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MULTICRITERIA DECISION ANALYSIS FOR SOCIAL ORIENTED DECISION MAKING. THE COMPROMISE FOR TEACHER'S SALARIES

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Abstract

Seeking mutual social understanding, to increase trustfulness between politicians and others decision stakeholders the interactive decision making model for social oriented problem solving is elaborated. The MCDA based decision making process creates comprehensive, productive, less tension environment for discussions. The elaborated decision making model was demonstrated seeking to pick up the teachers payment scheme acceptable for teachers and represented by present status of educational reform and would be in line with social equity. The main emphasize is put on the teachers as decision actors which input is valuable seeking the proper decision. Proposed model helps to pick up the alternative teachers payment scheme, based on fixed salary component with additional payment for supplement excessive work. The MCDA decision making model implementation conditions are discussed. Trade union could be the organizations that stimulate public administration bodies to use logic decision making models and prevent the issues turned to the problem, if politicians and administrators are not self reasoned.

Keywords: multicriteria analysis, decision making, teachers' payment scheme.

Introduction

The teaching quality and teacher's competence have considerable attention from policy makers and society in recent years. Productive discussions on teaching quality should be accompanied by discussions about the proper way of teachers' compensation for their inputs. Monetary compensation could be the one obvious policy tool dealing with teaching quality insurance (Clotfelter, 2008). While monetary compensation degree could be aligned according to market incentives and the room of state budget.

Permanent reforms of education system and new legislations, high standards and teaching quality requirements, hide the perception of teacher as individual proper actor in education policy decision making process. Teachers' society claims that they feel lack of consideration to their problems from the state government which elaborate education policy, from the local authorities, responsible for financial aspects of strategy implementation, from the school leaders who are in tight contact with single teacher, while education issue is on every day agenda.

Educational sector could be considered as the low-wage public service sector both in Lithuania and in other countries (Rogers, 2009). The state budget is always finite and it is very unlikely that it will be sufficient for every claim. State government should balance urgent demands of other state sectors and saving public finance, what put government in opposition of teachers' claims, and provoke dissatisfaction of teachers. The one way to reach consensus on changes the teachers' monetary compensation system is social negotiation.

The last "round table" negotiation on teachers' salary wages in Lithuania took part at 2008 as urgent Government reaction to teachers' country wide strikes. The consensus was reached and "The long-term programme for teachers' wages increasing" was adopted. Teachers' interests were represented by trade unions. Respecting the added value of trade unions participation in negotiation process we need to underline, that teachers society was not identified as decision making process actors.

To identify unprejudiced solutions, to smooth process of negotiation and to make social compromise between interest parts, the special approach for social decision making process is needed. Wider participation would secure that teachers' expectation and long lasting experience knowledge enrich decision. On top of all that the special approach should make decision making process more transparent and particular decision more understandable. The above mention presumption could fulfil by multicriteria decision analysis (MCDA) as method for process modelling. Seeking to balance social negotiation process, MCDA is studied and demonstrated as social structured approach to reach the mutual understanding.

The **goal** of this paper is to outline the main principles of social oriented decisions and elaborate interactive decision making model based on MCDA seeking mutual social understanding. The MCDA approach was demonstrated as a decision making tool for teachers payment system determination using their own preferences via making teachers active participants in decision making process.

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Methodological approach

MCDA was chosen as methodological approach for modelling decision process. There are plenty practical applications of MCDA, solving social oriented problems on state and local government issues around the world. This method was adopted for priority setting for Australian public administration as tool for problem solving (Mabin & all, 2001), the sediments contamination management were defined by MCDA in USA (Linkov and all, 2006), sustainable land policy planed in Germany (Henn & Patz, 2007), bioenergy system assessment was done in Uganda (Buchholz & all, 2009), application for social problems (Munda, 2004). MCDA has been proved to be very applicable tool for creative and innovative thinking (Čančer & Mulej, 2006).

MCDA is a decision support tool to structure the complex multi criteria problem. Procedure include breaking the problem into smaller analyzed parts and evaluating number of alternatives as single possible solutions again certain number of criteria's. MCDA application requires being precise during decision making process management, proper decision actors' identification and involvement and MCDA methodology.

One of the most widely applied sets of MCDA is the multi-attribute utility theory (MAUT) (Malczewski, 1999). Every alternative is evaluated according to its value and criteria weights. The alternatives are ranked with respect with their values.

The utility function is written:

$$U_i = \sum_j w_j \cdot u_{ij}$$

where U_i is the overall value of the i^{th} alternative, u_{ij} is the utility of the i^{th} alternative with respect to the j^{th} criteria measured by means of the utility function, and the weight w_j is a normalized weight or scaling constant for criteria j, so that $\sum w_j = 1$.

Model for social decision making

Single case of MCDA is social multi-criteria decision making method, which integrate different presumptions, mathematical functions and results interpretations. To choose MCDA for further development encouraged that MCDA enable to measure immeasurable quantities solving social oriented problems. It permits to take in to account sometimes confronted aspects and make agreed priority list.

The MCDA application for social oriented problems needs to enclose supplement procedures and particular presumptions. Two aspects, namely expert involvement and process constuction are the most sensitive for proceeding.

Experts. Since social oriented problem is characterized by set of aspects, which generally is immeasurable, the uncertain criteria's are evaluated by experts (researchers together with decision actors/stakeholders). Human personal knowledge and opinions are transforming to quantitative parameters. The room for new innovative alternative solutions, based on experts' experience, scientific knowledge and decision actors concern is creating. Application of method relies on the assumptions that decision-maker (participants of decision making process) is rational, his preferences do not change and he has perfect knowledge.

Process. Except formal procedures, such as goals, alternatives, criteria's evaluation, the process, actors' composition, their interactions are of main interest. Emerged tensions among actors are easier to control when process is arranged in high transparency environment, the participation rules and decision seeking methods are described clearly and documented in advance, actors are reasoned to solve the problem and the goals are conceptualized.

When constructing decision making process, we were guided by several essential principals:

- model must be as simple as possible to guarantee transparency;
- weights in this framework are clearly meaningful only as importance coefficients.

The MCDA framework must be accompanying by additional steps carefully put in to execution. These steps are decision actor's identification, actors-expert relationship establishment and involvement in proper step, result interpretation. The most substantial aspect is proper actors' composition involvement in proper decision making model stage.

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We are proposing seven stages MCDA based decision making model with integrated view to decision actors and their involvement (see Figure 1). The right side of diagram shows the composition of decision actors necessary to involve in each decision stage.

The first stage is problem analyses. First of all decision-makers should analyze the problem and decide what is expected at the end of problem solving and what is important for different decision actors. Problem analysis is accompanying by different stakeholders identification and the full set of actors composition.

The second stage is definition of goal and objectives. The outcomes of decision making process directly depend on the goal defined at the beginning of the process. It needs to be underlined, that goals definitions should be agreed upon all decision problem actors. So it is critical for success that stakeholders were identified and involved before goals are conceptualized. Otherwise we have risk to lost consensus at any further stages of decision making process.

The third stage is identification of set of evaluation criteria that are relevant to the goal. To increase precision for deeper characterization certain criteria, sub-criteria can be introduced.

The fourth stage is construction of alternatives. Every alternative should incorporate the single possible and acceptable solution. The third and fourth stages could be leaded by experts with close cooperation with stakeholders.

The fifth stage is alternatives and criteria scoring and weighting by stakeholders.

The sixth stage. The MCDA finalized by evaluating each alternative upon weighted criteria.

The seventh stage is social interpretation of alternatives. After evaluation of alternatives the decision makers have whole ranked list of alternatives as possible solutions and could choose the most optimal one

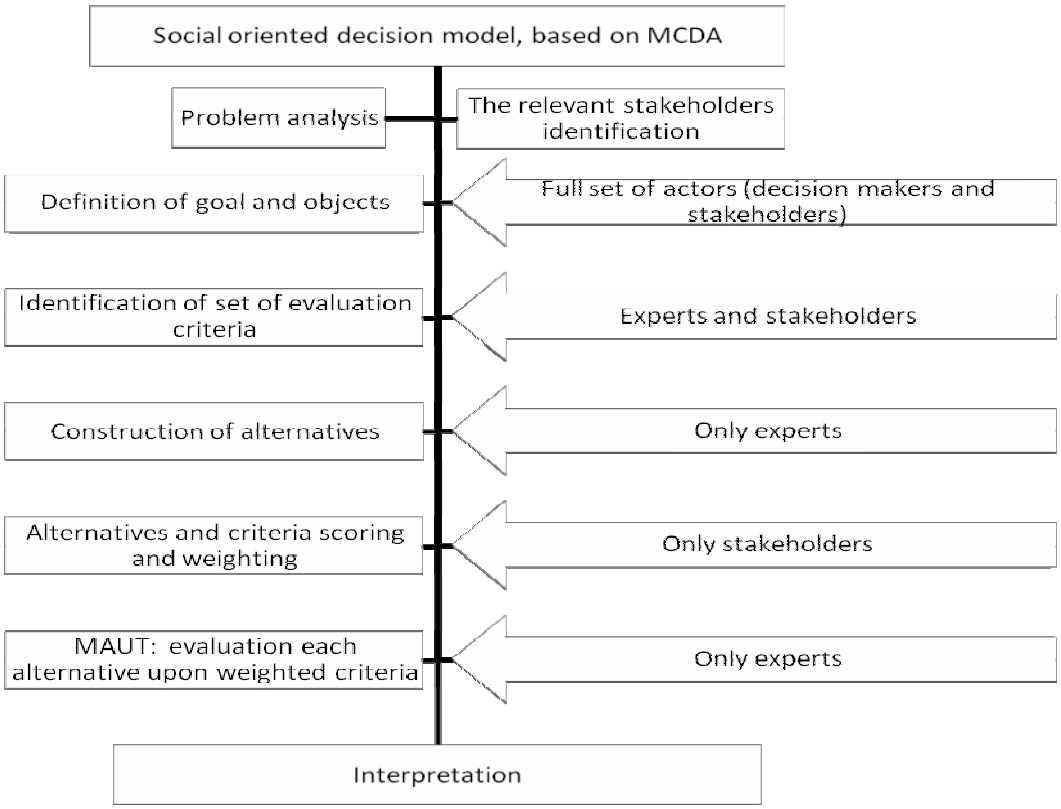

Figure 1. Social oriented decision model

Decision making process initiator has possibilities to bring in the experts from the outside with certain mission in to process. The experts-leaders could be specialists that have confidence in the eyes of the every actor of decisions making process. The main expert responsibility is suggesting process scheme, generating possible alternatives and criteria's, implementation of MCDA and coordinate the whole process from the managerial side.

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Implementation conditions. Trade union inspired bargaining while MCDA based decision making process is complementary and competing processes for seeking social decisions. It is needed to highlight difference between social decision model and bargain. For long standing issues, when these issues turn to the problem for any stakeholders, the bargaining is effective way to solve it. But the democratic decision making process must be the preference for politicians seeking to balance the interests at proper time and proper ratio. Effective public administration being responsible for consistent progress of certain sector, have the mission to identify the problem at the original stage and prevent the issue becoming chronic when cure is long and painful. In such case, the motivation to use scientific models is self reasoned. Otherwise the counterbalance mechanisms are necessary and could be realized by trade unions. The role of trade union bodies in the collective bargaining and social dialog is expanded in recent years, when lifelong learning and training aspects become the object of bargaining (Heyes, 2007). The introducing new methods in to policy decision making process could be the new object of trade union, when public administration bodies are passive. The expending the union mission is under discussions (Koppich, 2005).

Example of model application

This section is devoted to demonstrate how in previous section proposed model could be used to solve real policy issue, e.g. teachers' payment scheme determination.

1. Problem analysis.

The situation in education sector dramatically changed during the last few decades, though there are some systemic issues needed to be improved. That is sector funding. Although the national education budget have been increased by 52 % from 2001, but the percentage of education funding according GDP was annually decreased. Education funding level has direct impact on teachers' payment schemes and wages.

Legal teachers' payment scheme in Lithuania depends on amount of contact teaching hours, qualification and years of teaching experience. Similar payment system is used in higher education sector, with higher wages range.

Position based new payment system was introduced in 2007 as pilot project in 12 Lithuania schools. This scheme has similarities with tenure and is based on precisely countering every any activity that can rise during teaching process and this system is stimulating teachers to work excessively more hours.

While the world wide policy trends are to make connection between payment system to teaching: UK case at 2000 (Adnett, 2003) and some cases in USA (Clotfelter, 2008), teachers payment system in Lithuania is not performance related (Mikulskiene, in press), e.g. pupil's academic progress has no impact on salary level. So practice transfer from other public sectors is of an advantage. Public administration sector uses payment system, which is based on fixed part and extra payment. Extra payment is determined for overtime working, long-term working experience in the sector and 20 grade qualification scales.

Relevant stakeholders. Interest part as decision making actors could be named: public, government, school leaders, teachers and professional organization of teachers.

1. The public at large concern teacher salaries from the perspective of public finance which consist of tax level.
2. Government concern from the point of state budget composition and balancing saving the extra funding for new or devastating sphere.
3. School leaders are concerned by the quality level of the personnel of their teaching institution since salaries or bonus system could effect it directly.
4. Teachers concern about salaries as the salary level realized their expectation as consumers and realization as individuals. The salaries as the source of physical fulfillment relative to their perceptions of self-worth both an employee and as an individual (Young & all, 2004).
5. Teachers' trade unions concern by the interest of their members to secure salaries, benefits, working conditions and so on what is concerned of single teacher but in great power as union organization (Rogers, 2009).

During the ideal democratic decision making process all above mentioned stakeholders could contribute their input to the problem solving. The attempt to recognize teachers as key players in reforms are not completely new. USA policy makers attribute this role to teachers in charter school reform (Malloy & Wohlstetter, 2003). However, in Lithuania this recognition has some restriction. The legal status of trade union as associated body overshadows the added value of teachers' knowledge in to decision making process.

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2. The goal.

The topic of teachers' salaries provokes many different aspects. It is possible to pursue different goals: to save public finance via minimisation of education sector funding, to create completely new teachers payment system based on the new introduced reforming aspects. But since policy makers have no intention to stimulate policy intervention via introducing new payment system and taking in to account steadily increase dissatisfaction of teachers concerning salaries, the urgent matter is social equity via compensation system in comparison with others public sectors.

Generalizing, the goal of modelling decision process is: *from the range of possible payment system schemes to pick up this teachers' payment system, which could be acceptable by teacher, represent present status of educational reform and would be in line with social equity.*

3. The set of criteria.

There are certain groups of factors what should be considered when compensation discussions are underway. There are plenty of studies that revealed teachers preferences for higher salaries, better working conditions and greater intrinsic rewards (Borman & Dowling 2008). The criteria set was developed taking in to consideration the quality of working life concept with their factors: 1. consideration of work, 2. emotional state, 3. learning and improvement, 4. social relationship in the organization, 5. self-realization, 6. physical state, 7. safety and work environment (Gilgeous, 1998). It is proved that quality of working life could be improved by balancing of all factors in proper way and reaching higher level of employees' motivation and even loyalty (Akranavičiūtė & Ruževičius, 2007). Compensation consideration is the one of work quality factors and must be analyzed in aggregate system. It means, that certain payment system could be balanced by others factors secure social equity. The set of criteria was agreed with teachers during semi-structural one hour length interviews. Interviews were designed to gather information regarding matters what further could be qualified as criteria's for decision process.

7 groups of criteria were elaborated:

1. financial stability;
2. long-term teaching experience;
3. high competence standards;
4. qualification evaluation;
5. creation and innovation;
6. society respect;
7. profession engagement.

4. The alternatives.

Talking about social equity it is obvious anticipate that payment or compensation principles applied around public sectors, which are funded from state budget, must be comparable, good practice could be transferring when appropriate or inequity aspects are eliminated. Formulation of alternatives inspired by professional discussions in press, on political (Governmental) level and analyses of valid systems used in other public sector, as public administration and higher education. For alternatives formulation the present legal basis was taken in to consideration. Public administration and teachers payment systems both are comparable with slightly unequal compensation for experience component (Mikulskiene, in press).

Three alternatives as possible solutions have been formulated.

Alternative 1. Teachers payment system, based on present legislation – teachers salary depends on contact hours, qualification and years of teaching experience.

Alternative 2. Teachers payment system based on fixed salary component regarded as wider range of qualification scale (according public administration payment scheme).

Alternative 3. Teachers payment system depends on position based (tenure equivalent) (according Government pilot project).

5. Alternatives and criteria scoring and weighting.

Criteria measurement was based on the teachers' preferences which were transferred to certain criteria weight average value.

For quantitative study (alternatives and criteria scoring), questionnaire was designed according quality of working factors. For this decision making stage teachers preferences were consider as main source of input. Responders were asked to indicate what suggested alternative they prefer to score as priority alternative and valued every single criteria. The 10-point Likert scale response format was used. The study was done at January of 2009. All responders were anonymous. Printed questionnaires were delivered to teachers (N=77) of selected three Lithuania schools (represented urban and rural areas). Teachers represented

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deferent experience level: less experience-11%, 3-10 years of experience – 38%, 10-15 years – 13%, more than 15 – 38%.

6. MAUT.

The value of each alternative is calculated by summing the respondents' scores. It shows the teachers' evaluation of every alternative in numbers values. These values are corresponding to the evaluations getting from questionnaire. The criteria' scores were calculated using teachers' attached values. The every score were added and later the average value was calculated. The alternatives weights calculated using the multi criteria utility formula. The criterion score and alternative value was multiplied. The final evaluation of each alternative was calculated by summing alternative weight for each criterion. This evaluation shows the optimal decision of this problem. These scores are just mathematical evaluation of qualitative problems aspects. Alternatives evaluation upon weighted criteria is presented in Table 1.

Table 1. Alternatives evaluation upon weighted criteria

Alternative		**Teachers payment system, based on present legislation**		**Teachers payment system depends on position based**		**Teachers payment system based on fixed salary and wider range of qualification scale**	
	scoring	value	weight	value	weight	value	weight
qualification evaluation	0,16	492	79,49	460	74,32	506	81,75
financial stability	0,14	490	67,94	455	63,09	459	63,65
high competence standards	0,13	452	60,33	444	59,26	439	58,60
creation and innovation	0,15	436	64,03	425	62,42	433	63,59
long-term teaching experience	0,13	416	55,35	407	54,15	406	54,02
society respect	0,14	366	51,07	402	56,09	391	54,55
professional engagement	0,15	357	52,43	371	54,49	387	56,84
	1,00		**430,64**		**423,82**		**432,99**

7. Interpretation.

Obviously no alternative is ranked as the best. The Alternative 2 is slightly higher ranked than others. The Alternative 3 is the lowest ranked. Small disperse of alternative scores is the result of not full scale used by teachers. Just upper score values ranging from 6 to 10 were used for ranking. It causes smaller dispersion.

Selected alternative becomes evidence that teachers considered more on the possibility to work in well equipped and innovative environment. They have no priorities for their payment system. All objects which influence their life in work are the most significant. So the system with adequate balance of salaries and benefits system is satisfactory system for teachers' community. The results are "obvious" in some sense. Teachers gave the lowest ranking the new proposed payment scheme and that represent suspicious attitude to the Governmental decisions what are not agreed by teachers as decisions actors.

The results show that the present payment system is not so motivated and social equitable. The main proposal for Government could be to create other payment system which would be optimal for all teachers' criteria.

Conclusions

Seeking mutual social understanding, to increase trustfulness between politicians and others decision stakeholders the interactive decision making model for social oriented problem solving is elaborated. The MCDA based decision making process creates comprehensive, productive, less tension environment for discussions. It facilitates reaching the acceptable decision for confronting counterparts. Involvement of all stakeholders to the decision making process to the proper specific stage could: enrich decision by mutual understanding, make supporting the policy by implementers; enrich decision by new ideas; make process open and trustful.

The elaborated decision making model was demonstrated by picking up the teachers payment scheme acceptable for teachers and represented by present status of educational reform and would be in line with social equity. The main emphasize is put on the teachers as decision actors which input is valuable seeking

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the proper decision. In a policy framework, to have a ranking of all the alternatives is more useful than just to select one alternative only.

Proposed model helps to pick up the alternative teachers payment scheme, based on fixed salary component with additional payment for supplement excessive work. This alternative solution implement equity treated teachers among others public sectors. Teachers' prioritized alternatives give priority to the alternative where financial and social stability are realised. At the same time larger qualification grade could give motivation to raise the competence.

The MCDA decision making model implementation conditions are discussed. Trade union could be the organizations that stimulate public administration bodies to use logic decision making models and prevent the issues turned to the problem, if politicians and administrators are not self reasoned.

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