Quality Management for Pupil Health in Schools

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Abstract: The purpose of this paper is to examine the association between quality management values and pupil health in schools. A survey was conducted among all pupils in a Swedish primary school. Associations between the quality management values and the pupils' health were found. Cluster analysis identified groupings among the pupils. The findings extend the findings of previous research linking quality management to employee health. The main limitations are that the study was carried out in a single, relatively small school and that translating quality values into a pupil perspective may be arbitrary. However, the findings should be useful to school leaders, helping them improve the quality of their activities and the health of pupils. Children's health is vital to the wider societal welfare. This study is the first piece of research to investigate the relationship between quality management and pupil health in schools.

Keywords: Quality management, Schools, Pupil health

1. Introduction and Purpose

Pupil health is crucial to the well-functioning of schools. Lack of health impairs the learning process and reduces the quality of life of schoolchildren. The emotional and behavioural health of pupils varies across schools and is impacted by the schools at varying levels (Lewer et al. 2024). Socioeconomic differences may result in extra challenging health situations for some children (Elgar et al. 2015). Mental health problems are common, and training for staff to handle them is vital (Soneson et al. 2024). Even telepresence robots are used to help pupils with physical and emotional health needs access their education (Lewer et al. 2024). Pupil health problems may be due to various reasons, for instance, insufficient sleep (Wheaton et al. 2016). The indoor environmental quality, regarding issues such as ventilation, cleanliness, temperature and mould, is also vital, and it has been shown to be related to the academic performance of students (Toyinbo 2023). Schools can be a resource for health literature in two ways: as a learning resource in health literacy and as a health-literate organisation in itself (Kirchhoff et al. 2022).

In several industries, quality management has been shown to be related to workplace health. This association has also been indicated for schools. However, in these studies, the health of schoolteachers and other staff has been examined. So far, no studies have examined the connection between quality management and pupil health in schools.

Consequently, the purpose of this paper is to examine the association between quality management values and pupil health in schools. The remainder of the paper is structured as follows. First, the theoretical bases for the paper, quality management and health promotion, are briefly reviewed. Next, the study's methodology, findings and analysis are presented. The paper concludes with a discussion and the conclusions of the study.

2. Quality Management

Quality management (QM) can be viewed as a system comprising techniques, tools and values (Hellsten and Klefsjö 2000). The system is related to ethics and culture (Alsetoohy et al. 2026). Research has found that quality management is strongly associated with performance and also promotes culture and innovation (Xu et al. 2026) as well as efficiency and customer satisfaction (Alkhatib et al. 2026). The underlying values of quality management are often seen as the most critical aspect and have been found to be related to the better functioning of the quality management system (Lagrosen and Lagrosen 2005). A literature review has shown the following six values to be the most common: customer orientation, committed leadership, everyone's participation, process orientation, continuous improvement and fact-based decisions (Lagrosen 2006):

- Customer orientation. All processes should focus on satisfying both external and internal customers.
- Participation of everybody. All employees across the organisation should be involved in the quest for higher quality.

- Leadership commitment. Quality should be the main focus for all leaders in the organisation, from top management to all levels of management.
- Process orientation. The organisation should be structured around its main processes, which should be mapped, with a process owner for each.
- Continuous improvement. Organisations should constantly strive to improve all parts of their operations.
- Fact-based decisions. Decisions should be made based on ample and reliable data.

Research has found associations between these values and employees' health in various organisations (Lagrosen et al. 2007, Lagrosen et al. 2010, Fadhel and Alqurs 2025). A connection to stress has also been identified (Lagrosen and Lagrosen 2020).

3. Workplace Health Promotion

Within health promotion, 'Sense of Coherence' (SOC) is one of the most vital concepts.

(Antonovsky 1987). The overall meaning of the concept is an individual's ability to handle stressful situations. Since stress is prevalent in many workplaces today, SOC has been shown to be related to workplace health. It expresses itself in the dimensions:

- Comprehensibility - whether one experiences the events and impressions that occur as reasonable or as random and inexplicable.
- Manageability - if you consider yourself generally unsuccessful or if you feel that even if you face difficulties, you can deal with them and meet the challenges that life brings.
- Meaningfulness - that you feel that life has a meaning, that there is something that is worth living and fighting for.

Research has shown that SOC is related to physical health, and there are indications that it is related to a lower incidence of serious diseases such as cardiovascular disease, diabetes, cancer, and mental illness (Lindström and Eriksson 2006). There is also a connection to self-efficacy, the confidence people have in their ability to influence their life situation successfully (Bandura 2004). Furthermore, extensive research shows that SOC is essential for managing stress in working life (Lindström and Eriksson 2006) as well as for students (Ballester-Ferrando et al. 2025), and that strong SOC reduces the risk of burnout in the workplace (Kalimo et al. 2003) while increasing well-being at work (Feldt 2007).

The demand-control model is a framework for describing the stress-related effects of work on employees. It is a function of the demands the work exposes people to and their ability to control them. High control can mitigate the effects of high demands (Karasek 1979, Karasek and Theorell 1990). It defines work strain as the combined effect of these two different job characteristics:

- *Demands* - how high the requirements for performance are, as well as the difficulty and complexity of the work. Both physical and mental aspects are included.
- *Control* - what degree of control the employee has over his/her work situation regarding possibilities for influencing how and where the tasks are performed, and the possibility of managing the demands in the previous point.

Taken together, the dimensions give rise to four distinct work situations. Each type of job has different effects on health. Research shows that the combination of high demands and low control is the riskiest situation. For instance, high emotional demands and low control among teachers have been found to be associated with an increased risk of pupils' aggressive behaviour (Andersen et al. 2021). In contrast, the upper high control and low demands usually entail the least risk of health problems.

Flow (Csikszentmihalyi 2008) is a concept which has been developed in the context of positive psychology. It is described as a state in which people fully engage in an activity in a way that is both maximally effective and highly enjoyable. One is completely absorbed in what one does to the extent that time and space are forgotten. The state is also characterised by energy, creativity and efficiency.

Flow gives a feeling that order is being created in consciousness (Csíkszentmihályi 1990). There is a clear connection between flow and organisational learning, especially the discipline of personal mastery in the learning organisation (Senge 2006). Flow has also been shown to be created by the quality management Kaizen technique (Yokozawa et al. 2025). This is about being part of a larger creative whole and gaining an

increased ability to achieve the things that are really important. Some characteristics of the state of flow are (Csíkszentmihályi 1990):

- That you get so caught up in what you are doing that you forget time and space.
- Absorption in the activities combined with a clear focus and control over the situation.
- Balance between competence and challenge.

Research has shown a connection between flow and success in athletes (Jackson 2001) and musicians (Travis et al. 2011, O'Neill 1999). Furthermore, flow has been shown to be associated with lower blood pressure and improved cardiac and respiratory function (de Manzano et al. 2010).

Another study investigated the relationship between flow and health among school employees in Västra Götaland County, Sweden, with 229 participants. The results indicated a significant connection between experiences of flow and the experience of health (Lagrosen and Lagrosen 2014).

4. Methodology

The study was carried out in a primary school in western Sweden. In order to respond to the research questions, a questionnaire was developed. The basis was a verified measurement instrument (Lagrosen et al. 2012) that has been designed for measuring health, quality and learning, and it was adapted to the present context. The questionnaire included eleven indices, each consisting of three items. Each item measured the pupils' agreement with a statement on a five-level Likert-type scale with the endpoints "do not agree at all" and "agree completely". To preserve anonymity, the only demographic background data that was collected was age and gender.

The first six indices concerned the six quality management values presented above. They have been used in several previous research studies. However, they were now adapted to fit the pupils' situation. For instance, the questions regarding leadership commitment did not concern school management but rather the schoolteachers, since teachers take on a leadership role vis-à-vis the pupils. Next, two indices intended to measure the two dimensions in the Karasek model presented above, demand and control, were included. They have also been tested in previous research.

Moreover, an index, also used in previous research, intended to measure the level of flow experience was included. Finally, two indices aimed at measuring health were included. One of them is an assessment of the self-reported health of the pupils. Self-reported health has been found to correspond with physical measures of health (Su et al. 2022). This index has been used in several previous research studies. In addition, an index intended to measure the level of the dimensions of sense of coherence (SOC) experienced by the students was integrated. There are various measurement instruments that have been developed to measure the presence of SOC. Nevertheless, in order not to make the questionnaire too long and since this is not the main focus of the study, a more straightforward index with only one item for each dimension was chosen.

The school enrols pupils from grades one (usually seven years old) to nine (usually fifteen years old) in the Swedish school system. As the smaller pupils were judged to be too young to be able to understand and reflect on the items thoroughly, the questionnaire was directed to all pupils from fourth grade (usually ten years old) to ninth grade. There were 54 pupils in total in those grades in the school. The pupils filled out the questionnaires at their school using computers provided by the school in separate places. In this way, it could be ensured that a 100% response rate was achieved while preserving the pupils' anonymity.

5. Results and Analysis

The descriptive data and reliability, assessed using Cronbach's alpha, are presented in Table 1.

Table 1: The descriptive data

Index	Mean	Standard Deviation	Cronbach's Alpha
Customer orientation	4.21	.69	.60
Leadership commitment	4.00	.83	.82
Participation of everybody	3.95	.84	.79
Process orientation	4.01	.89	.79
Continuous improvement	3.96	.85	.74

Index	Mean	Standard Deviation	Cronbach's Alpha
Fact-based decisions	3.92	.82	.74
Demand	3.11	.97	.52
Control	3.64	.81	.69
Flow	3.12	1.01	.71
Self-reported health	3.52	1.01	.70
Sense of coherence	3.61	1.03	.79

In a general observation, it could be noted that the levels of the quality dimensions are rather high, which may point to this being a well-functioning school. The health of the pupils also seems to be relatively good.

A Cronbach's alpha value of .6 or higher is usually considered sufficient (Hair et al., 1998). The demand index is below this level. This means that the reliability of this index, in terms of consistency, may be inadequate. Further, analyses including this index should, therefore, be interpreted with caution. The results involving this specific index could be biased by the lack of consistency that was shoen. The other indices scored .6 or higher, indicating that they have adequate reliability regarding consistency.

Table 2: The correlation between self-reported health and the other indices

Index	Correlation	p-value
Customer orientation	0.440**	0.000
Participation of everybody	0.403**	0.000
Leadership commitment	0.420**	0.001
Process orientation	0.505**	0.000
Continuous improvement	0.506**	0.000
Fact-based decisions	0.604**	0.000
Demands	-0.285	0.072
Control	0.486**	0.000
Flow	0.604**	0.000
Sense of coherence	0.797**	0.000

In accordance with the purpose of the paper, the correlation between self-reported health and the other indices was tested using Pearson's correlation coefficient test in the next step. The result is shown in Table 2.

Thus, all the quality indices were significantly correlated with the health index. Ranging from .403 to .604, this must be considered a rather high level of correlation. Demands tend to be negatively correlated with health, but this relationship is not significant. On the other hand, control and flow are both significantly correlated with self-reported health. Finally, Sense of coherence is exceptionally highly correlated with health, which is not surprising since both are measures of experienced health.

For that reason, it is also logical that a similar picture emerges when the Sense of coherence is correlated with the other indices, which have basically the same correlations (see Table 3).

In the next step, the association between health and quality management was further examined by utilising regression analysis. Among the quality value indices, the multicollinearity was high. This is not surprising since they together form a comprehensive management system. For this reason, the decision was made to use a summated variable that included all the values and to examine their association with the health indices using simple regression analysis. The summated variable was created by calculating the arithmetic mean of numbers of the six quality management values and using this as a composite variable.

Table 3: The correlation between sense of coherence and the other indices

Index	Correlation	p-value
Customer orientation	0.538**	0.000
Participation of everybody	0.521**	0.000
Leadership commitment	0.499**	0.001

Index	Correlation	p-value
Process orientation	0.697**	0.000
Continuous improvement	0.622**	0.000
Fact-based decisions	0.623**	0.000
Demands	-0.453	0.072
Control	0.534**	0.000
Flow	0.715**	0.000
Health	0.797**	0.000

Consequently, in the first test, simple linear regression was utilised to assess whether the level of experience with quality management values significantly predicted self-reported health. The fitted regression model was:

Health = .053 + .588*(quality dimensions)

The overall regression was statistically significant (R^2 = .334, F (1, 53) = 27.541, p < .000). It was found that the experienced levels of the quality dimensions significantly predicted self-reported health (β = .588, p <. 000).

In the next step, similarly, simple linear regression was used to test whether the level of experience with quality management values significantly predicted Sense of coherence. The fitted regression model was:

Sense of coherence = .-699 + .718*(quality dimensions)

The overall regression was statistically significant (R^2 = .506, F (1, 53) = 28.765, p < .000). Thus, it was found that the experienced levels of the quality dimensions significantly predicted Sense of coherence (β = .718, p <. 000).

Potential groupings in the data were examined with cluster analysis. The particular aim of this test was to connect the results to the demand-control model with its two dimensions and four types of work situations. Therefore, a k-means solution of four clusters was chosen.

Again, quality dimensions were used as a summated variable to avoid overly complex analysis. In addition, the indices *demands*, *control*, and *health* were included. The results are shown in Table 4.

Table 4: The cluster analysis

Cluster	1	2	3	4
Quality dim.	3.71	4.49	2.50	4.46
Health	2.79	4.31	2.75	4.42
Demands	3.17	1.97	4.75	3.54
Control	3.41	4.19	1.83	4.13
Number of cases in cluster	25	12	4	13

In accordance with Hair et al. (Hair et al. 1998), the clusters were labelled and may be described as follows:

1. *The middle group* has medium values on most indices, and their health is not very good.
2. *The gliders* have the most comfortable situation. They experience that the demands are relatively low while the control is high, and they have high values on the quality dimensions index. Their health is good.
3. *The strugglers*, in contrast, have the most challenging situation. They feel that the demands are very high while their control is low. They have low values on the quality dimensions and the worst value on the health index.
4. *The achievers*, finally, are relatively similar to the gliders, but the difference is that, in their opinion, the demands are rather high. Nevertheless, they seem to be able to handle these demands with a high level of control and high values on the quality index. In consequence, they actually have the highest value on the health index.

In the next step, the clusters were depicted in a graph of the demand-control model. The result is shown in Figure 1.

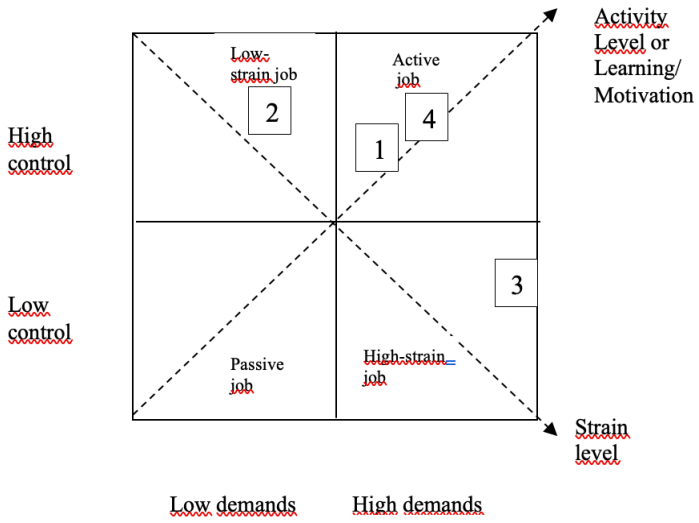


Figure 1: The clusters in the demand-control model. (Developed after Karasek, 1979)

In the figure, the achievers and, somewhat less clearly, the middle group are in the *active job* section of the diagram. This may be a good place for school pupils to be, since this is where the learning is highest. The achievers also show good values in the health and quality dimensions.

The strugglers are in *high-strain* job area where the demands are high, and the control is low. This is generally a problematic situation that often leads to health problems. Accordingly, their health is not good, and they do not experience much of the quality values.

The gliders are in the low-strain job quadrant. This may seem ideal; indeed, their health is good, and they score highly on the quality index. Nonetheless, in this part of the diagram, the learning is not as high as it could be, and learning is the main purpose of a school. Thus, these pupils may benefit from meeting higher demands in order to unfold their potential.

6. Discussion and Conclusion

Our findings suggest that there is an association between quality management in schools and the pupils' health. The values of quality management were all found to be correlated with the health index as well as the Sense of Coherence index. Moreover, the regression analysis indicated that the experienced level of the composite quality management levels significantly predicted pupil health as well as pupil Sense of Coherence. These results extend the findings of previous research that has shown that quality management values are associated with workplace health among employees across various organisations. Consistent with previous studies, quality management values, individually and as a composite way of managing, were found to be related to better health among the pupils.

In addition, the demand-control model was tested for associations with the health indices. Control was found to be correlated with better health. For Demand, a non-significant negative correlation was indicated. This is consistent with the findings of Lagrosen and Lagrosen (2020), who found that Control is positively related to teachers' health, whereas Demand was not significantly related. The current study thus extends these results and points to a similar effect of Demands and Control for teachers and pupils.

Furthermore, Flow was found to be associated with better health among the pupils. This is also in line with the findings of Lagrosen and Lagrosen (2014) regarding teachers. Consequently, there are indications that flow has a comparable influence on health among both pupils and teachers in schools.

Groupings among the pupils were analysed using cluster analysis, and four groups were identified. This shows that various pupils experience their school situation very differently and that these differences affect their health. Some pupils struggle with demands that they perceive as too high while having low control. Other pupils seem to have too low demands and might benefit from higher challenges, even health-wise.

The results of the study should be useful for managers in the school sector. Establishing a quality culture in which the values of quality management are permeating the organisation may be a prerequisite for health

among pupils as well as teachers. It will likely also increase the effectiveness of the teaching and lead to better learning outcomes. Consequently, school managers should take steps to integrate quality management practices in their organisations. The finding that Control and Demand affect various pupils differently implies that school managers need to consider each individual pupil's situation and tailor the educational activities accordingly. Some pupils need more support and greater control, while others may benefit from being more challenged by the school activities.

There are several limitations to the study. It was carried out in a relatively small school in Sweden. The possibility of generalising the results to other schools in other countries is uncertain. Statistical generalisation is obviously not feasible from a single case study, but analytical generalisation may be possible (Yin 1994). In addition, translating the quality management values from an employee perspective to a pupil perspective necessarily entails a certain amount of arbitrariness. Translating them differently may have yielded different results.

This is a pilot study in a field that has not attracted previous research. Further research should include more large-scale studies across various countries to examine whether the results reflect broader phenomena. Additionally, in-depth qualitative studies would be valuable for investigating the actual mechanics of the associations that have been indicated. Finally, longitudinal research would also be useful for increasing understanding of the development of the associations over time.

In conclusion, the study has indicated associations between quality management values and pupil health in schools. Associations with the demand-control model and with flow were also found. Consequently, efforts to improve the quality of educational institutions may also enhance the health of pupils.

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