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University of Twente
Department of Education
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THE EFFECTIVENESS OF THE IMPLEMENTATION AND THE USE OF A COMPUTER ASSISTED ATTENDANCE REGISTRATION SYSTEM

K.Tj. Bos & A.J. Visscher, Centre for Applied Research on Education (OCTO), University of Twente, Enschede, The Netherlands

Abstract

Effective schools studies have shown relationships between the amount of truancy in schools and their organizational characteristics. Absent pupils reduce their effective instruction time and persistent absenteeism is assumed to be related to drop out. One possible way to combat truancy is the use of a computer-assisted absence registration system (ARS). The implementation and use of an ARS in thirty secondary schools in four big Dutch cities has been evaluated in a longitudinal study with a pretest-posttest-control group design. Important factors for ARS use seemed to be 'motivation' and 'encouragement'. A significant effect of the use of ARS on the truancy rate could not be demonstrated. Nevertheless the majority of the experimental schools reported some other strong positive effects and no serious negative effects of implementing and using ARS.

Introduction

The advantages of the use of the computer in terms of an increase of efficiency and effectiveness have lead to the widespread use of computer technology for administrative and management activities in schools. This paper concerns the evaluation of the implementation and use of a computer assisted 'attendance registration system' (ARS). In the Netherlands, as well as in Great Britain and the U.S.A. truancy and student drop out are serious problems in secondary education. Effective schools research has shown the relationship between the truancy magnitude of schools and their organizational characteristics (e.g. Rutter, 1979; Stoel, 1986). Absent students reduce their effective instruction time and persistent absenteeism is assumed to be related to drop out. Therefore it is important to take the truancy problem seriously.

One way in which schools can combat absenteeism is to register the attendance of students by means of ARS. The main advantage of ARS is that it generates truancy figures and statistics efficiently and timely. As a result of that schools are able to react to truancy more quickly and adequately, which might contribute to a reduction of the truancy rate. Moreover, ARS enables the analysis of truancy trends and patterns as well as relations between truancy and other variables like timetable characteristics, teachers, subjects and test scores. On the basis of this

information schools can develop school anti truancy policies to reduce the magnitude of absenteeism.

With this in mind the Dutch government in 1988 started a project in which thirty secondary schools in four cities participated voluntarily. These schools implemented ARS (hard- and software) in their organisations.

At the same time a three year longitudinal evaluation study was started to examine the effect of ARS use on truancy rates, as well as on other effects. The results of this study will be presented in this paper.

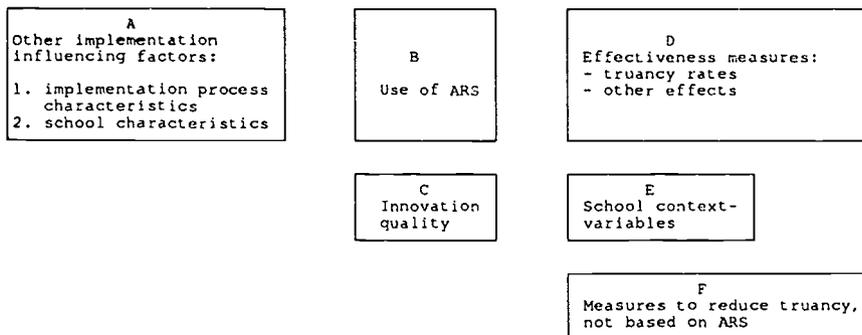
Questions

The central questions of this research project can be stated as follows:

- Which factors stimulate or hinder a successful implementation of ARS?
- To which extent can the truancy magnitude be reduced by means of ARS and which other effects (than changes in truancy rates) has ARS use?

To answer these questions a research framework has been constructed on the basis of literature research. The research framework for the ARS evaluation study is shown in figure 1.

Figure 1: Research framework for the ARS evaluation study



A crucial variable in the study is 'the use of ARS' (block B). This variable can be affected by characteristics of the innovation process (A1): for example by the degree to which schools are coached during the implementation process, the innovation resources schools receive and the degree to which the principal encourages school staff to innovate. School characteristics (A2) can also influence the use of ARS: one can for instance think of the degree of pupil counselling and the degree of teacher support, the innovation motivation of school staff and the resemblance between ARS procedures and the old, manual way of attendance registration of a school. It is assumed that the degree of ARS use is affected by the quality of ARS (the quality of the hard- and software of ARS, block C) as well. The effectiveness of using ARS has been measured by determining changes in truancy rates between 1988 and 1990, 1990 and 1991 and between 1988 and 1991

(block D). It was expected that truancy rates would decrease after ARS was implemented. However, installing and using computers often also goes along with unplanned positive and/or negative effects. For that reason it was also investigated to what degree such effects were perceived by school staff.

In order to be able to attribute a measured effect to ARS use, the influence of school context variables (E) such as school size, percentage of non-Dutch pupils and the social economic background of the pupils (SES) had to be controlled for. The same goes for variable F, the number of truancy reducing measures, taken by schools, that are not based on ARS.

Method

The ARS evaluation study has a longitudinal quasi experimental design with one pretest and two posttests. This design can be marked as a pretest-posttest-control group design. Data have been collected in an experimental group which consists of thirty schools for vocational and general secondary education in four big Dutch cities which are voluntarily participating in the ARS-project. Data were gathered before ARS implementation in April 1988 (the pretest) and in April 1990 (posttest one) and April 1991 (posttest two).

In the literature about truancy a great diversity of truancy definitions, methods to measure them and of ways of data collection can be observed (e.g. Rutter, 1979; Galloway, 1985; Reid, 1985; Grimshaw & Pratt, 1986; De Vries, 1987). As a consequence of that different studies result in truancy figures that are very difficult to compare. In most studies truancy is not measured very exactly. In the ARS evaluation study it was tried to measure truancy with a strict method. The attendance data were gathered during three days in one week in April 1988, April 1990 and April 1991 during all lessons (ca. 8500 in each year), except those given in examination classes. During each lesson, teachers registered names of pupils who did not attend their lessons on special forms. Subsequently school staff, responsible for absence handling, reported which pupils were absent with permission, and during which lesson periods. By comparing both sets of data the percentage of truancy per day, per grade, per subject, per timetable-hour, etcetera could be calculated.

The control group in this study consisted of nineteen schools for secondary education. In these schools, which are of the same size as the experimental schools and which are located in the same cities as the experimental schools, student attendance is registered manually. Comparing changes in truancy rates between 1988, 1990 and 1991 in the control group with those in the experimental group was necessary to avoid false conclusions about the effectiveness of using ARS.

The other variables (features of the school organisation, implementation process, school context characteristics, ARS use, innovation quality, etcetera) were measured in 1988, 1990 and 1991 by interviewing school principals and clerical staff. Besides, questionnaires were handed out to the management, teachers and all other staff members involved in attendance registration (e.g. school caretaker, clerical staff etc).

Data analyses resulted in output statistics, like frequencies and association measures such as Pearsons Product Moment correlations and non parametric correlations.

The effectiveness of the use of ARS was analysed by means of multiple regression analysis and analysis of variance. In these analyses dependent variables were variables either from block B or block D (figure 1). The predictive variables for Block B (ARS use) were the variables from block A and block C. In the analysis of the predictive value of ARS use (block B) for changes in truancy rates (block D), the context variables from block E and F should have served as control variables.

Results

Regression analysis on the 1990 data showed that among others the motivation towards ARS use and the degree to which schools meet the requirements for ARS use are important factors that influence ARS use. Examples of such requirements are the degree to which schools consider the school characteristics as one of the truancy causes and the degree of pupil guidance. These variables explain 48 per cent of the variance in ARS use. The same analysis on the 1991 data did not result in any predictors of ARS use ($p < .05$).

Regarding truancy rate differences (between 1988-1990, 1990-1991 and between 1988-1991) in the experimental and control group, on the basis of variance analysis it can be concluded that although these differences are stronger in the experimental schools than in the control group, a significant effect ($p < .05$) of the use of ARS on the truancy rate could not be demonstrated. An explanation for this might be that most schools only used ARS in a clerical, registrational way and did not develop anti truancy policies on the basis of ARS information. Results indicate that some context variables like 'ethnic background of pupils' (percentage non-Dutch pupils in school) and school size are important for the degree of truancy and the degree to which truancy can be reduced by means of ARS use.

Moreover, the majority of ARS schools reported some other strong positive effects of using ARS: schools have a better insight in truancy trends and patterns and in relations between truancy and other variables (for example timetable characteristics and test scores), the quality of absence registration and handling has improved and computing truants for pupil reports requires less work than when ARS was not used. On the other hand schools did not mention any serious negative effects of using ARS.

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