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# **Exploratory pilot trial of a participative organizational change intervention for reducing work-related stress and improving the psychosocial work environment**

**Keywords:** work-related stress; employee wellbeing; organisation change; empowerment; structural interventions

## **Abstract**

This study explores the applicability, impact, and potential for effect of a participative organizational change intervention to tackle work stress as a social determinant of health. A pilot trial was conducted in four secondary schools using a controlled before-after design. Qualitative and quantitative data were collected at baseline and 5 months post intervention. 2 schools received the intervention involving a theoretically-grounded cycle of 7 facilitated workshops, compared to no intervention in 2 schools. The intervention resulted in sizeable contextual transformations in both intervention schools, developed in response to collaborative identification of systemic contradictions in the work environment. The findings demonstrate a statistically significant reduction in work stressors ( $b = -.27$ ,  $SE = .13$ ,  $t(247) = -2.09$ ,  $p = .04$ ). Moreover, there is a positive direction of effect in most of the outcome measures. This study is the first evaluation of a participative change approach to organizational interventions for addressing work stress in the teaching profession. It demonstrates the applicability, impact and potential for effect of upstream interventions for tackling the social determinants of health. The participative organizational intervention resulted in structural changes that improve the psychosocial work environment, and address demand-control-support and effort-reward imbalance mechanisms of work stress. It indicates that organizational improvement and effectiveness can be a tangible impact of a systems approach to nurturing a positive psychosocial work environment, making such structural interventions more amenable to adoption and implementation.

## **Introduction**

Work-related stress is an established social determinant of health and health inequalities (Benach *et al.*, 2007). Several large-scale surveys have consistently pointed to higher than average levels of occupational stress amongst teachers compared to other occupations. The recent national Labour Force Survey in the UK demonstrated more than double the average rates of self-reported stress, depression and anxiety for the teaching profession (HSE, 2014). A survey of over 30,000 educators in the USA revealed that 73% often found their work to be stressful, and 78% were often physically and emotionally exhausted at the end of the working day (AFT, 2015). There is an extensive body of research worldwide documenting

physical, psychological, and behavioural symptoms and consequences of teacher stress (Travers and Cooper, 1996; Lazarus, 2006; Al-Mohannadi and Capel, 2007; Skaalvik and Skaalvik, 2009; Kyriacou, 2011; Yang *et al.*, 2011). Prior research on the factors associated with teacher stress have identified: heavy workload, relationships with colleagues and management, poor working environment, pupil behaviour, long working hours, providing cover for teacher shortages and absences, pressure of school targets and inspections, coping with change, and administrative duties (Travers and Cooper, 1996; Benmansour, 1998; Lambert and McCarthy, 2006; NUT, 2011). Cumulatively the evidence suggests organizational-level factors as critical determinants of teacher stress outcomes.

The work stress literature distinguishes between three levels of intervention: primary, secondary and tertiary (Murphy, 1988). Primary interventions are conceived as preventive and proactive, secondary interventions as ameliorative, and tertiary interventions as reactive (Lamontagne *et al.*, 2007). Primary interventions focus on adapting the environment to fit the individual, while secondary and tertiary interventions are directed at individual-level changes in behaviours, attitudes, and practices. At the individual level, stress management and counselling interventions emphasize training in coping strategies in an effort to alter physiological, emotional, and/or behavioural responses to potential stressors. At the organizational level, emphasis is placed on changing those aspects of the teacher's work environment that are potential sources of stress (Cecil and Forman, 1990).

In an umbrella review of existing systematic reviews on managing stress at work, the authors assert that psychosocial work stressors can only be tackled by organizational and systemic strategies and policies (Bhui *et al.*, 2012). However, organizational-level interventions to address work-related stress are scarce (Biron *et al.*, 2012). The umbrella review found mixed evidence of benefit for organizational interventions (Bhui *et al.*, 2012), although the authors conflate worksite health promotion programmes with the conceptualization of organizational interventions adopted herein (Naghieh *et al.*, 2015), as changing the structure and/or context of the work environment. A more recent review concluded that although organizational-level interventions are still relatively rare, there is growing evidence that they can be effective in promoting a positive and healthy work environment (Tetrick and Winslow, 2015). A current Cochrane review indicates very little evidence for high quality evaluations of organizational-level interventions for teacher stress (Naghieh *et al.*, 2015).

The present interdisciplinary study explores the impact and potential for effect of a participative organizational change intervention, in order to tackle the causes of stress and enhance wellbeing in teachers. We test the intervention as a pilot quasi-experimental study in 4 secondary schools with baseline and 5 months post-intervention quantitative and qualitative outcome measures. The intervention leads to a collectively developed and agreed plan of action. This will need to be implemented

post-intervention, and the resulting changes will need to be embedded in order to have structural, cultural, behavioural and/or cognitive impact on each respective organization and its members. It is from this impact that the organizational intervention can influence stress and wellbeing outcome measures. Due to this complex causal pathway, and the nature of the study as an exploratory pilot with a small number of clusters, we hypothesized that in the short-term there will be a gradual improvement in the outcome measures and we did not expect statistically significant effects. We further hypothesized that the participative organizational change endeavour will lead to higher decision latitude, support, and recognition for teachers in line with the demand-control-support (Karasek and Theorell, 1990) and effort-reward imbalance (Siegrist, 1996) models of work stress.

## **Methods**

### **Design**

A pilot trial was conducted as a controlled before-after study in four secondary schools (2 intervention and 2 control) in the UK. The ‘business as usual’ control schools were matched based on socio-economic and geographical indicators. Post-intervention data collection was conducted at 5 months after the end of intervention delivery. Ethical approval was obtained for the study from the University Research Ethics Committee.

### **Outcome measures**

We collected qualitative and quantitative data before and after intervention delivery. Qualitative data included semi-structured interviews with teachers and management. 74 interviews were conducted across the two phases of data collection. Quantitative data included an online survey consisting of demographic information and the following validated questionnaires: Teachers Stress Inventory (Fimian, 1988), Maslach Burnout Inventory-Educators Survey (Maslach *et al.*, 1996), and Organizational Health Inventory (Hoy *et al.*, 1991).

### **Intervention**

Identified studies in the Cochrane review and the health promotion literature cumulatively pointed to participatory approaches as a target for organizational interventions to address teacher stress. Within the family of participative change methods (Lewin, 1946; Drucker, 1954; Freire, 1972; Kanter *et al.*, 1992; Kotter, 1996; Reason and Bradbury, 2001; Kim, 2002; McIntyre, 2008), the *Change Laboratory*- grounded in Activity Theory (Engestrom, 2001)- was identified as a promising intervention for improving teacher wellbeing at the organisational level. It facilitates dialogue between different staff groups and management, and empowers people within the organisation to diagnose the causes of their problems, discusses and model solutions, experiment with them, and develop concrete system-level, context-specific solutions. The approach has a robust theoretical basis, with a coherent methodology that has been consistently applied in a range of settings (Engestrom, 2001; Hill *et al.*, 2007; Sannino, 2011; Kajamaa, 2012; Virkkunen and Newnham, 2013; Hauge *et al.*, 2014). However, this intervention had not been used to address

work stress, and further had not been subject to experimental evaluations.

Activity Theory is a theoretical framework rooted in developmental psychology, studying human actions in social settings. The discipline was developed by Lev Vygotsky (1896-1936) and Aleksei Leont'ev (1903-1979). The fundamental idea of Activity Theory is that socio-cultural, mental, and material resources for action are intertwined. In this perspective, change is never isolated from its historical context, but is socially and discursively constructed and materially and culturally mediated in object-oriented activity (Kajamaa, 2011). Engestrom (2001) characterises Activity Theory with five principles. The first principle is that the unit of analysis is the Activity System (Figure 1), defined as "object oriented, collective, and culturally mediated human activity" (Engestrom and Miettinen, 1999). The second principle is the multi-voicedness of Activity Systems. The different positions in the division of labour carry their own diverse history, and the Activity System itself carries multiple strands of history in its artefacts, rules and norms. The third principle is historicity, as Activity Systems take shape and transform over lengthy periods of time. The Activity System can only be analysed by studying the local history of the activity and its objects, and the history of the ideas and tools that have shaped the activity. The fourth principle is the central role of contradictions as sources of change and development. Contradictions are historically accumulated structural tensions within and between activity systems. When an Activity System adopts a new element from the outside (e.g. a new technology), it often leads to a contradiction whereby an old element (e.g. rules or the division of labour) collides with the new one. Such contradictions generate problems and tensions, but also innovative attempts to change the activity. The fifth principle is the idea of Expansive Learning, which is cyclical and is triggered by problems in the system, leading to surfacing of inner contradictions, and followed by deviations from established norms via innovative solutions (Figure 2). The transformation is expansive, as the introduction of a new element can lead to further contradictions with other current elements of the Activity System. This may eventually lead to the re-conceptualisation of the object of an activity and to the reorganisation of its structure (Kajamaa, 2012).

The Change Laboratory cycle aims to culminate in an organisation-wide, context-specific solution that would improve the psychosocial work environment and reduce work-related stress in the teaching profession. Seven weekly Change Laboratory workshops were conducted in each intervention school. Participants were representative of the hierarchy within the organization, including main-scale teachers, middle managers, and senior leaders. The workshops started with feeding in extracts from baseline interview data, which focused on organizational problems and challenges. Conceptual models and tools of the methodology were utilized to facilitate the discussion (Engestrom, 1987), highlight collective learning, and emphasize areas requiring further analysis. The workshops included analysis of tensions and contradictions within the organization, designing new work practices, and refinement, modeling, and planning for implementation of the new solutions. The

planning and task allocation took place in the final Change Laboratory workshop, which corresponded with the end of the school year, and the proposed solutions were implemented from the start of the new school year and after the end-of-intervention (i.e. without involvement of the researchers).

### **Data analysis**

We analyzed the quantitative data using the Stata statistical software package. Missing data was addressed with Multiple Imputation (Little and Rubin, 2014). Reliability tests were conducted, including Cronbach's alpha, Little's MCAR test (Little, 1988), Monte Carlo error (White *et al.*, 2011), and comparison of results with complete-case analysis, mean imputation, and last observation carried forward models. Data are presented as Beta coefficients from bivariate regression analysis with standard errors, considering a  $p < 0.05$  or lower as statistically significant.

All interviews and Change Laboratory workshops were recorded and transcribed. Thematic analysis (Braun and Clarke, 2006) was used to analyse the qualitative data, as it is a theoretically flexible analytic method, and thus suitable for the present study which was to be analysed with Activity theory and work stress theories. The qualitative data analysis software NVivo was utilised to organize and analyse the transcripts. The codes and themes were independently deduced by two researchers and subsequently reconciled. Credibility and consistency (Lincoln and Guba, 1985) was maintained by cross-checking recurrent patterns under each theme with data from each phase of the data collection, as well as with field observations and data from the intervention workshops. For the purpose of this paper, the following themes were analyzed: 'context', 'implementation of the intervention outputs', 'organizational impact of the intervention', and 'process evaluation'.

## **Results**

### **Qualitative findings**

School A is a secondary school with around 550 pupils and 50 teachers, situated in a rural working class town in South East England. The school had experienced positive results in the preceding few years, attributed to the head-teacher for having "turned the school around". However, these efforts have included constant reactive change, regarded as a major cause of stress within the School. The changes were reported to have generally been ill conceived, leading to organizational tensions and inconsistencies. Management culture was generally described by teachers as top-down, complaining of inadequate involvement in decision making and poor communication of change to staff. Teachers also complained of misjudgement by the senior leadership of the teacher's workload, and lack of recognition of staff efforts. Challenges agreed by the Change Laboratory group to be taken forward collated under the following themes: community, consistency, and teaching for exams.

The intervention in School A resulted in a number of outputs. A collection of social cohesion initiatives were devised to address staff morale and wellbeing, and to nurture support functions. The Change Laboratory team developed a “Socials Committee” involving the wider staff body, and devised near-term, medium-term, and long-term goals. They arranged a number of activities such as staff lunch days, an end-of-year function which was widely attended, and a Christmas party with majority attendance compared to previous years. Interviewees report that the staff room is now used by a significantly larger number of people on a regular basis. The surge in attention to social and collective aspects in the school also resulted in action by the senior leadership. For example, the Head of Personnel allocated a budget for initiatives for staff wellbeing such as a free massage service. The social cohesion initiatives and their impact were summarised by one of the senior leadership as follows:

*“We have around 40-50 staff [teachers] here and we have 32 going on the canoe trip which is a really really good result and we have people I would never ever see in a canoe.... Christmas dinner was great, best one we’ve had for years, and staff room is more packed. We also did a big hog roast and a band at the school at the end of the year instead of disappearing at the last minute. We were dancing, it was really good fun actually. This came about at the end of last year for the first time as the result of Change Lab, and we are going to keep that going year on year. So I think the staff welfare thing has been really successful”*

Teachers regarded Rural school as being more friendly and cohesive compared to the recent past:

*“I think we’ve got a much more cohesive staff. I think everyone that’s here wants to be here, and I think we’re all kind of looking forward... I find that you walk along the corridors now and people smile and say Hi. That didn’t probably happen a couple of years ago”*

Another output was the Collaborative Management System, which sought to achieve involvement of all staff in devising, revising and implementing school policies. The Change Laboratory team piloted the new system with a whole-school policy (Marking Policy). This collaborative process resulted in recommendations for small changes to the policy, rather than dismissing it and devising a new policy. The changes included a flexibility to adapt certain elements of the marking pro-forma to better suit individual departments. The result of the pilot is summarized in the following interview excerpt:

*“The summary decision was that we could let people adapt things within their departments... They more sort of selected things that worked for themselves which is quite refreshing because previously somebody would’ve said, “I wonder if we still need these,” and then we would’ve ended up with a new pro-forma and everybody doing that pro-forma and no real rationale about why”*

This finding reflected earlier concerns by staff that policies must be relevant to them, and that this is best achieved with their involvement and participation in devising

policies:

*"I think staff quite appreciated that they were consulted with, it was a case of, here's what we found, but we found it together. So there was no kick against it in the [announcement] meeting. It was quite acceptable, whereas in another situation, without the way that it was done this time, people would've walked out of the meeting and said: "brilliant, another sheet, I wonder why we've got to do that?"*

The result of the pilot reflected teachers' disapproval of constant radical change. The excerpt below reflects the individual and organisational consequences of that status quo:

*"[Constant change] is quite stressful for everybody involved because a change like that needs training with the children, it needs training with the staff, and there would've been very little of any of that. There wouldn't have been much buy-in and it would've gone a bit pear shaped"*

The new policy review approach was perceived as a significant transformation. It was seen as a departure from quick and unsustainable decision-making and dealing with change, and instead a considered approach to analyse problems, involve staff, and generate consensual and sustainable solutions. The new approach also served to grant legitimacy to the policy, as teachers were involved in the process.

The systems-thinking approach that has been pursued in the Collaborative Management System involves collective learning, striving for maximum participation of staff, and considered reflection on the processes of change. This organisational impact is apparent in the following excerpt by one of the teachers who is also a Change Laboratory participant:

*"We've had a few meetings where we've been looking at how we can take forward the strategies that we talked about in the previous [Change Laboratory] meetings where we were learning, and now, I think we're still learning, but we're trying to sort of apply things to situations that are coming up within school and I think it's been quite successful. Rather than just saying, "let's just do it like this," we've kind of thought through how we're going to do things"*

A third output was an initiative titled the 'Teaching Alliance', which was set up to empower teachers for transforming teaching and learning. The head-teacher had instructed the Teaching Alliance team to "work to a Change Lab approach as a non-negotiable", demonstrating the impact of the intervention on the school leadership. Two members of the Teaching Alliance were also Change Lab group members:

*"Mandy and I are on that team and we are very big fans of Change Lab, and we know the only way you're going to keep staff with you is by having this system of reviewing, taking peoples opinions, building them into what we do from the ground up"*

The Change Laboratory seems to have had further impact on leadership thinking, attitude and conduct. The following excerpt demonstrates the impact of the new



policy review system on the leadership's approach to decision-making:

*"Before, he (head-teacher) was saying to people: "you need to do this and change it" and the sort of brief was "we have this problem, go and fix it". Whereas now, it seems as if leadership is beginning to say: "could somebody look at this".... and it wasn't necessarily expected that you had to change something, or something had to be done within two weeks"*

The 'multi-voiced' dimension of the Change Laboratory intervention has nurtured a culture of dialogue and participation in Rural school, as highlighted by a teacher in the following excerpt:

*"Consultation got much better. People started to actually meet and talk, which actually used to be a little bit of a swear word; Talking in a group was a bit like somebody was wasting time"*

Teachers cited an increased recognition of staff efforts as a new trend in Rural school: *"I don't know if David [head-teacher] is doing this deliberately. I hope he is, but you know, we're getting a lot more treats. I know that sounds silly, but it's things like: we did a workbook review, so everybody was under quite a lot of pressure to get books in and get the book review done. And we all had bacon sandwiches the following morning, and we've all just had free lunch today. So there's a lot more treats going on. We feel like we've been a bit more rewarded"*

School B is a secondary school with around 1200 students and 80 teachers, situated in a city in South East England. The school is in an urban area of high relative deprivation and home to a number of ethnic minorities. The school had been struggling with results, student behaviour, teaching and learning, and general management and organization in the previous few years. The staff body at School B have been described as a fragmented community. Management culture was generally described by teachers as top-down, with much ambiguity with respect to decisions and directives. The head-teacher was described as supportive and approachable, having a generally positive attitude towards new ideas and initiatives. This characteristic had conversely led to approval of many initiatives, resulting in duplication, miscommunication, and generally disorganized atmosphere relayed by interviewees. Challenges agreed by the Change Laboratory group to be taken forward collated under the following themes: behaviour and consistency, organization and communication, student's learning, and community.

The intervention output at School B was the collective design, planning and implementation of a new structure in the school entitled 'Action Groups'. All identified organizational challenges in the intervention workshops were considered to be addressed under this structural change initiative. Action Groups were conceived as a collaborative decision-making system with a "horizontal division of work". All teachers join one of the six Action Groups, which have the responsibility to identify

major challenges and potential solutions within distinct problem areas, and to plan short-term, medium-term, and long-term actions to address these challenges.

They were perceived by the Change Laboratory group as “a tool for collaborative policy-making”, “a method to consult with and involve staff”, “help to implement and review policies”, “address consistency, accountability, and shared ownership”, and “help all staff find out what is happening in different areas of the school and departments”. Interestingly, the management and dynamics of Action Groups were modelled on the Change Laboratory, during planning sessions after the end of intervention (i.e. without involvement of the researcher for the present study).

Action Groups were planned to convene eight times throughout each school year, during directed time (paid time) after school hours, devolved from Urban school’s teacher CPD (Continuing Professional Development) programme. Each teacher was to choose which Action Group to join, and each subject department was directed to ensure it was represented on all Action Groups. Non-teaching staff were encouraged to join the Action Groups, with the incentive to be paid overtime. A member of the senior leadership team was assigned to each Action Group. The Group Facilitators had to ensure all members fully engaged throughout the year. Facilitators were initially selected from among the Change Laboratory participants to “convey the new systems thinking approach”, with future plans for them to be elected by each respective Action Group.

The general working process of the Action Groups, entitled “The Improvement Cycle”, was designed as follows:

1. Summary of the School Review and the Change Laboratory Summary of Problems documents distributed in the first session of each Action Group.
2. Each group to determine broad aims based on the school vision and mission.
3. To focus on priority issues, but start with quick wins to boost involvement and ownership
4. Consider only one issue at a time, which may have several elements
5. Consult with stakeholders (staff, students, parents, governors), including visiting other schools if necessary
6. Review data and develop proposal- check it fits with mission statement. Also have an impact statement (clear impact on pupil outcomes, including review date, and how to measure and evaluate); ensure consistency for application to all departments
7. Involve and communicate with senior leadership team and other Action Groups
8. Pilot the initiative and evaluate
9. Present results of pilot, as well as proposal for school-level implementation (including training for staff if required) to other working groups for final consultation; parents and students where appropriate; and senior leadership team for approval
10. Implement, evaluate and review- share success and celebrate with staff,

students and parents

The Action Group composition was designed to contain the following elements: Action Group Facilitators, Subject Representatives (nominated by each department); Senior leadership representative; Action Group Ambassadors (to meet with counterparts in other Action Groups to ensure alignment); Learning to Lead Ambassadors (to liaise with students and ensure their views are represented; and Parent Ambassadors.

As well as generating new ideas and solutions to outstanding organisational problems, the Action Group initiative has served as a structure to collate and organise the many existing and planned initiatives and projects at Urban school. As such, it has influenced many initiatives, since they have either been allocated to and subsequently been overseen by an Action Group, or their planning and implementation process has followed the Action Group's "Improvement cycle" process.

The Action Groups at Urban school have provided the means for organisational learning with respect to an alternative mode of working, collaborating, and decision making. A number of staff members acknowledged the Action Groups as a desirable decision-making mechanism at Urban school compared to the situation before:

*"I think people needed something. Before there was a sense that things cannot stay as they are, morale was probably pretty low... I'm not saying now it's absolutely, it's not perfect by any means. But I feel that there is a mechanism in place for pretty successful change to be managed if people use it (Karen, Phase 3)".*

The embedding of the Action Group structure within Urban school seemed to organise the many existing and prospective initiatives and programmes, and alleviate the ambiguities in this area:

*"I certainly think people would now know exactly where to go with an initiative to make it work- they would go to the Action Group that's most relevant (Kate, Phase 3)"*

The following is an example of the development of an output by one of the Action Groups. It demonstrates the value of a forum for cross-curricular communication, as well as the knowledge and expertise that are generated which can feed into other school structures to add value. The Learning to Lead Action Group discussed the issue of student homework as an area that needed improvement and affected student outcomes, with the potential to serve as a target for student-led projects. The solution to be tested was for students to set their own homework- an idea which stemmed from an art teacher in the group who shared his positive experience with this practice. He found that when students were given choice and freedom of what to draw, they would be better motivated, work harder at the task, and demonstrate better results. After discussing the solution and following the "Improvement cycle" process, teachers in Maths, French and English volunteered to pilot this initiative in their respective departments, and to feed back the results in the subsequent Action Group meeting.

Due to having extensively discussed homework and conducted pilots of new ways forward, the members of this Action Group felt that they “have something to offer” to the upcoming Urban school homework policy review, and had communicated this to the senior leadership team.

The Change Laboratory participants appeared to be champions of this systems thinking and transformed mode of practice at Urban school and in taking the Action Groups forward. A number of the participants highlighted that the process gave them a realisation of the significance of reflection in planning, while suggesting that non-Change Laboratory Action Group participants didn’t seem to perceive this at the start of the initiative:

*“I just think the more reflecting you do and practice, the better the outcomes could be. And I think people didn’t have time or didn’t have the inclination or didn’t have the experience that that is a worthwhile activity (Margaret, Phase 3)”*.

It was suggested that after the Change Laboratory intervention, the head-teacher had become more conscious of asking staff for their opinion on school matters:

*“I suppose the head-teacher does a bit more actually, he asks for your ideas and opinions, and for like the new development he’s getting us all to put ideas down and things like that which is more open than he would have been normally (Kate, Phase 2)”*.

A number of Action Group facilitators have been younger members of staff who participated in the Change Laboratory sessions. A member of the extended senior leadership team suggested that this role has been good management training and experience for these younger members of staff:

*“It’s been quite good, the younger members of staff who don’t have a lot of responsibility have been given responsibility and some project management.... So its quite good to give them something to dig their teeth into (Susan, Phase 3)”*.

Qualitative data from both intervention schools revealed the emerging organizational impact of the intervention. The analysis for School B demonstrates themes on reports of improved morale and reduction in role ambiguities. Further, The Action Groups were seen as a vehicle to build better communication, collaboration, and relationships amongst the various layers of the hierarchy. Leadership were reported to be more conscious of asking staff for their opinions, and the Action Groups were thought to improve leadership attitudes who initially “felt uncomfortable not being in control”. The analysis for School A demonstrated themes on reports of the staff being “much more cohesive”, and a significant increase in attendance at social events directly attributed to the Change Laboratory. Teachers reported relatively more consultations, and increased recognition and reward of staff efforts by leadership, who reported discussing staff morale more regularly at leadership meetings. Teachers reported an emerging shift from excessive unwarranted change which was a major reported cause of stress, to a more considered and inclusive view of change by the leadership team.

### **Quantitative findings**

The four schools in the pilot trial employed a total of 259 teachers, from whom 255 people completed the surveys. Table 1 presents demographic characteristics of the participants. The vast majority of participants (93.7%) identified their ethnic group as White British, and there was no statistically significant baseline difference between the 2 study groups. Chi squared tests indicate no significant difference in gender:  $\chi^2(1, N = 255) = 1.76, p = .19$ , or mode of employment:  $\chi^2(1, N = 255) = 0.38, p = .54$ , between the intervention and control group. Independent-sample t-test indicates a statistically significant baseline difference in age between teachers in the 2 study groups ( $t = 3.38, p < .01$ ). Wilcoxon rank-sum (Mann-Whitney) test indicates no significant difference in teaching experience ( $z = 0.902, p = .37$ ) or number of years employed at school ( $z = 1.80, p = .07$ ) among participants between the 2 study groups.

Although 98% ( $n = 255$ ) of the teaching population in the 4 schools completed the study survey, they were generally not consistent with survey completion at both time points. Response rate was lower when assessed at follow up (73% at baseline and 66% at end-of-intervention point). The qualitative data indicated a number of causes of non-response which were generic to all teachers, including absence or high workload at the time of survey completion reminders. No teacher sub-groups were identified to have other unique causes for non-response, and thus it was contended that missing data within this sample of teachers was at random without a specific identified systematic cause. Little's MCAR test for the data resulted in a chi-square = 525.30 ( $df = 515; p = .37$ ), demonstrating no identifiable patterns in the missing data and suggesting that the data complies with MCAR assumptions. However, a conservative decision was made to adopt an MAR assumption, and address missing data with Multiple Imputation. The imputation model accounted for clustering, and was tested with the Monte Carlo error, demonstrating statistical reproducibility of the model. A further test of the model was conducted by comparing the results with complete-case analysis, mean imputation, and last observation carried forward. The multiple imputation model demonstrated most proximity to complete case analysis, and the most conservative estimates.

Table 2 reports the effect estimates between the intervention and control groups using bivariate regression. The findings demonstrate a statistically significant beneficial effect in the subscale: Teacher Stress Inventory-Work stressor ( $b = -.27, SE = .13, t(247) = -2.09, p = .04$ ) at end-of-intervention point. The scale refers to the sources of stress at the workplace and has 6 items, such as "my caseload/class is too big" and "there is little time to prepare for my lessons/responsibilities". The findings indicate that based on the five-point scale on which participants rated each statement, the strength of stress shifted from 'moderately noticeable' towards 'barely noticeable' (Fimian, 1988). The other variables with statistically significant findings at end-of-intervention point also have a significant baseline difference in the same direction, which limits their interpretation. While realising that most of the effect estimates were not statistically significant, a pattern can be seen as a general improvement of outcomes from baseline to end-of-intervention. Compared to the control group, the

intervention group demonstrated positive scores on 7 out of the 22 scales at baseline. At end-of-intervention, 16 scales out of 22 demonstrated beneficial effects.

### **Process Evaluation**

This exploratory pilot trial demonstrated the possibility to encapsulate a methodology with its conceptual and analytical roots in the interpretivist paradigm into an experimental design study. In order not to contaminate the intervention, all the qualitative data collected at baseline was considered as part of the intervention, and the data collected at the three waves of quantitative data collection (baseline, post-intervention, and at follow up) was not utilized in the Change Laboratory sessions. First, the data collected in the ‘mirror data’ phase in the Change Laboratory were purposeful qualitative data, and analysis and presentation of baseline quantitative data would add little value to the depth of discussions expected in the Change Laboratory sessions. Secondly, in considering scalability of the intervention, collection and analysis of survey and organizational data were not deemed to be components of the intervention, as they make it more lengthy and costly while adding little value. Finally, the end-of-intervention point was considered as the end of Change Laboratory sessions.

The qualitative findings demonstrated that the outputs of the intervention were in line with the theory of change, and fulfill the theoretical objectives of the intervention and the desired outcomes, suggesting rigor in intervention implementation. The intervention and its outputs were deemed to be acceptable to the staff and management in both intervention schools. Some challenges were present in this area, such as slow uptake of the new way of working by different members of the organizational hierarchy. Interviewees were generally positive about the intervention. Teachers saw the Change Laboratory as an opportunity to tackle the top-down decision-making culture which led to poor rules and subsequent inconsistencies. A number of teachers associated nuanced changes in leadership behavior in empathetic one-to-one interactions, consultations, and a more considered approach to decision-making with an impact from the Change Laboratory intervention. The few negative comments were mainly pessimism on the likelihood of the school-wide implementation of ideas generated as a result of enhanced teacher involvement. This may be addressed in future studies by striving to achieve more explicit and vocal support and commitment of senior management for involvement of staff in organizational decision-making.

The number of Change Laboratory sessions and duration of each session required negotiation, and in both cases were shorter than other published implementations of this intervention. “Division of labor” had certain connotations with the teachers and this was replaced with “division of work”. These adaptations to intervention components were deemed acceptable, and did not jeopardize the integrity of the intervention. The content of the revised sessions were planned with advice from intervention developers to further ensure fidelity. It was observed in both schools that

an enabler of preserving the outputs of the Change Laboratory intervention was the dedication and commitment of the champions of this new systems thinking approach, which include most of the Change Laboratory participants.

A cost analysis of the intervention as implemented in this pilot trial was conducted. It suggested that the cost of intervention equates to £112 per teacher. The intervention cost may be considered worthwhile, considering that the cost of a replacement supply teacher for 1 day of sickness absence is at least £150 in the UK. This does not take into account the other associated costs and consequences of stress-related sickness absence. Furthermore, it does not consider the value of significant organizational improvement resulting from the Change Laboratory intervention.

### **Discussion**

This study demonstrates applicability and acceptability of participative organizational change to address psychosocial work stressors. It responds to calls for longitudinal studies in this area (Taris and Kompier, 2014), revealing positive organizational impact of the intervention as well as indicating potentially beneficial effects. The quantitative findings demonstrate a statistically significant positive effect on the *work stressor* sub-scale, suggesting that the intervention may have started to tackle the causes of stress in the organization. The overarching intervention pathway demonstrated that the Change Laboratory intervention leads to the collaborative design of a number of outputs with a plan of action. These outputs were implemented and embedded throughout the organization post-intervention. It would naturally take time for these new systems to be embedded and have an impact on structure, culture, leadership, organizational climate, and work practices. It is following this impact that individual-level health and wellbeing outcomes can be realized and meaningfully measured. This pathway underscores the statistically significant finding on the work stressor sub-scale, suggesting potentially more pronounced effects if adequate time was afforded for the impact of the intervention to be realized. Considering that this study was an exploratory pilot trial, effect direction is relatively more pertinent than effect magnitude or statistical significance. Effect magnitude is limited by the inadequate time allowed for the intervention outputs to be fully implemented, to achieve their impact, and influence the outcomes of interest. Statistical significance is affected by sample size associated with the nature of this study as a pilot trial. Positive scores were observed at end-of-intervention in more than double the number of scales, further supporting the potential for effectiveness of the intervention.

The intervention theory and process has an emphasis on the surfacing of contradictions between different elements of the Activity System as a means of development and innovation. Such development is cyclical and is referred to as expansive learning, whereby the transformations may eventually lead to a reconceptualization of the object of an activity and to the re-organisation of its structure (Kajamaa, 2011). Teachers and managers in the intervention schools collaboratively designed actions to address systemic contradictions generating stress

in their respective organisations. The common theme in the output of both Change Laboratory cases was their focus on the object of decision-making, and leading to an expansive learning in terms of a reconceptualization of decision-making within their respective organisations. The central contradiction was found to be between the macro perspective and priorities and agendas of the senior leadership that shape policies and processes, and the micro perspective of those having to enact and comply with the decisions made by senior leaders. The Collaborative Management System in Rural school and the Action Groups in Urban school can be seen as mediators synthesized from this contradiction. They involved learning and revelations for senior leaders about front-line conditions, and appreciation of the strategic level perspective by those at the front line. In line with the literature, this study demonstrates that participative change approaches are helpful alongside the realisation that capacity building is required for main-scale staff to make meaningful and appropriate contribution (Elo *et al.*, 2008) to organisational decision-making. The provision of a relational and reflexive space (Kellogg, 2009) is crucial for such endeavour, which also provides significant learning for organisational leaders. The triadic synergy of capacity building and management learning in a reflexive space demonstrates the potential to tangibly address the more deeply rooted systemic drivers of work-related stress.

The qualitative data demonstrates significant structural and cultural transformations in each respective intervention school. In School A, the social cohesion initiatives demonstrated major positive impact on the school climate, improving morale and making the staff more cohesive and supportive. These activities also raised the profile of staff wellbeing within the school leadership. The new collaborative system of policy review and implementation demonstrated a feeling of involvement and ownership among staff, and resulted in a shift in the culture of decision making from sudden and radical top-down changes to participative, considered, and continuous improvements. The Teaching Alliance initiative demonstrated the transfer of more control and power to teachers to shape their work. The impact on leadership included more considered and collaborative decision-making, appreciation of dialogue, and increased recognition for staff efforts.

We regard this complex organisational intervention as a process-oriented intervention. The intervention outputs are context specific and a result of participative analysis of the challenges and potential solutions in the respective organisation. Comparison of intervention outputs in the two schools demonstrates different output components, but also suggest similarities with respect to function. Therefore it is the process of the intervention that is generalizable and scalable, and not its outputs. As such, the intervention is amenable to the rigor that is achieved by standardisation, while simultaneously producing outputs that are specific and relevant to the organisation in question.



Utilising the Activity System model as a conceptual aid, the Change Laboratory participants in both schools were able to move beyond situating teacher stress and wellbeing at an individual and superficial level, to identifying the historically accumulated systemic factors that were adversely affecting their psychosocial work environment. The proposed organizational-level changes were in accord with the mechanisms of core work stress theories: demand-control-support model (Karasek and Theorell, 1990) and effort-reward imbalance model (Siegrist, 1996). As demonstrated by the study findings, the Change Laboratory intervention worked along several specific pathways identified in these models. At one level, the new Collaborative Management System at School A and the Action Groups at School B empowered teachers with respect to their direct responsibilities and the wider school organization, resulting in increasing the teacher's decision latitude and enhancing control over their job and the work environment (Tetrick and LaRocco, 1987). Furthermore, these new systems provide social support mechanisms for teachers to enrich their daily work and deal with problems and challenges (Marshall and Cooper, 1979; Hochwarter *et al.*, 2006). The effects of the new systems can be further explained via the effort-reward imbalance pathway, as greater involvement in organizational decision-making enhances self-esteem and a sense of belonging. The wider impact on organizational culture and leadership, and its influence on other initiatives such as the Teaching Alliance at School A, also increased recognition of teachers. Moreover, the activities and initiatives to enhance staff cohesion and engage teachers in cross-curricular teamwork in both schools provide recognition and reward for staff (Eisenberger *et al.*, 1986; Christian *et al.*, 2011).

The study contributes to the small literature on evidence-based organizational interventions for teacher wellbeing (Naghieh *et al.*, 2015), providing the first evaluation of a participative approach in this area. Moreover, it is the first evaluation of the Change Laboratory method with an experimental design. The study further contributes to the body of literature on structural interventions for work stress, which is meagre compared to prevailing research on individual-level interventions, and demonstrates the prospects for tackling the causes of stress in the work environment. Structural transformations as outputs of the Change Laboratory in both organizations in this study are in line with calls in the literature for participatory and wellbeing initiatives to be institutionalised and directly linked to core business operations in order to achieve sustainability (Fernandez and Rainey, 2006; DeJoy *et al.*, 2010). The literature reports that organizational-level interventions are often deemed too risky for organizations to adopt (Cooper and Cartwright, 1997; Chandola, 2010), leading to the predominance of individual-level interventions for addressing stress and wellbeing in organizations. This exploratory study supports previous research highlighting the importance of creating favourable environments for enhanced effectiveness (Mathieu *et al.*, 2006; Gracia *et al.*, 2016). It indicates that organizational improvement and effectiveness can be a tangible impact of a systems approach to nurturing a positive psychosocial work environment, making it more amenable to adoption and implementation.

### **Limitations and Future Directions**

The present study warrants further research for intervention optimisation and large-scale experimentation, in line with the MRC Complex Interventions framework (Craig *et al.*, 2008). A current systematic review outlines the requirements for future studies to evaluate organizational interventions (Naghieh *et al.*, 2015). As this trial suggests, it is important to include adequate follow-up, considering that structural interventions take time to be fully embedded, and for their impact to be realized. Future research must also address a number of limitations in the present study. The exploratory trial revealed a possible implementation gap which could be addressed in the form of follow-up workshops. The inadequate involvement of students (or otherwise clients/users) should be considered, as they constitute the ‘object of activity’ for teachers. Although ethical approval of the study constrained the research on children, a limited attempt to involve student perspectives in the form of anonymous essays proved valuable and enriched the discussions in the diagnostic stages of the Change Laboratory workshops. The intervention can thus be further optimised in subsequent research and implementation efforts by ensuring adequate involvement of users. While response rate in this study was good, there were missing data in the surveys and a consideration of incentives, timing, and survey parsimony will improve the quality of data. Finally, considering the wide-ranging organisational effectiveness potential of the intervention alongside employee wellbeing outcomes, appropriate economic evaluation of the intervention should be considered in future scaled-up studies.

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## Figures

Figure 1: The Activity System model (Engestrom, 1987)

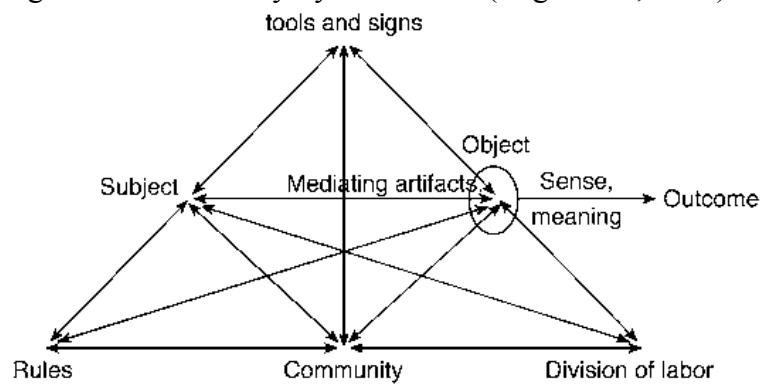
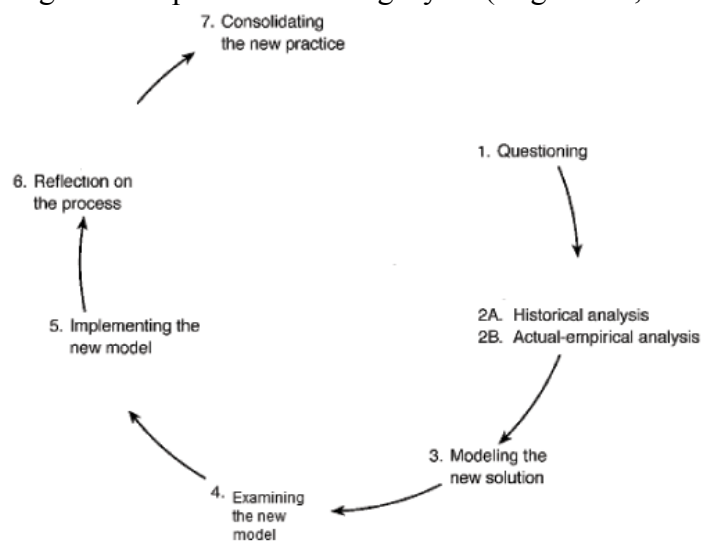


Figure 2: Expansive Learning Cycle (Engestrom, 1999)



## Tables

Table 1 Demographic characteristics of participants

	<b>N</b>	<b>n(%)</b>	<b>Intervention group</b>	<b>Control group</b>
<b>Gender</b>				
Female	174	68.20%	64.20%	72.00%
Male	81	31.80%	35.80%	28.00%
<b>Employment</b>				
Full-time	191	74.90%	73.20%	76.50%
Part-time	64	25.10%	26.80%	23.50%
<b>Ethnicity</b>				
White British	239	93.70%		
Asian	6	2.40%		
Black	3	1.20%		
Other	7	2.70%		
<b>Age</b>				
Median			35.5	43
Mean			37.01	42.23
SD			9.53	10.23
Min			23	22
Max			62	63
<b>Years teaching experience</b> Mean (SD)			10.43 (8.82)	10.81 (8.04)
<b>Years employed at school</b> Mean (SD)			5.52 (4.37)	7.14 (6.41)



Table 2 Effect estimates between intervention and control group

	Baseline <i>b</i> (SE)	End-of-Intervention <i>b</i> (SE)
<b>TSI-total</b>	0.04 (0.09)	-0.06 (0.10)
<b>TSI time management</b>	0.05 (0.10)	-0.04 (0.12)
<b>TSI work-stressors</b>	-0.18 (0.13)	-0.27 (0.13)*
<b>TSI professional distress</b>	-0.14 (0.14)	-0.23 (0.17)
<b>TSI discipline &amp; motivation</b>	0.37 (0.14)*	0.48 (0.15)*
<b>TSI professional investment</b>	0.02 (0.14)	-0.04 (0.14)
<b>TSI emotional manifest</b>	0.03 (0.17)	-0.08 (0.19)
<b>TSI fatigue manifest</b>	0.18 (0.15)	-0.14 (0.14)
<b>TSI cardio manifest</b>	0.03 (0.14)	-0.10 (0.16)
<b>TSI gastro manifest</b>	-0.08 (0.16)	-0.07 (0.17)
<b>TSI behavioural manifest</b>	0.09 (0.08)	-0.08 (0.11)
<b>MBI emotional exhaustion</b>	0.02 (0.17)	-0.11 (0.18)
<b>MBI depersonalization</b>	0.22 (0.15)	0.12 (0.14)
<b>MBI personal accomplish</b>	0.34 (0.15)*	0.05 (0.13)
<b>OHI-total</b>	-0.02 (0.04)	0.02 (0.05)
<b>OHI institutional integrity</b>	0.12 (0.06)	0.11 (0.07)
<b>OHI initiating structure</b>	-0.21 (0.08)*	-0.21 (0.07)*
<b>OHI consideration</b>	0.40 (0.09)*	0.51 (0.09)*
<b>OHI principal influence</b>	0.02 (0.08)	-0.01 (0.07)
<b>OHI resource support</b>	-0.09 (0.08)	0.04 (0.10)
<b>OHI morale</b>	-0.05 (0.06)	-0.01 (0.06)
<b>OHI academic emphasis</b>	-0.24 (0.06)*	-0.28 (0.07)*

Key: \*=p<.05

shaded area= positive scores compared to control