Space Usage Factor

$$= \frac{\text{Mean Research Area per Faculty}}{\text{Research Space with Individual Faculty}} \times \text{Research Productivity Number}$$

More details and examples:

- Raw **Research Productivity Number(RPN)** in term of relative weights of *i-th* contributing factor (W_i): $RPN = F + W_s * N_s + W_p * N_p + W_{pr} * N_{pr} + W_{pt} * N_{pt}$
- **Mean Research Area per faculty(MRA)** = Total research area/Number of faculties

- **Efficient Research Space Usage Factor(ERSUF)**= $RPN * (MRA / RSIF)$
- Possible formula for weights in efficiency factor could be discussed further.
- One possibility is that weight of student (W_s) is taken as **1** while other weights are:

$F=4$ (*Faculty*), $W_p = 1/2$ (*Publications*), $W_{pr} = 1/2$ (*Projects*), $W_{pt} = 1/4$ (*Patents*)

- Another possibility with unequal weight for Professor, Reader and Lecturer as university allows different number of students with them

$F=5$ (*Professor*), $F=4$ (*Reader*) or $F=3$ (*Lecturer*),

$W_p = 1/2$ (*Publications*), $W_{pr} = 1/2$ (*Projects*), $W_{pt} = 1/4$ (*Patents*)

- **Efficient Research Space Usage Factor (ERSUF)** for first case is

$$ERSUF = (4 + N_s + N_p/2 + N_{pr}/2 + N_{pt}/4) * (MRA / RSIF)$$

Examples:

1. If ratio $MRA/RSIF=2$, $ERSUF = 2 (4 + N_s + N_p/2 + N_{pr}/2 + N_{pt}/4)$
2. If ratio $MRA/RSIF=1$, $ERSUF = (4 + N_s + N_p/2 + N_{pr}/2 + N_{pt}/4)$
3. If ratio $MRA/RSIF=1/4$, $ERSUF = 1/4 * (4 + N_s + N_p/2 + N_{pr}/2 + N_{pt}/4)$

Possible impact and benefits of listing of ERSUF:

- It can act as transparent yardstick of any research space allotment and it will prevent HOD from unnecessary pressures during such decisions as this will be very impartial list.
- It has great potential to unlock lots of underutilized research space in department.
- It will reverse the trend of research space grabbing tendency in department.
- If one asks for more space it will be decided on the basis of this ranking and genuine case specific requirements.
- If any faculty is about to retire or have retired and is not allowed by university to expand his/her group in department he/she may improve his/her ranking and goodwill by transferring part of your space.
- Faculty with lowest ranking could improve their ranking by surrendering part of their space to improve ranking or may be asked by HOD to do the same in case of need for research space in the Department.
- Top three ranking faculty can be opted as space committee members under HOD.
- Finally, System which promises progress of institution/department should be preferred over retrogressive one.

This material was presented in the staff council meeting held on 27 Sept.2005 on Research Space problem in the Department of Chemistry. I appreciate constructive suggestions offered by my colleagues for this article.