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ABSTRACT

A quasi-experimental, treatment-control group investigation was designed to test the effects on Dutch primary school teachers of the staff development program "Dealing with Mixed-Age Classes." Research findings from mixed-age classes, effective teaching, and classroom management and organization were translated into teaching behaviors. Following seven 3-hour workshops teachers in mixed-age classes implemented self-designed plans to increase selected research-derived teaching behaviors and pupils' time-on-task. Based on pre- and post-training classroom observations, a significant treatment effect was found for pupils' time-on-task levels in mixed-age classrooms and for teacher behaviors regarding effective instruction, lesson design and execution, and classroom organization and management. (Author/IAH)

TRAINING TEACHERS IN COMPLEX CLASSROOM ORGANIZATIONS (MIXED-AGE CLASSES) TO IMPROVE INSTRUCTION AND CLASSROOM MANAGEMENT BEHAVIOUR

Effects of a staff development programme*

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SUMMARY. *A quasi-experimental, treatment-control group investigation was designed to test the effects on the staff development programme Dealing with mixed-age Classes. Research findings from mixed-age classes, effective teaching and classroom management and organization were translated into teacher behaviours. Following seven 3-hour workshops teachers in mixed-age classes implemented self-designed plans to increase selected research-derived teaching behaviours and pupils' time-on-task. Based on pre-and posttraining classroom observations, a significant treatment effect was found for pupils' time-on-task levels in mixed-age classrooms and for teacher behaviours regarding effective instruction, lesson design and execution, classroom organization and management.*

Introduction

This study describes and assesses the effectiveness of a staff development programme for teachers in mixed-age classes as it relates to areas of classroom management, instruction, and pupils' on-task behaviour. The staff development programme described here was inspired by the findings from our research on mixed-age classes. Training topics were drawn from the research on teacher and school effectiveness; the design of the training process was guided by the research on staff development effectiveness.

BACKGROUND

Increasingly, Dutch primary schools have no option but to introduce mixed-age classes (also called vertically grouped or multi-age classes), because of the drop in pupil intake, and reduced staffing. In these classes, pupils from more than one grade level are taught simultaneously by one teacher. About 30% of all classes in primary schools are mixed age. Findings from a questionnaire survey conducted in the northwest of England indicated that a total of 66% of the respondent schools had some kind of mixed-age grouping (Bennett, O'Hare & Lee, 1983). In other European countries, there is also an increasing adoption of mixed-age grouping as a direct response to falling school rolls and associated staff cuts. Schools that now have mixed-age classes out of necessity without any experience of this form of organization, make greater demands on their teachers in terms of classroom organizational talents and devising effective teaching-learning conditions for all pupils. Getting parents to accept mixed-age grouping often appears to be difficult. Parents fear that pupils in mixed-age classes will not attain the same level of academic achievement as pupils in single-age classes.

During 1981-1985 three observational studies were conducted on learning and instruction in Dutch primary schools (Veenman, Lem & Winkelmolen, 1985; Veenman, Lem, Voeten, Winkelmolen & Lassche, 1987/88). The major objectives of these studies were to determine how a variety of instructional features influenced time-on-task in mixed-age classes. The results indicate that time-on-task levels in mixed-age classes are, on average, about 6% lower than in single-age classes; and that time-on-task in mixed-age classes is influenced by instructional features that include instructional setting or grouping arrangement, pupil's ability level, task difficulty and teaching behaviours. No significant differences in achievement test scores were found between pupils in mixed-age and single-age classes. Teachers who had to change from single-age to mixed-age grouping did not change, and did not intend to change, their approaches to classroom organization. The majority of the observed teachers who used the whole-class approach continued to do so with vertically grouped classes. (This was also found in a study conducted in England by Lee, 1984). Our interview data revealed that teachers in mixed-age classes were less satisfied with their jobs than their counterparts in single-age classes. The heavy teaching load and the heavy demands on classroom management skills forced many teachers to work with a mixed-age class as if it were several classes which have to receive instruction in turn. Teachers perceived difficulties in organizing resources, pupils, and time more effectively. Finally, it was found that teachers teaching mixed-age classes in schools with both vertically and horizontally grouped classes felt rather isolated from their colleagues in single-age classes. They judged the professional support from their colleagues as inadequate; problems with teaching mixed-age classes were not shared with one other.

From these studies we concluded that the difficulties teachers face in mixed-age classe are centred around five problem areas: 1) the efficient use of time, 2) designing effective instruction, 3)

classroom management, 4) the organization of independent practice or learning and 5) clear goals collectively agreed upon in making mixed-age schools work.

The studies we conducted thus far were descriptive in nature. The next step was to design a staff development programme for teachers of mixed-age classes. This programme had to be schoolbased. In this second study we tested the effects of introducing teacher effectiveness and staff development research findings into an existing school system. The research was based upon three assumptions: a) research findings can be used to provide a systematic focus on teaching and schooling and thereby serve as a school improvement tool; b) research findings can be transmitted to school practitioners in forms if the findings are viewed as legitimate and useful guides to practice, and c) research findings can be interpreted positively by principals and teachers if careful attention is given to style and manner of delivery, with particular emphasis placed upon situation-specific issues that vary from one school setting to another (Griffin & Barnes, 1986). The next section gives a brief outline of the content of the staff development programme dealing with mixed-age classes (DMC).

THE RESEARCH BASE OF THE STAFF DEVELOPMENT PROGRAMME

Based on the identified problem areas, five teacher education booklets were developed.

Instructional time.

This booklet is based on the notion that time is an essential element in learning and a potentially useful instructional variable. The way in which teachers and pupils spend their time provides valuable insights into the effectiveness of the teaching-learning process in mixed-age classes. Results of the syntheses of several thousand individual studies of academic learning conducted during the past half century in different countries show that instructional time has an overall correlation of about 0.4 to learning outcomes (Walberg, 1986; Fraser, Walberg, Welch & Hattie, 1987). Teachers were informed of the importance of concepts such as pupil-engaged learning time, time needed for and spent in learning, time allocation, pupil's success level, task appropriateness. Teachers were encouraged to use strategies that help pupils' stay on-task. Further, several observational methods were presented to observe pupils' time-on-task levels. Instructional time is an important topic for teachers in mixed-age classes because the complexity of the classroom organization may lead to lower levels of time-on-task.

Effective instructions.. The research on effective teaching has yielded a pattern of instruction that is particularly useful for teaching a body of content or well-defined skills. In general, researchers have found that when effective teachers teach concepts and skills explicitly, they: begin a lesson with a short statement of goals; begin a lesson with a short review of previous, prerequisite learning; present new material in small steps; provide active practice for all pupils; guide pupils during initial practice; provide feedback and correctives, supervise pupils during seatwork or independent practice; review, weekly and monthly (Rosenshine, 1986; Rosenshine & Stevens, 1986). In the second booklet teachers were informed of the findings of this research and of the key instructional behaviours as defined by Good, Grouws & Ebmeier (1983). They were encouraged to design lessons using these very specific components. Pupils in mixed-age classes work more in an individual seatwork setting. In this setting, significantly less time is spent on the task as compared to the whole class or direct instruction setting. Important steps in the lesson plans for teachers in mixed-age classes are guided and independent practice. After presentation of new material the teacher has to supervise pupils' initial practice to make sure that they can practice independently with minimal difficulty when the teacher is instructing another group of pupils. At that moment the teacher is too busy to supervise the first group.

Classroom management and organization.

Classroom management includes all the things teachers must do to foster pupil involvement and cooperation in classroom activities and to establish a productive working environment. Teachers were informed of ways to manage their classes, largely in the light of research conducted by Kounin (1970) and Evertson, Emmer, Clements, Sanford & Worsham (1984). According to Kounin successful managers are aware of what is happening in classrooms (with-itness), are able to handle two or more simultaneous events (overlapping), to sustain a group focus (group alerting and accountability) and to keep the action moving along smoothly (smoothness and momentum). Based

on the work of Evertson et al. teachers were informed of ways of organizing a good room arrangement, for planning and using classroom rules and procedures, for managing pupils' work and maintaining good pupils' behaviour. In mixed-age classes teachers are probed more on their classroom management skills than teachers in single age classes (Veenman et al., 1987). Teachers in mixed-age classes with high levels of on-task behaviour were effective classroom managers. Their classes were well-organized and well-managed.

Independent learning.

Pupils in mixed-age classes spend most of their time in an independent seatwork setting. While one group of pupils is working individually, the teacher is teaching another group. Therefore, pupils in mixed-age classes need to be adequately prepared during instruction. Teachers are informed of some instructional procedures that can help increase pupil engagement during seatwork, including e.g.: a) the teacher spends more time in demonstration (explaning, discussion) and guided practice, b) the teacher makes sure pupils are ready to work alone, by achieving a correct response rate of 80% or higher during guided practice, c) the seatwork activity follows directly after guided practice, d) the seatwork exercises are directly relevant to the demonstration and guided practice activities, e) the teacher guides the students through the first few seatwork problems (Rosenshine & Stevens, 1986). Attention is also given to the organization of multitasks: tasks in which pupils plan, select and organize materials and activities. In multi-task settings teachers are unable to control directly what each pupil is doing. In this booklet teachers were informed of ways to structure the working environment, largely in the light of Kierstead's work (1986). One aspect of the multi-task setting is the use of the pupils' work cycle; a set of routines, procedures, rules and consequences that spells out for pupils exactly what is expected of them: how they are to proceed and to account for the responsible use of their time.

School climate and school leadership.

This booklet was written to give teachers and their principals some results of the research on school effectiveness. In general terms the importance of cooperation, collegiality, shared values and norms and instructional school leadership. In our research we found that some teachers in mixed-age classes felt very isolated from their colleagues working in single-age classes. This booklet highlighted some outcomes of school effectiveness research: school site management, active leadership, high expectation for pupils, change-supportive norms, school-wide staff development, clear goals, collaborative planning and collegial relationships (Purkey & Smith, 1983; Good & Brophy, 1986). The content of this booklet was not directed at changing teaching behaviours, but on stressing the importance of shared problem solving, collegial support and a planned, purposeful programme for dealing with mixed-age classes on a school-wide basis.

The contents of these booklets are integrated into a model for school and classroom effectiveness. This model comprises the components: leadership, school climate, teacher behaviours, pupil behaviours and pupil achievement (cf. Squires, Huitt & Segars, 1983). Each booklet contained a rationale, definition of terms, and specific recommendations and guidelines for implementing the instructional behaviours in mixed-age classes. To facilitate understanding and use, numerous case studies were provided, along with several checklists. Some teaching behaviours were presented by trained teachers in the form of videotapes; videotape designed specifically for the purpose of demonstrating effective teaching and classroom management.

RESEARCH QUESTION

The study examined the effects of a staff development programme that introduced selected findings from teaching effectiveness research into ongoing school settings with mixed-age classes. The research question that guided the study was: Did the staff development programme dealing with mixed-age Classes (DMC) increase the frequencies of research-derived teaching behaviours and, further, was there an effect upon pupils in terms of on-task behaviour? (On-task pupil behaviour was used as a proxy for pupil achievement. See Evertson et al., 1983; Griffin & Barnes, 1986.)

DESIGN

The study was a field quasi-experimental design with treatment (N=17) and control (N=9) groups of teachers, and the pupils associated with each teacher.

PARTICIPANTS

The staff development programme was part of the regular in-service training activities of the college of education for primary teachers (PABO) in the Nijmegen school district. A total of 41 teachers volunteered to participate in the study. This group of teachers comprised 8 school teams (all the teachers in a school) and two teachers from another school. For logistical reasons (budget, time constraints and available staff members) 17 teachers out of these 8 school teams were selected for participation in the observational study (treatment group). These teachers were selected by the staff members before the beginning of training to ensure that from each team two or three teachers were selected to represent grades 3-8. The teachers' teaching experience ranged from 7 to 25 years. Nine teachers were recruited from 6 schools in the same area to form the control group. These schools were roughly equivalent to the schools in the treatment group. The teachers in this group did not participate in the training. The teachers' teaching experience in the control group ranged from 5 to 22 years.

INSTRUMENTATION

The instruments used to measure the quantity and quality of programme implementation and pupils' time-on-task levels were largely based on the instruments used in our first study (Veenman et al., 1987, 1988). These instruments included an observation instrument, a classroom rating scale and teacher questionnaires.

Time-on-task and instructional skills observation.

Observational data on pupils' time-on-task levels were collected by a 'predominant activity' time sampling procedure (Tyler, 1979). To obtain information on the behaviours of teachers and pupils a predetermined observational sequence was set up. The observer took a quick look at the behaviour of the first pupil and that of the teacher for seven seconds and recorded the responses at the particular instance during the next thirteen seconds. After this recording the observer switched to the next pupil, repeating the same procedure. After observing all pupils the observer started the observational procedure again at pupil number one. Each observation period lasted 40 minutes. The observations were recorded by using a portable microcomputer (EPSON HX-20). Every 7 seconds the display reflected the number of the pupil to be observed and (after a signal) the observational categories to be recorded. At the end of each observation period the data were stored on tape and afterwards transmitted to a mainframe computer.

The observers recorded the following four pieces of information: a) the pupils' response to the task (e.g. on-task, off-task); b) the target group of the teacher (e.g. grade level 5 or 6); c) the task-related activities of the teacher (e.g. supervision, guided practice); and d) the settings in which learning activities occurred in each grade (e.g. group instruction, seatwork). The observation instrument included 18 categories.The observational variables are listed in Table 1.

Prior to collecting observational data, the four observers went through a training programme of about 45 hours, which involved the coding of videotapes as well as live coding. Inter-observer reliability checks, estimated by analysis of variance (Winer, 1971), ranged from 0.82 to 1.00 (with the exception of two categories: off-task procedural 0.64 and guided practice 0.72); median 0.98. All classrooms were observed by one observer.

Classroom rating scale.

After each observation, the Management & Instruction Scale (MIS) was used by the observer to assess teacher and pupil behaviour on a number of variables. These ratings consisted of five-point scales that focused on instructional skills, lesson design and execution, managing pupil behaviour, classroom organization and pupil behaviours such as the level of disruptive and inappropriate

behaviour. The 30 variables of the MIS, listed in Table III, were based on the research of Evertson et al.(1983), Good et al. (1983) and Rosenshine (1986). Inter-observer reliability checks, estimated through analysis of variance, ranged from 0.67 to 0.96 (median 0.86).

Based on a principal-components analysis, the 30-item scale was broken into five subscales: 1) instructional skills; 2) organizing instruction; 3) use of materials and space; 4) adjusting instruction; and 5) dealing with disturbances. Measures of internal reliability (Cronbach's alpha) were computed for each scale. The alpha-coefficients ranged from 0.66 to 0.91 and are reported in Table III. Scoring was done for each subscale and for each observational variable of the MIS.

Questionnaires.

Questionnaires were used to get information on the teachers' perception of the staff development programme, booklets and workshops, and their reports of their experiences with the implementation of the contents of the programme. These questionnaires were submitted to all 41 teachers who participated in the DMC programme. Of these teachers 38 returned the questionnaire.

DATA COLLECTION

Observational data were collected in mixed-age classrooms of 17 teachers who voluntarily participated in the DMC programme (treatment teachers) and 9 control teachers. Before the start of the programme, each teacher was observed during two mathematics periods and two reading/language periods (November-December 1986). After the programme was provided each teacher was again observed for two mathematics and two reding/language periods (May-June 1987). All observations took place in the morning.

The observational data for each observation period, collected through the time-sampling procedure, was expressed in minutes. Next, the pupil and teacher behaviours within each category on the instrument were averaged to produce means in each category for each class and teacher for each observation. Finally, the observations in each subject area, mathematics and reading/language, were collapsed to produce mean rates for each observation period: pre and post treatment data. It was recognised that the observational variables were not independent of each other: coding an event into one category excludes all other categories at the same time interval.

For the observational data, collected by the rating procedure, scale scores were computed by adding the values of the item responses contained in each scale. For each scale, scores for each variable were also computed. In testing the differences between treatment teachers and control teachers, a level of significance of 5% was used (one-tailed). The unit of analysis was the class or teacher. The observational data is based upon 136 observations in the treatment group (17 classes x 4 lessons x 2 intervals: pre and post) and upon 72 observations in the control group (9 classes x 4 lessons x 2 intervals).

Frequencies of 'teachers' responses on the questionnaires were tailed.

For a complete description of the design, the instrumentation, and data collection procedures see Lem et al. (1988).

THE DMC INTERVENTION

The contents of the staff development programme DMC, as noted, were developed by the faculty of education of the University of Nijmegen in cooperation with a teacher training college for primary schools and two local school advisory services. The training was provided by two experienced teacher educators in collaboration with the research project members. At the school-level, teachers were given guidance and support by members of the local school advisory services.

The 41 teachers of the 8 schools were divided into four workshops-groups. In order to get acquainted with each other and to come to agree on objectives and design of the training, trainer and school staffs consulted each other. An introductory booklet briefly discussed the DMC's general rationale and the used model for school and classroom effectiveness.

Before the start of training, information based on the observational data collected in four observation periods prior to the training, were fed back to the 17 observed teachers.

The training included seven 3-hour workshops, one week apart. (January-April 1987.) Between the workshops teachers were asked to try out in their classrooms some of the teaching recommendations as described in the booklets. The first topics of the workshops were devoted to the

following topics: instructional time, effective instruction, classroom management and organization, and independent learning. In the sixth workshop, which took place at the teachers' school and not at the teacher training college, each observed teacher for a second time received feedback on the observational data collected prior to staff training. This feedback-session was more comprehensive than the first one, because the observational data were now related specifically to the five discussed topics. Teachers were encouraged to supplement the research-based information with their own craft knowledge and to look for improvement opportunities. Particular attention was paid to the 'instructional improvement in this iterative cycle: 1) information collection (this was done at the first by the observers); 2) comparison of collected information with research findings and/or own standards and identification of improvement opportunities; 3) selection and preparation of strategies for classroom modification; and 4) implementation of classroom modifications. The teachers who were not observed during the pre-planning phase, were also asked to prepare improvement plans, using their own observations or judgements and the provided research findings. The seventh and last workshop was devoted to the topic school climate and school leadership, and to a brief evaluation of the worth and merit of the staff development programme (cf. Fenstermacher & Berliner, 1985). The questionnaires were also handed out. The post-training observational data were fed back to the observed teachers at the beginning of the new school term (September 1987).

In designing the workshop activities the training process was guided by the recommendations of Joyce & Showers (1980, 1988) for effective staff training. The five major suggested components of training are: 1) presentation of theory; 2) modelling or demonstration; 3) practice; 4) structured feedback; and 5) coaching. The theory was presented in the booklets. Modelling or demonstration of the suggested teaching skills was done through video-fragments, suggested activities and case studies in the booklets. Practice under simulated conditions was achieved by practising with peers (role-playing); practice under real conditions was achieved by asking teachers to try out new ideas or improvement plans and to tell each other at the next workshop what new things they had tried in their classes and how they worked. Feedback was given by observers. Teachers were also strongly advised to observe their colleagues and give each other feedback. Coaching for application involved helping teachers analyze the content to be taught, and making specific plans to implement that content successfully into the classroom or school. Teachers were encouraged to coach each other (peer coaching) in trying new practices. Peer coaching boosts the effectiveness of normal, workshop-based in-service training (Sparks, 1986). If peer coaching was not possible, teachers were advised to consult the principal, school adviser or research members.

The purpose of the DMC-intervention was not to tell teachers how they must teach. Teachers were provided with major concepts and tools so that they could hopefully analyze their teaching in the light of the research findings.

RESULTS

A summary of the descriptive statistics for each dependent variable on the observational instrument is presented in Table I. The SPSSX one-tailed *t* -test for paired samples was used to examine the difference between the pre- and post-treatment data of the experimental group to determine if the treatment teachers exhibited more of the desired behaviours called for in the DMC-programme on the post-test than on the pre-test. Paired t-tests were performed because the repeated measurements are dependent (pretest/posttest) and hence yield correlated sample means. Independent one-tailed t-tests were used to examine the difference between the treatment and the control group. The results of these tests, based on gain scores (post-test scores minus pre-test scores), are also shown in Table I.

When comparing the treatment group with the control group before training, significant differences were apparent for the time-on-task scores. The average time-on-task score for the control teachers was 29.7 minutes (lesson duration 40 minutes), for the treatment teachers 26.7 Analysis of covariance was considered to test the differences between treatment and control group, but not applied because of the voluntary character of the treatment group (self-selection may correlate with pre-test scores), the found significant differences between the two groups in the pretest, and the small number of classroom/teachers that would cause a decrease in statistical power.

Data displayed in Table I indicate that the DMC programme had a marked effect on time-on-task levels of the pupils. As can be seen, the treatment group began the training with lower time-on-task scores than the control group did. This initial difference, as noted, was significant. After training treatment group pupils exhibited significant increases in their time-on-task levels ($p < 0.01$) and significant decreases in off-task behaviours ($p < 0.05$). The average amount of time-on-task in

mixed-age classes of treatment teachers was 67% on the pre-test and 82% on the post-test. Interestingly, the control-group pupils significantly decreased their on-task activities from 75% to 69% ($p < 0.05$). The difference in gain scores between the treatment-group pupils and control-group pupils in on-task activities is significant ($p < 0.01$). These results indicate that treatment teachers were able to establish classes with significantly greater proportions of pupils engaged in appropriate tasks (on-task) and significantly lower proportions of pupils off-task.

Scatterplots were constructed to examine the trend of treatment-group and control-group classes regarding time-on-task levels from pre-test to post-test. The range in time-on-task scores for the treatment-group classes were dramatically reduced after training. All treatment-group classes improved their time-on-task levels.

Insert Table I here

Table I also provides descriptive statistics on the amount of time devoted to instructional settings. All instructions were coded according to one of the two general instructional settings: direct instruction or seatwork. In direct instructional settings, the teacher presents and explains academic content to a single-age group in a mixed-age classroom. In seatwork settings, pupils spend their time in learning tasks individually or as a subgroup in a mixed-age class. Each setting has a different 'holding power' on the attention of the pupils. In mixed age classes seatwork involving pupils working alone on their tasks is most frequent.

In the DMC programme effective instruction for both settings were discussed. To examine the relations of setting to time-on-task, each 7-second observation score for setting was paired with the time-on-task score.

Table II presents the amount of time-on-task during class instruction and individual seatwork for treatment-group pupils and control-group pupils. In terms of the DMC intervention's effect upon pupil behaviour, treatment-group pupils were again more frequently in-task in academic activities in both settings than were control-group pupils. The difference in gain scores between treatment-group and control group was statistically significant ($p < .01$). After training the treatment-group classes exhibited, in both settings, significantly more on-task behaviour than before training ($p < .01$). In control-group classes the time-on-task levels between pre- and post-test decreased. During seatwork this decrease was significant ($p < .05$).

Insert Table II here

Table I also summarizes some of the teacher behaviours to estimate the degree of programme implementation. Significant differences between pre- and post-test scores for treatment teachers were found for the variables preview, ($p < .01$), transitions and unrelated activities ($p < .05$). The differences in these variables were also significant when treatment teachers were compared with the control teachers (see Table 1). More important than the total amount of time spent on review is the finding that almost all treatment teachers used the component review as part of their instruction. Before training 41% of the treatment teachers began their lessons with a short review of previous learning. After training this figure was 94%. For control teachers these percentages were respectively 44% and 33%. Furthermore, treatment teachers spent less time on transitions and unrelated activities. No significant differences were found in the variables guided practice and monitoring. No comparisons between treatment teachers and control teachers were performed on the quantitative variables amount of instructional time, giving directions, and individual help. Qualitative aspects of these variables were
assessed by the Management & Instruction Scale (MIS). Of the target group variables only one comparison was made between treatment and control teachers. The amount of no interaction between teacher and pupils was lower in treatment classrooms than in control classrooms. In general, the scores of this variable were small.

Table III contains a summary of the descriptive statistics and the results of t-tests between treatment and control group for the subscales, and for each dependent variable on the Management &

Instruction Scale (MIS). Results show that teachers who participated in the staff development programme used the recommended behaviours significantly more often than control teachers. On all the subscales of the MIS significant implementation effects were found. All the differences in gain scores are significant at the 1% or 5% level. In general, treatment teachers were able to use more effective instructional, classroom management and organization techniques than control teachers ratings for all the subscales on the MIS after training ($p < .01$). Post-measures of treatment teachers' performance after training on 26 of the 30 ratings (87%) were significant compared to pre-measures of treatment teachers' performance before training ($p < .05$). The scores of the control teachers remained relatively stable.

Insert Table III here

DISCUSSION

The question of whether participation in the staff development programme. *Dealing with mixed-age classes* could increase the frequencies of research-derived teaching behaviours on classroom instruction, management and organization, and on pupils' on-task behaviour seems to have been answered, at least indirectly, by the results of this results of this study. The treatment group differences at the end of the training indicate that the staff development programme enhanced teachers' skills in mixed-age classes.

The principal component of the treatment were five teachers' booklets based on results from prior research in mixed-age classes, and on selected findings from teaching effectiveness research relevant for teachers in mixed-age classes. The results of the questionnaires suggest that the booklets have been studied and used by the teachers. Almost all the teachers reported that the booklets and workshops were very helpful because they provided many concrete, specific and practical suggestions. The case studies in the booklets were rated as particularly valuable because they provided concrete illustrations of how other teachers in mixed-age classes had implemented particular strategies. These positive ratings of the staff development programme may have contributed to implementation of the programme.

The feedback sessions also affected implementation. During these feedback sessions, observed teachers examined their instructional and management skills and speculated on lesson plans, management techniques and classroom organization that could increase effective instruction and pupils' time-on-task levels. Providing teachers with formative evaluation data promoted positive classroom changes.

Part of the success of this staff developement programme and those described by Evertson (1985) and Evertson et al. (1983) no doubt is due to the fact that none of the trained behaviours are startling or new to teachers. It is likely that their structuring and that of the rationales for their use provide a conceptual framework from which teachers can make critical decisions about their teaching on an everyday basis' (Evertson, 1985).

There are some limitations to the study. First, the applicability of the content of the staff development programme was judged less positively by kindergarten teachers (grades 1 and 2). The content was more suited for grades 3-8. At this point the programme is in need of improvement. Second, in providing the staff development programme the two teacher educators were strongly supported by the members of the research project staff. These members designed the contents of the course and had more knowledge about research on mixed-age classes, teaching effective research and classroom management. Training programmes initiated, developed by a university are generally more effective than those initiated within the school or by teacher educators. This may due to the fact that professionals who work outside the schools have more time and resources available to develop, test, and present training programmes to teachers (Wade, 1985). The next step in our research will be the training of teacher educators and school advisers to conduct the programme on their own. Teacher educators and school advisers will be trained in the special functions related to their respective roles. Third, although peer observation and coaching by peers, principals and school advisers were stressed, contextual patterns appeared to have a substantial effect on implementation of peer observation and coaching. In our study all schools were small. Teachers and principals had their own classes to teach and there was little opportunity for peer observation and peer coaching. School advisers also lacked time to attend workshops and coach the schoolteams. Of the five school advisers

who participated in the study, only one was able to attend the workshop and coach school teams on a regular basis. The cooperation between teacher educators and local school advisers need further consideration. Fourth, two of the four observers participated in the delivery of the staff development programme and in the feedback sessions. This was done to attune the feedback sessions to the content of the staff development programme and vice versa, and for budgetary reasons. It could be assumed that the entanglement of these two roles may have influenced the objectivity of the post-measurement data. This assumption may be unwarranted; comparisons of the post-observational data of these two observers with the data of the other observers, who did not participate in the staff development programme, showed no significant differences or biases.

The findings nevertheless suggest that training similar to that described here is a successful staff development activity for teachers in mixed-age schools.

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TABLE I. Mean frequencies (in minutes) of observation categories, and results in *t-t* ests on gain scores for treatment and control teachers (lesson period = 40 minutes)

Observation categories	Pre-test data Treatment	Control	Post-test data Treatment	Control	Pre-post gain Treatment	Control	*p*
A. PUPIL BEHAVIOUR							
On-task	26.9	29.7	32.8	27.5	5.9	-2.2	**
Off-task:							
procedural	4.5	4.0	3.4	4.0	-1.1	-0.0	*
waiting	1.5	1.3	0.4	1.4	-1.1	0.1	*
not-engaged	7.1	5.0	3.5	7.1	-3.7	2.1	**
B. SETTING							
Highest grade level:							
instruction	11.2	13.8	11.1	11.1	-0.0	-2.7	N.T.
seatwork	28.8	26.2	28.9	28.9	0.0	2.7	N.T.
Lowest grade level:							
instruction	10.3	11.4	11.7	12.5	1.4	1.0	N.T.
seatwork	29.7	28.6	28.3	27.5	-1.4	-1.0	N.T.
C. TEACHER BEHAVIOUR							
Instruction:							
review previous work	0.5	0.3	1.7	0.2	1.2	-0.1	**
presentation	13.1	16.6	10.7	14.0	-2.4	-2.5	N.T.
guided practice	4.0	3.0	4.8	2.1	0.8	-0.9	N.S.
Controlling seatwork:							
individual help	10.7	7.4	11.9	7.7	1.2	0.2	N.T.
monitoring	2.6	2.2	4.0	3.1	1.3	0.9	N.S.
Organizing:							
transitions	6.3	6.4	5.3	7.5	-1.0	1.1	*
no teaching behaviour	2.7	4.1	1.7	5.4	-1.0	1.3	**
D. TARGET GROUP							
whole class	4.2	3.1	4.4	3.0	0.2	-0.1	N.T.
highest grade level	16.4	17.2	15.9	15.0	-0.5	-2.2	N.T.
lowest grade level	16.5	15.6	18.2	16.6	1.7	1.0	N.T.
no interaction	2.8	4.1	1.5	5.4	-1.0	-1.3	**

Note: Treatment group N= 17; Control group N= 9. Due to observational loss in treatment group: Setting N= 15; Target group N= 14.
* p <.05; ** p <.01. N.S.= non significant; N.T.= not tested for implementation

TABLE II. Average percentages of time-on-task per setting, and results on t -tests on gain scores by group (lesson period = 40 minutes)

Setting category	Pre-test data Treatment	Control	Post-test data Treatment	Control	Pre-post gain Treatment	Control	*p*
Instruction * on-task	73.3	75.3	86.8	68.4	13.5	-6.9	**
Seatwork * on-task	64.5	73.7	80.2	67.2	15.7	-6.5	**

Note: Treatment group N= 15; Control group N= 9.
** p <.01

TABLE III.Mean rates on subscales and variables of the Management & Instruction Scale (MIS), and results of t tests on gain scores.

Subscales/items	Pre-test data Treatment	Control	Post-test data Treatment	Control	Pre-post gain Treatment	Control	*p*
1. Instructional skills (alpha= 0.90	23.1	24.1	28.2	23.3	5.1	-0.9	**
Describes objectives clearly	3.5	3.7	4.3	3.6	0.8	-0.1	**
Actively engages pupils	2.9	3.3	4.2	3.2	1.3	-0.1	**
Clear directions	3.7	3.8	4.1	3.7	0.4	-0.1	*
Provides assistance during instruction	3.4	3.3	4.2	3.2	0.8	-0.1	**
Consistently enforces work standards	2.6	2.9	3.7	2.7	1.1	-0.2	**
Initiates work-related contacts during presentation	3.8	3.6	3.9	3.4	0.1	-0.2	
Maintains pupils'responsibility for work	3.3	3.5	3.8	3.4	0.5	-0.1	
2. Organizing instruction (alpha= .84):	15.7	16.6	20.0	17.4	4.3	0.8	**
Materials are ready	3.6	3.4	4.1	3.6	0.5	0.2	*
Clear directions	3.5	3.6	4.2	3.7	0.7	0.1	**
Uninterrupted activity flow	3.1	3.5	3.9	3.6	0.9	0.1	**
Effective monitoring of transitions	2.9	3.1	3.9	3.2	1.0	0.1	**
Pupils don't disturbe each other	2.6	3.1	3.8	3.4	1.2	0.3	**
3. Use of materials and space (alpha= .66):	21.0	21.9	24.1	22.7	3.0	0.9	*
Degree of visibility	3.8	3.8	3.9	3.9	0.1		
Appropriate arrangement of pupil desks	3.0	3.5	4.3	3.6	1.4	0.1	
Suitable traffic patterns	3.1	3.3	3.5	3.6	0.4	0.2	**
Availability of materials	3.4	3.8	3.9	3.9	0.1	0.2	
Adequate supply of materials	3.8	3.8	4.3	3.9	0.4	0.5	*
Adequate storage of materials	3.9	3.7	4.1	3.9	0.2	0.2	
4. Adjusting instruction (alpha= .86):	20.1	21.2	23.9	21.0	3.8	-0.2	**
Amount of content covered	3.2	3.6	3.9	3.4	0.7	-0.2	**
Appropriate pacing of lesson	3.3	3.4	3.9	3.4	0.7	0.1	**
Attention spans considered in lessons	3.4	3.8	3.9	3.9	0.5	0.1	*
Creates a pleasant work orientation	3.5	3.8	4.2	3.5	0.7	-0.3	**
Adequate instruction and concentration	3.6	3.8	4.0	3.8	0.4	-0.0	**
Adequate seatwork procedures and concentration	3.0	2.9	3.9	3.0	0.8	0.1	**
5. Dealing with disturbances (alpha= .91):	18.3	20.1	23.6	19.7	5.3	-0.4	**
Stops inappropriate behaviour quickly (instruction)	3.5	3.6	4.3	3.8	0.8	0.1	**
Stops inappropriate behaviour quickly (seatwork)	2.5	3.0	3.9	2.9	1.4	-0.1	**
Consistency in managing behaviour	3.2	3.2	4.1	3.1	1.0	-0.2	**
Rewards appropriate behaviour	3.1	3.2	3.4	2.9	0.3	-0.3	*
Allows few disturbances	3.0	3.6	3.8	3.6	0.8	-0.1	**
Stops disruptive behaviour quickly	2.8	3.1	4.0	3.3	1.1	0.3	*

Note: Treatment group N=17; Control group N= 9. Means for the ratings are based on five-point-scales: 1= low occurrence or least characteristic; 5= high occurrence or most characteristic; * p <.05; ** p <.01