



Evaluation of Teachers and PISA 2009 Results in Estonia

Maie Kitsing^{1*}, Kristi Ploom¹ and Hasso Kukemelk¹

¹Tartu University, Ülikooli 18, 50090 Tartu, Estonia.

Authors' Contributions

This work was carried out in collaboration between all authors. Author MK designed the study, managed the literature searches, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author KP managed the statistical analyses of the data and wrote the section on the methodology of the study. Author HK complemented the study. All authors have read and approved the final manuscript.

Research Article

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ABSTRACT

Aims: The aim of the study was to find out whether there is any difference in the opinions of teachers from high- and low-performing schools concerning the application of different aspects of the evaluation of teachers in determining performance-related pay. In addition, the study also aimed to find out whether the above-mentioned school groups use the evaluation of teachers in determining performance-related pay in the first place.

Study Design: An empirical cross-sectional study.

Place and Duration of Study: Educational Sciences, Tartu University, from September 2011 to March 2012.

Methodology: The sample of the survey consisted of Estonian schools that participated in two surveys: (1) the PISA 2009 survey and (2) the research project "Performance and analysis influencing drivers in public schools". The intersection of the two surveys consisted of 102 schools. In the survey conducted by the present authors, school performance was evaluated using an Ordinary Least Squares regression model as the "school effect" or value added based on school-level PISA data on student performance and student social background indices. Based on the estimated "school effect", the sample schools were divided into three groups: schools with high, moderate and low

*Corresponding author: Email: maie.kitsing@hm.ee;

effect on student performance. An ANOVA was used in order to test whether there is any difference between teachers' opinions and the implementation of evaluation in determining performance-related pay in high- and low-performing schools.

Results: The results of the analysis indicated that teachers in low-performing schools expect to receive pay for each individual work process. Teachers in high-performing schools, value high student results more or, in other words, aspects related to the school's overall performance.

Conclusion: Considering the results, it can be argued that teachers in low-performing schools do not perceive their work as a teacher as a whole and they are not orientated towards achieving good results among students.

Keywords: School management; human resources management; teacher evaluation; school effectiveness. performance-related pay; PISA.

1. INTRODUCTION

Successful school leadership and management predisposes students to learn and teachers to teach. The work of teachers is the most important factor contributing to student achievement in schools. School leadership and management comes second to this – school heads affect the results by determining the school's goals, developing human resources and organising the learning process [1,2,3,4]. School heads can have a great effect on student learning through motivating and evaluating teachers [5,6]. The survey focused on the comparison of the evaluation of teachers and their opinions of evaluation in low- and high-performing schools (based on student performance in PISA 2009 (Fig. 1). Teachers were asked if they consider it important that in the determination of performance-related pay several aspects are taken into account; for instance, the guiding of young teachers or extracurricular activities, student study results, and so on.

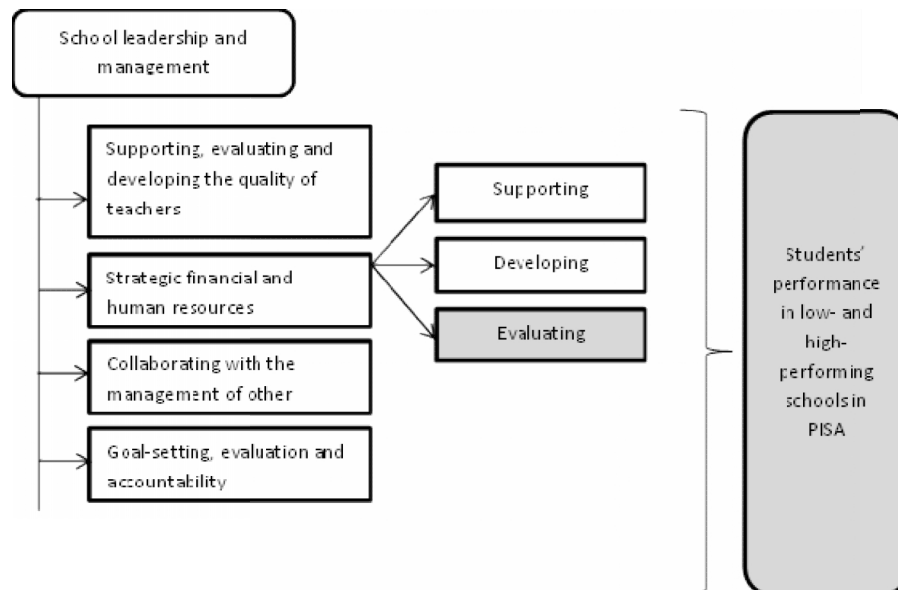


Fig. 1. The focus of the survey

The figure is based on the study „Improving School Leadership“ [2]

There are a number of researchers who have emphasised that teachers need feedback and evaluation [7,8,9]. Sartain et al. [10] have argued that a successful evidence-based teacher evaluation system has to promote and support teacher development and improve their instructional practice and student outcomes. The results of evaluations allow teachers to discover areas for further development. Therefore, evaluations affect teachers directly and consequently increase their professionalism. As a result of evaluation they may take part in training programmes to learn new skills or they may take part in personal learning programmes to increase their general knowledge. Peterson referred to two types of evaluation. Summative evaluations are made in licensing, employing or in awarding tenure to teachers: these are critical career steps for the teachers and motivate them to address relevant areas of their training. Formative evaluation aims to enhance professional development in teachers [11]. Performance-related pay, which is based on the evaluation of teachers, is a potential motivating factor for teachers. Goodman and Turner [12] have argued that incentive pay had little impact on student performance in math and reading; however, Figlio and Kenny [13] have claimed a positive relationship between teacher performance-related pay and student performance in the United States. Linking teacher salaries to student performance may convince teachers to focus on raising student achievement and stimulate innovation in the school system as a whole [12]. Kimball et al. [14] have argued the same – the evaluation of teachers has a positive effect on student performance. The survey conducted by the present authors compared the results of the evaluation of teachers in Estonian high- and low-performing schools (groups based on PISA 2009). In conclusion, it would appear that evaluating teachers should provide real benefit for teachers, motivating them to improve their professional knowledge and skills. The outcome of this course of action should be the enhancement of educational provision for the students in their care.

The Programme for International Pupil Assessment (PISA), which measures the performance of students who have completed compulsory schooling [15], is carried out by the Organisation for Economic Cooperation and Development (hereafter OECD). Through participation in the PISA study, countries are given feedback on the effectiveness of their education systems as well as on the suitability of core curricula to societal needs [16,17]. Several countries have used the results of PISA for improving their own education systems [18,19,20].

Estonia took part in the PISA studies in 2006 and 2009. Estonian students achieved good results in both surveys. According to the mean scores in the international comparison in PISA 2009, Estonian results ranked 13th in the world, and 5th in Europe [21]. Based on the international comparison, the differences in the results between Estonian schools were small, but still noticeable. It is vital to find and address the range of deficiencies in the system so that all students will achieve their potential. It is our belief that promoting the professionalism of head teachers and teachers is critical to this work.

In the OECD's Teaching and Learning International Survey (TALIS) it was noted that Estonian head teachers have the lowest average use of instructional and administrative styles of school leadership [22], and they pay less attention to administrative and educational management and leadership. The study poses the following hypotheses:

Hypothesis 1: Students that perform better in the PISA survey attend schools where performance-related pay procedures, including evaluation, are implemented.

Hypothesis 2: Teachers' opinions of evaluation procedures are less positive in schools where there are less successful student outcomes.

The aim of the study was to compare the opinions of teachers concerning evaluation in high- and low-performing schools in Estonia and to find out whether the above-mentioned school groups use the evaluation of teachers in determining performance-related pay.

2. MATERIAL AND METHODS

The sample of the survey consisted of Estonian comprehensive schools that participated in two surveys: (1) the PISA 2009 survey and (2) the research project "Performance and analysis influencing drivers in public schools". The intersection of the two surveys consisted of 102 schools.

In PISA 2009, the Estonian sample consisted of 4,727 students (2,297 girls and 2,430 boys; 3,841 students did the test in Estonian, 886 in Russian) which was a representative sample of more than 14,000 15-year-olds in Estonia. In PISA 2009, 175 schools participated in the survey out of which 138 were Estonian-speaking schools, 31 Russian-speaking schools and 6 mixed-language schools [23]. By analysing the data on school performance (based on the PISA test) and school personnel management patterns (based on the questionnaire survey), very different relationships and procedures were found when comparing schools according to their language of instruction (Russian and Estonian). As a result, schools that teach in Russian were excluded from the analysis and the study continued only with schools with Estonian as the language of instruction. Schools that have data on the PISA test for less than 10 students were also excluded from the analysis.

The second survey, the research project "Performance and analysis influence drivers in public schools" was a questionnaire survey based on the EFQM Excellence Model theoretical framework. The questionnaire consisted of 103 questions having several underlying assertions and criteria to measure. In total there were 176 assertions in the questionnaire. The answers to the questions were given on a 5-point Likert scale (1–do not agree at all; 2–rather do not agree; 3–hard to evaluate; 4–rather agree; 5–totally agree). Respondents could also answer 0, which indicated having no information or having no opinion. The inquiry was carried out electronically and in written form from November 2009 until February 2010. There were more than 10,000 respondents altogether: 303 school head teachers, 2,165 teachers, 5,482 students, 1,922 parents and 546 school board members. The total number of target schools in the 2009/10 school year in Estonia was 209. Consequently, the responses were received and analysed from nearly 70% of the target schools [24].

The survey consisted of 102 schools divided into 3 groups according to PISA results in reading. The first 34 and the last 34 were compared against each other considering the teachers' attitudes in reference to evaluation.

The survey evaluated school performance as "school effect" or value added based on school-level PISA data about student performance and social background indices. The school effect was estimated as the residuals from the Ordinary Least Squares regression model $Y_j = \beta X_j + u_j$, where Y_j and X_j are school sample means of student performance and student social background indices, and the residual u_j is defined as school value added or school average effect on student performance.

Based on the estimated “school effect”, the sample schools were divided into three equal groups: schools with high, moderate and low effect on student performance. A Variation Analysis (ANOVA) was used in order to identify differences in implementing the evaluation of teachers and in teachers’ opinions of the different measures, which serve as basis for performance evaluation and performance-related pay in schools. In other words, potential differences between teachers’ opinions in two groups of schools were estimated: (1) schools that are highly effective, and (2) schools that are less effective. The study tested whether the difference in teachers’ opinions and implementing evaluation for performance-related pay in the two school groups are statistically significant or not. If the rate is $P=.05$, it could be alleged that the differences are statistically important, allowing for a margin of 5% error. In the results section of this paper, only the aspects introducing statistically significant differences between the defined groups (“high” and “low”) at the $P=.05$ level are presented.

3. RESULTS AND DISCUSSION

3.1 Results

First of all it is essential to re-iterate that the sample for the survey consisted of schools where the effect of the students’ socio-economic background was eliminated, and two groups were formed according to “school effect”. The hypotheses of the study were not confirmed entirely. Schools that performed well in PISA did not implement performance-related pay more than schools with lower student performance. However, the survey showed a statistical difference between teachers’ opinions of evaluation and using evaluation results in low- and high-performing schools grouped according to PISA 2009 (Table 1 below). In low-performing schools, teachers consider it important to receive pay for each individual activity related to teaching (e.g. participating in school development, mentoring young teachers, guiding extracurricular activities). On the other hand, teachers do not expect additional pay for each detailed activity but consider it important that their performance be assessed according to the outcomes of their students in exhibitions and competitions.

Statistically significant differences also occurred when observing how these two school groups use the evaluation of teachers in determining performance-related pay. Low-performing schools evaluate teacher participation in undertakings outside the school, which support the development of the school. These undertakings include, for instance, European Union projects, seminars on cooperation between schools, and so on.

Table 1. The results of Anova tests: Average scores of teachers' opinions and the significance of the differences between the two groups of schools were: (1) schools that have a high effect, and (2) schools that have a low effect on student performance

Claim	Average score of teachers' answers		Sig. from ANOVA test
	Low performing schools	High performing schools	
In my opinion it would be practical to proceed from the following indicators (performance, results) when deciding on teachers' performance-related pay in our school:			
Participating in school development (EU projects, inter-school events, performing in seminars, etc.)	4.18	3.97	.041
Supervising young teachers	4.23	4.00	.044
Guiding extra-curricula activities (hobby schools, etc.)	4.12	3.86	.047
Implemented in our school on assessing teacher performance:			
Participating in school development (EU projects, inter-school events, performing in seminars, etc.)	1.07	1.00	.006
In my opinion it would be practical to use the following to assess teacher performance:			
Student results in exhibitions and competitions	4.03	4.23	.044

3.2 Discussion

The results of the research indicate some discrepancy between teachers' opinions of evaluation and using evaluation results. Even though the questions were posed in relation to performance-based pay, the replies reflected the teachers' overall opinions of the criteria used in their evaluation. It could be argued that they reflect the respondents' opinion of teaching as a profession. Teachers from low-performing schools consider it important that each activity that is not directly connected to regular school lessons should involve additional payment. It probably escapes them that the evaluated activities are one part of being a teacher. Delivering regular lessons and preparing specific lessons are considered to be the only duties teachers must perform. Such opinions also indicate that the teachers do not comprehend how instructing young teachers or participating in the development of the school, including cooperation with different people or groups could benefit them. It could be argued that teachers from low-performing schools isolate themselves from the world outside regular school lessons and do not understand that communication and cooperation outside the school is beneficial for their students and their own progress.

The responses of teachers from high-performing schools indicate that they value student study results. Muralidharan and Sundararaman [25] have reached a similar conclusion. According to their survey, 80% of teachers had a favourable opinion about the idea of linking a component of pay to measures of performance. Low-performing schools (teachers), however, value processes. Relying on the survey, it can be argued that high-performing schools most probably have specific measures for evaluating teacher effectiveness. It could

be claimed that teachers in these schools also consider various additional activities – participating in the development of the school and cooperating with different interest groups, extracurricular activities with students, and instructing young teachers – a natural part of their everyday work. They do not expect to be paid for each additional activity.

It could be claimed that it is either the presence or lack of strategic leadership skills that has an impact on the different approaches to the evaluation of teachers. The latter is conducted by school head teachers in order to make decisions about teacher efficiency and performance-related pay. The quantitative indicators the participants were questioned about in the survey belong to the data describing school effectiveness. The analysis of the internal evaluation of Estonian educational institutions has indicated that low-performing schools have difficulties setting up measurable strategic goals as well as deciding on specific indicators, and therefore, they do not implement such evaluation strategies [26]. The school efficiency indicators summarised here are influenced by the contribution of each teacher. Certainly, the presence of an evaluation culture can be seen as a promoting factor. Although the survey examined the evaluation of teachers from the perspective of performance-related pay, the indicators are equally important for supporting teacher professionalism. Ensuring feedback for teachers on the efficiency of their work based on certain criteria indicates that the school has a clear system of goal setting and specific indicators to evaluate their achievement.

Teachers' opinions about evaluation also reflect the overall opinion of the school toward evaluation and using evaluation results; furthermore, it could be said that they reflect the school's evaluation culture. By analysing results, we can support teachers in their continuing development. In this way we show how we value on-going professional development. School heads have an important role to play here – they need to understand the aims, motives and values guiding the everyday work of teachers.

It was surprising that one of the criteria used to evaluate teachers in low-performing schools was their participation in undertakings that take place outside the school, yet are beneficial for the school's development. This suggests that the heads of low-performing schools understand the need for development and consequently encourage their teachers to participate in such undertakings.

The discrepancy between the opinions of teachers from low- and high-performing schools suggests that performance-based evaluation is not as desirable in low-performing schools as it is in high-performing schools. Another option would be to pay more attention to evaluating the results of the work instead of the process. Evaluating individual processes amplifies the value of these processes, yet it does not combine the work of teachers into an integral whole serving a specific purpose. In addition, teachers do not comprehend the outcome of different processes or their impact on the students or on themselves. The survey also suggested that the performance-based evaluation of teachers could be implemented when teachers have achieved a certain level of professionalism and have shown good results in their work.

School heads should pay attention to attitudes among teachers regarding evaluation and their understanding of the benefit of evaluation. The survey indicated that there is a discrepancy between opinions about evaluation held by teachers in high-performing and low-performing schools. This discrepancy was not very large but given that people's behaviour and actions depend on their values and attitudes, school heads should take this result into account when developing the school's evaluation culture and planning teachers' duties and in-service training. Opponents may argue that the evaluation of teachers plays only a small

role in student study results and may not be worth paying attention to, but there is good reason to claim that evaluating the efficiency of the work of teachers on the basis of certain quantitative indicators is one part of consistent organisational management. The evaluation of teachers yields necessary feedback for the school head teacher about the efficiency of the institution. In addition, the opinions of teachers concerning evaluation reflect their values and motivating factors. In order to execute the goals set in an educational institution, measurable indicators need to be employed, or at least a specific portion of the indicators should be measurable. The same requirements should apply to the teachers' work. Therefore, the professionalism of school heads must be improved both in terms of knowledge and skills to help them evaluate the efficiency of the institution, including that of teachers, and make effective use of the evaluation results. Implementing an evaluation process and gathering the results presupposes the existence of an evaluation culture in a school and the understanding that evaluation is above all in the service of progress, be it the progress of the teacher or the school as a whole. It is very likely that the school head's uncertainty about the evaluation process, developing evaluation indicators, conducting the evaluation of teachers or using evaluation results is transferred to teachers. Therefore, teachers may see the evaluation process as an unpleasant undertaking that reveals their weaknesses. On the other hand, it is vital for the teachers to know their weaknesses so they know how to increase their level of professionalism through lifelong learning. Otherwise the teacher may look to the socio-economic factors as the critical factors in poor student performance. Alongside the aforementioned evaluation culture, which supports progress, it is essential that teachers also have sufficient knowledge about evaluation to help them understand the need for evaluation. Therefore, it is important for teachers to be engaged in the process of developing the indicators which form the basis for the evaluation.

Summarising the results, it could be argued that the heads of low-performing schools should try to communicate with teachers so that they become more aware of teacher attitudes to their work. Constant collaborative dialogue will help each party to understand their responsibilities. Heads in schools that are under-performing must stress the need for continuous improvement in the standard and quality of the education the school offers. Furthermore, according to the OECD, in countries with comparatively low salaries for teachers, student performance tends to be better when performance-based pay systems are in place [27].

In further studies, it would be worth focusing on the teachers and head teachers of low-performing schools and studying some of the following issues:

- a) Why is performance-based evaluation not implemented in low-performing schools?
- b) Why do teachers of low-performing schools consider it important to receive a separate payment for each individual part of teaching?
- c) What are factors that motivate teachers in low- and high-performing schools?
- d) To what extent are school heads aware of the factors that motivate teachers in their work?

Evaluation would provide essential feedback about areas in need of improvement and would enable school heads to support teacher professionalism and participation in lifelong learning. Teachers' opinions of evaluation in turn communicate information about the motivation factors and values they rely on in doing their job. It is crucial that the school head, who manages the educational institution and is responsible for its performance, acquires this information. Creating an evaluation culture in the institution that values and supports

development is also the task of the school head. Schools must become self-evaluating so that all those involved become self-critical. This in turn will lead to collaborative reflection and school development activities.

4. CONCLUSION

Teachers' opinions of using evaluation results differ in low- and high-performing schools grouped according to their results in the PISA 2009 survey. In addition, there is a statistical difference when it comes to evaluation implemented as a basis for determining performance-related pay. It can be argued on the basis of the results of the survey that low-performing schools implement the evaluation of teachers by considering the participation of teachers in activities outside the school and which support the development of the school; however, they do not evaluate their teachers on the basis of criteria related to student results.

Teachers in low-performing schools find it important to receive pay for each individual work process, which suggests that they do not perceive the various elements of their work as a cohesive whole. It can also be argued that their payment expectations relate to performing certain duties irrespective of the results. Teachers in high-performing schools, on the other hand, do not expect additional pay for each activity. It can be assumed that they perceive their work as a teacher as a cohesive whole and they understand that every aspect of their work contributes to the development of students and to their own professionalism.

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COMPETING INTERESTS

The authors have declared that no competing interests exist.

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