

EdCW 2020**International Scientific and Practical Conference Education in a Changing World: Global Challenges and National Priorities****DEVELOPMENT OF CONCEPT MODEL FOR EVALUATION,
ENHANCEMENT AND PROMOTION OF UNIVERSITY
TEACHERS**

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Abstract

Mongolian universities are at the edge of huge paradigm shift that leads significant changes in academic work. Therefore, new conceptual model accounting complex and changing nature of academic work is need to be developed. The current study is purposed to develop concept model for evaluation, enhancement, promotion of university teachers, and for accelerating the leadership. The concept model was developed based on the idea derived from "Think Thank" group of Mongolian University of Science and Technology. A number of studies and international sources related teacher development framework, teacher's standard and teacher leadership were investigated over past 5 years. Developed concept model starts with defining university-department-professorship relationship and further extended identifying university professor's five core roles. Professor's workload capacity was expressed by function with 5x5 matrices defined by professor's responsible activities as well as their coefficient of activity types, which can be used as key performance index. The model offers opportunities to develop quantitative assessment tool for professor's performance, to enhance human resource management system, and to update existing compensation or leadership promotion system. The developed concept model can be used as a benchmark for further development of professional development framework, university teacher standard, as well as national system of HE capacity building.

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1. Introduction

The concept of effective leadership has become increasingly embedded to the educational improvement. It is evident from international studies that the effective leadership provide powerful indirect influence on school improvement and on the student learning achievement (Daniëls et al., 2019). Specifically, the teacher leadership suggests that teachers hold a central position in the ways schools operate and in the core functions of teaching and learning (Wenner & Campbell, 2017). Moreover, leadership has been identified as leverage for transformation, organization culture forming, and community building (Lesinger et al., 2016). Literature survey believes that education leadership is necessary if change is to take hold (Sagnak, 2016). Therefore, leadership should be considered as a key for successful educational improvement, especially in this era of educational paradigm shift.

Mongolian higher education (HE) system and universities were originated from the HE system of old Soviet Union, in which the universities focused primarily on teaching. Whereas the Academy of Sciences and its specialized research institutions, which were not part of the HE system, conducted research. As a result, research functions and graduate programs at universities are underdeveloped (Sumberzul & Oyunbileg, 2018). Recently, Government of Mongolia started focusing on enhancing research capacity of Mongolian universities (Zoljargal, 2020). Ministry of Education launched a “National Program on Research Universities (2018–2022)”. Thus, Mongolian Universities are at the edge of huge shift that defined as a transformation of teaching university into research-oriented university. Moreover, triple helix model of university-industry-government interaction becoming a benchmark for innovation development process (Leydesdorff, 2018) Therefore, universities are also challenged to be entrepreneurial university.

Teaching to research or innovation transformation is not only challenge in Mongolian HE. Sustainable development goal (SDG) forced universities to increase their civic contribution and thus the civic engagement becoming another major challenge at universities (Zamora-Polo & Sánchez-Martín, 2019). Rapid changes of information technology already had significant impact on HE. Current pandemic situation of COVID-19 accelerated use of ICT in HE. Invasion of technology in education reshaped HE system and leading to the teaching to learning transformation (Ossiannilsson et al., 2016).

These unprecedented challenges and paradigm shift in HE sector forced us to rethink changing aspect of academic work. Coaldrake and Stedman (1999) well outlined main aspect of changes in academic work considering pressure on time, workload, ethical issues, performance, professional standard, accountability, specialization and complexity of university work, diffusion and blurring of academic staff role.

2. Problem Statement

An existing system of workload allocation, performance evaluation and promotion, as well as compensation in Mongolian HE sector generally accounting teaching role of university professor. Most of teachers complain about misjudgment of performance evaluation and compensation system, which is one

factor for leadership development as a key motivational driver. Therefore, new conceptual model that accounts changing nature of teacher's role is necessary.

3. Research Questions

- What will be future role of university teachers?
- Can we model complex academic work capacity using single form of algebraic equation?
- What can we do using such model if we succeed to develop generic model?

4. Purpose of the Study

The purpose of current study is to develop concept model describing of complex academic work of university teachers that can be utilized performance evaluation, leadership enhancement, human resource planning as well as merit compensation at universities.

5. Research Methods

An idea to develop concept model was derived from “Think Thank” group of Mongolian University of Science and Technology (MUST), the group of individuals who purposed to change an existing performance evaluation system of university teachers at MUST. A number of surveys and face-to-face discussions to identify drawback of existing performance evaluation system were conducted.

National policies and initiatives on HE (Government policy on science and technology, 2014-2025; Government policy on innovation, 2018-2025; National program on research university, 2018-2022; National human resource development program in science, technology, and innovation, 2019; SDG-2030 Mongolia; Vision-2050 Mongolia long term development plan, etc.) were reviewed to define future changes in HE and in teacher's role.

To evaluate international trends in HE, paradigm shift or challenges facing at universities, and changes on academic work of university teachers the group were reviewed international studies (Koster & Dengerink, 2008; Lindberg-Sand & Sonesson, 2008), teacher development frameworks (Aitken & Tatebe, 2014) and international standards for teachers including (Lifelong learning, U. K., 2009; Henderson & Jarvis, 2016).

Finally, we tried to demonstrate university-department-professorship relationship, future role of university teacher, teacher's workload capacity. The workload capacity model was expressed using general equation of matrix.

6. Findings

Developed concept model defining relationship between university-department-professorship was shown in Figure 01. At macro level, university can be viewed as a system consisted of 1) governance & management-investment, 2) institutional development-human resource planning, 3) internal institutional aspect- culture or ethics, 4) external institutional aspect-law legislation and 5) infrastructure- campus or platform.

At meso level, the departments are core engine of university where 1) excellent researchers, 2) righteous leaders, 3) teaching individual with effective pedagogue, 4) professional advisor, and innovative engineers should be accumulated.

At micro level, the final unit of university should be professorship, in which professors need to do five main activities including emerging innovation, adequate research, efficient teaching& learning, professional service, and civic contribution or engagement.

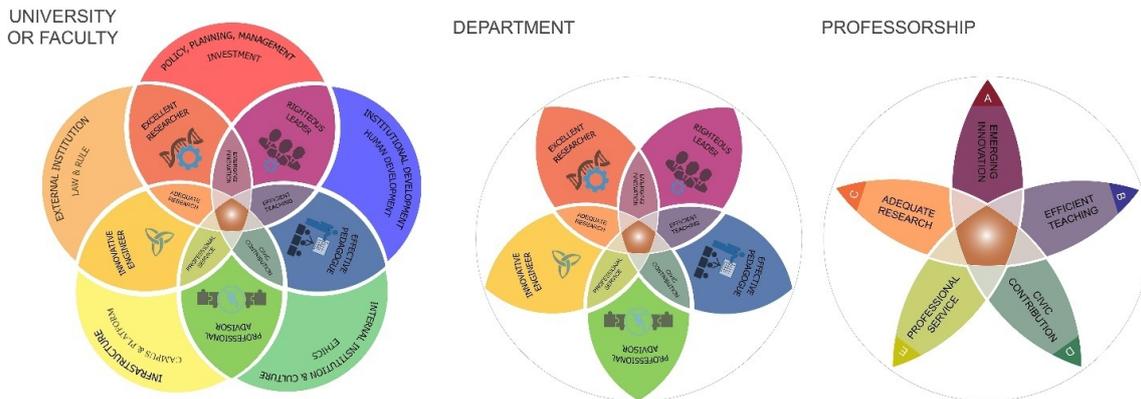


Figure 1. Definition and relationship between university-department-professorship at macro, meso, and micro level

To define workload capacity of university teacher, let's express teachers or professor's five roles as x_1 -teaching& learning, x_2 -research, x_3 -innovate, x_4 -professional service, and x_5 -civic contribution or engagement. In simple form, the teacher's workloadcapacity can be expressed as

$$a_1*x_1 + a_2*x_2 + a_3*x_3 + a_4*x_4 + a_5*x_5 = f(x) \quad \text{eq.1}$$

where, suppose a_i is a coefficient of power indicating the importance of related activities. However, problem arise from that all x_i teacher's activities are inter-related. For instance, which category will be if teacher's performance related pedagogic innovation, is it registered in teaching- x_1 or innovation- x_3 ? Or, what is main activity category if the teacher performs research that facilitate civic engagement, is that research- x_2 or civic contribution- x_5 ? Same problems are derived from all x_i . The main drawback of current performance evaluation system, where all teachers complain about misjudgment, is originated from the system does not consider above mentioned inter-relation.

To create more flexible performance evaluation system, accounting complex nature of teacher's role, that can further accelerate teacher leadership, we extended the simple form of workload capacity equation in multi-dimensional matrix form as follows

$$\begin{aligned}
 a_{11} \cdot X_1 + a_{12} \cdot X_2 + a_{13} \cdot X_3 + a_{14} \cdot X_4 + a_{15} \cdot X_5 &= f_1(x) \\
 a_{21} \cdot X_1 + a_{22} \cdot X_2 + a_{23} \cdot X_3 + a_{24} \cdot X_4 + a_{25} \cdot X_5 &= f_2(x) \\
 a_{31} \cdot X_1 + a_{32} \cdot X_2 + a_{33} \cdot X_3 + a_{34} \cdot X_4 + a_{35} \cdot X_5 &= f_3(x) \\
 a_{41} \cdot X_1 + a_{42} \cdot X_2 + a_{43} \cdot X_3 + a_{44} \cdot X_4 + a_{45} \cdot X_5 &= f_4(x) \\
 a_{51} \cdot X_1 + a_{52} \cdot X_2 + a_{53} \cdot X_3 + a_{54} \cdot X_4 + a_{55} \cdot X_5 &= f_5(x)
 \end{aligned}
 \tag{eq.2}$$

In equation 2, a_{11} , a_{22} , a_{33} , a_{44} , and a_{55} diagonal coefficients can represent directly related activities of teaching, research, innovation, professional service, and civic contribution, respectively. While, other a_{ij} coefficients can represent distinguished inter-related activities. For example, a_{12} indicates activities related teaching-oriented research (such as: educational research, pedagogic studies etc...). In other hand, a_{21} indicates activities related research-oriented teaching (such as project based teaching in graduate program). a_{13} indicates teacher's activities related teaching-oriented innovation (such as: implementing ICT in teaching program or introducing new innovative teaching pedagogy). While, a_{31} indicates innovation-oriented training (such as: training to adapt new technology in teaching practice). So forth, all distinct characteristic of a_{ij} can be defined.

All x_i , the list of HE teacher's work activities, can be determined from current database. Let's assume that we can divide those list of work into respective a_{ij} categories. In such case, the purposed workload capacity equation is solvable and can be used as a quantitative tool for performance evaluation as well as merit compensation. However, determining optimum value of coefficient a_{ij} that is suitable for every HE institution is impossible. Universities can decide power of a_{ij} coefficients (ranged from 1 to 10) based on their primary strategic direction and internal as well as external legislation. For example, in case of MUST which strategically planned to increase their research capacity, coefficient a_{12} or a_{21} can be chosen as higher as possible. Controlling these power coefficients in workload capacity model may allow HE institutions to control their achievement of strategic plan.

The workload capacity model, the numerical equation, can only be quantitative tool to evaluate HE teacher's performance. Thus, we assume there is a need of visually designed tool to promote faculty development, to increase leadership, to facilitate teamwork, and to compare departments or schools for increased competition as well as cooperation. Therefore, the concept of penta persona (PP) data analyzation and visualization tool was implemented in this study (Figure 02). PP has five axes including A (innovation), B (teaching & learning), C (research), D (social service or contribution), and E (professional service), respectively.

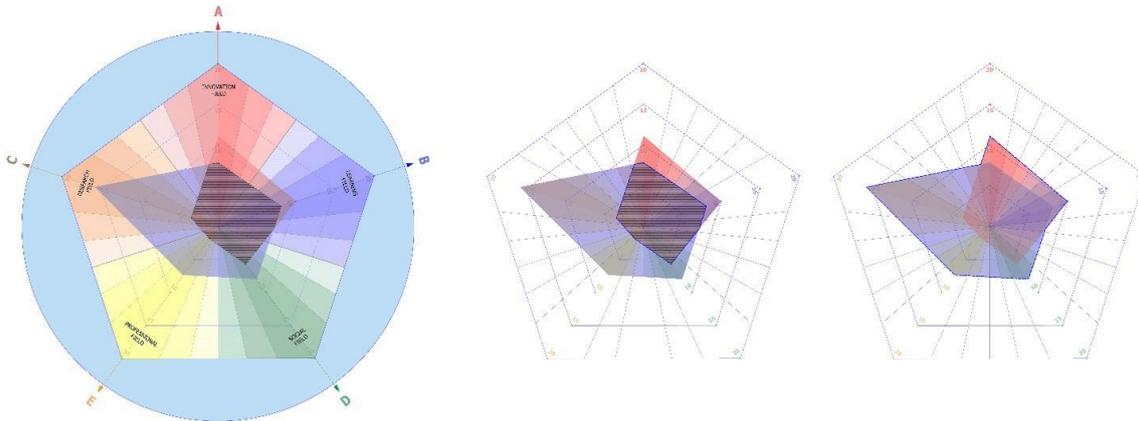


Figure 2. Concept of penta persona (PP) data analysis and visualization tool

In Figure 2, an example of performance comparison between two distinct professors was provided. Suppose that the numerical value at each five axes were quantified from workload capacity model. For instance, numerical value of Aaxis, which is innovation, can be calculated using equation 3.

$$A = \sum f(a_{i3}, a_{3j}) \quad \text{eq. 3}$$

Where, all element of column 3 and row 3 in matrix should be considered (Figure 03).

$$\begin{aligned} a_{11} \cdot x_1 + a_{12} \cdot x_2 + a_{13} \cdot x_3 + a_{14} \cdot x_4 + a_{15} \cdot x_5 &= f_1(x) \\ a_{21} \cdot x_1 + a_{22} \cdot x_2 + a_{23} \cdot x_3 + a_{24} \cdot x_4 + a_{25} \cdot x_5 &= f_2(x) \\ a_{31} \cdot x_1 + a_{32} \cdot x_2 + a_{33} \cdot x_3 + a_{34} \cdot x_4 + a_{35} \cdot x_5 &= f_3(x) \\ a_{41} \cdot x_1 + a_{42} \cdot x_2 + a_{43} \cdot x_3 + a_{44} \cdot x_4 + a_{45} \cdot x_5 &= f_4(x) \\ a_{51} \cdot x_1 + a_{52} \cdot x_2 + a_{53} \cdot x_3 + a_{54} \cdot x_4 + a_{55} \cdot x_5 &= f_5(x) \end{aligned}$$

Figure 3. Case of calculating numerical value of A axis using equation 3 for penta persona

To our understanding, PP data analysis and visualization tool provide several advantages.

- First, for micro level (Figure01), individual professor can see where they are for each 5 axes in comparison with colleagues. This will stimulate self-motivation and leadership enhancement of faculty members. It may be providing opportunity to decide who should he or she team up to increase their capacity.
- Second, for meso level (Figure01), departments can identify their current competence using intersection shape area or can see their future development potential using united share area (Figure 02). Showing department to department or school to school comparison via PP

visualization tool will eventually lead competition, which is important factor for educational improvement.

- Third, for Macro level, purposed PP data analyzation and visualization tool can be used as human resource management tool for capacity building, performance monitoring, leadership enhancement, to assess departments by making analyzes faculty members.

7. Conclusion

Conceptual model that can be used for developing teacher's performance evaluation & promotion, leadership enhancement, and merit compensation system at universities was developed by defining teacher's workload capacity equation in multi-dimensional matrix form. The concept of penta persona data analyzing and visualization tool was also introduced to promote faculty development, to increase leadership, to facilitate teamwork, and to increased competition between departments. Developed model can be used as a benchmark for further development of professional development framework, university teacher standard, as well as national system of HE capacity building.

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