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AUTHOR van Hout, Hans
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ABSTRACT

This study examined the problems of postgraduate research assistants in the Netherlands. The study was conducted as a result of Government plans to introduce a new educational system for obtraining a doctorate equivalent to a Ph.D.--the "assistants-in-training system" (aio system). On the basis of a literature study on the American and British Ph.D, a model was developed for assessing problems of Dutch research assistants (Ph.D students). As possible causes of these problems three categories were discerned: (1) background (age, gender, motives, etc.); (2) the discipline; and (3) the working environment (supervision, the department, etc.). A survey of research assistants (n=166) at six Dutch universities who were studying in the natural sciences, social sciences, and humanities revealed the following: that the influence of the discipline appeared to be substantial (background, working environment, and experienced problems); that the working environment also had a substantial effect on research assistant problems; and that research problems caused teaching problems. A new global causal model is presented for further research. Contains 14 references. (GLR)

A CAUSAL MODEL FOR ASSESSING PROBLEMS OF DUTCH RESEARCH ASSISTANTS (PhD-STUDENTS).

Hans van Hout, PhD.

Director

IOWO: Center for Research and Development into Higher Education

University of Nijmegen
P.O. Box 9104
6500 HE Nijmegen
Netherlands
(80) 612470
Fax: (80) 615551

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Boston, October 31, 1991

Texas A&M University
Department of Educational
Administration
College Station, TX 77843
(409) 845-0393

ASSOCIATION FOR THE STUDY OF HIGHER EDUCATION

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On the basis of an literature study on the American and British PhD a model was developed for assessing problems of Dutch research assistants (PhD students). As possible causes three categories are discerned, background (age, gender, motives etc.), the discipline and the working environment (supervision, the department etc.). A survey is conducted (n= 166). The preliminary model is improved in incremental steps (LISREL VI). The final model is highly acceptable. The influence of the discipline appears to be substantial (background, working environment and experienced problems). The working environment has a substantial effect on the problems. Research problems cause teaching problems. A new global causal model is presented for further research.

1. INTRODUCTION

The research reported on in this paper deals with the problems of postgraduate research assistants in the Netherlands. The reason for this research lay in Government plans to introduce an new educational system for obtaining a doctorate equivalent to a Ph.D., the so-called 'assistants-in-training system' (aio system).

The new structure for 'research training' is not a programme of taught courses. The assistant, called aio, is appointed for a maximum of four years, during which (s)he is expected to prepare a thesis under the supervision of a professor. During the first year a substantial amount of time may be spent on further specialised instruction. The aio can be assigned a small teaching load (25% of working time at most), in particular routine teaching tasks, while payment is based on the assumption that, in the course of these four years, his/her share in the research and instruction at the university will increase. After the first year a formal assessment is to be carried out: a positive assessment will imply supervision guaranteeing that the thesis can be completed and a doctorate conferred within four years.

2. THEORETICAL FRAMEWORK

The American and British research literature on Ph.D. courses is reviewed (e.g. ABRC, 1982; Berelson, 1960; Bucher & Stelling, 1977; Cartter, 1976; Hay, 1987; Katz & Hartnett, 1976; Malaney, 1988; OECD, 1987; Rudd, 1975; Rudd, 1985; Solmom, Kent, Ochsner & Hurwicz,1981; Vartuli, 1982; Welsh, 1979; Winfield, 1987). Examined are the **individual characteristics of the Ph.D. students** (region of origin, socio-economic background, church/religious background, sex, age, intellectual abilities and motives for taking up Ph.D. studies); **process characteristics** (general satisfaction with the course, problems related to the position as a Ph.D. student, choice of research topic, the writing process, research facilities, supervision and problems arising from it, and school environment); and **the products of the Ph.D.-training** (completion rates, competence and attitudes as teacher and as researcher, the quality of theses and their contribution to the development of science, the employment situation and the rate of return for the Ph.D. student).

On the basis of the findings in the review of the literature and the limited Dutch literature available on research assistants, a categorization of possible **problems** experienced by research assistants is developed:
Research problems with respect to (1) choice of topic, (2) time planning, (3) quality of the research, (4) facilities, (5) writing the thesis.

Teaching problems with respect to (1) presentation skills, (2) structuring of the subject matter, (3) motivating and activating students, (4) sufficient mastery of the subject matter.
Problems in the working environment with respect to (1) supervision, (2) the relationship with the department, faculty and students, (3) the position and status of the research assistant, (4) the formal legal status.

Subsequently, the following categorization of **possible causes** of problems experienced by research assistants is developed:
Characteristics of the research assistants: (1) age, (2) sex, (3) intellectual abilities, (4) employment or undergraduate experience, (5) motives, (6) teaching and research orientation.
Characteristics of the discipline;
Characteristics of the working environment: (1) characteristics of the departments (degree of organisation, teaching of research orientation), (2) nature and frequency of supervision, (3) method of working (autonomy, in isolation or in teams, planning), (4) extent of the teaching and research assignments.

The literature does not provide a clear insight, either theoretically or empirically, into the relations between causes and problems. Because of the large number of variables many relations would in fact have to be interpreted as quasi-relations. Therefore, the variables should be tested in connection with each other. In view of this we have constructed a preliminary global causal model for problems experienced by research assistants. The basic assumption was that the model has to be as simple as possible.

3. THE SURVEY

In 1983 166 research assistants in three faculties - natural sciences, social sciences and humanities - of six Dutch universities filled in a questionnaire (response 66%). This survey has yielded the following variables via factor and scalogram analyses.

- **Individual characteristics**: age; sex; teaching experience; years of service as research assistant; teaching motive; university research motive; teaching orientation; and research orientation.
- **Characteristics of the working environment**: faculty (natural sciences, social sciences and humanities), teaching orientation of the department; research orientation of the department; supervision; planning; working autonomously or in isolation; and extent of the teaching assignment.
- **Problems experienced**: teaching concerns; teaching stress; research concerns, research stress; satisfaction with the supervisor; satisfaction with the department; and satisfaction with the status of research assistant.

The preliminary global causal model has been operationalised and made concrete by means of a number of hypotheses with regard to the relations between the variables. The operationalised model was tested via the LISREL-VI procedure: a procedure designed to test causal models. This procedure showed that the model had to be rejected since it did not fit the relations as found between the variables. On the basis of the relations observed in the literature and the parameters of the LISREL procedure it was possible to improve the model in incremental steps. The model that was finally obtained (tabel 1) rejects the basic assumption on which the preliminary model was constructed, but not its specific hypotheses. The improvement consists mainly in the adding of relations. The final model is highly acceptable, both with regard to content and from a

statistical point of view (chi-square 152 with 165 degrees of freedom, p=.74, with a 'goodness of fit index' of .929).

4. THE RESULTS

The influence of the discipline of study appears to be substantial. The research assistants in the natural sciences are younger, more predominantly male, and they have less teaching experience than their colleagues in the social sciences and humanities. The teaching motive is stronger in social sciences and humanities than in natural sciences, while the university research motive is strongest in humanities and weakest in natural sciences. Research orientation shows no differences between disciplines, unlike teaching orientation; research assistants in humanities have the strongest teaching orientation, and those in natural sciences the weakest. Research assistants in social sciences and humanities judge their departments more teaching-oriented than do those in natural sciences, but there are no differences between disciplines in the research orientation of departments.
Supervision is more intensive and more explicitly arranged in social sciences and humanities as compared to natural sciences. Furthermore, the progress of work is planned more in natural sciences and humanities than in social sciences. The degree of autonomy appears to be unrelated to discipline. As regards the composition of the teaching assignment, an examination was made of the number of courses taught and the undergraduate theses supervised. It appears that the fact that social sciences research assistants have a larger teaching assignment is mainly a consequence of the larger number of undergraduate theses that they supervise.

As indicated above, three types of problems experienced are distinguished: teaching problems, research problems and problems in the working environment. Teaching problems comprise the variables teaching concerns and teaching stress, research problems consist of the variables research concern and research stress, while problems in the working environment involve three variables, viz. satisfaction with the supervisor, satisfaction with the department and satisfaction with the status of research assistant.

Teaching concerns
Only 4% of the research assistants are never concerned about the teaching assignment, 40% often worry about at least one aspect of this task. Research assistants are more concerned about teaching especially if they are older, have more research concerns and work in social sciences and humanities.

Teaching stress
32.5% of research assistants do no experience stress at all as a result of the teaching assignment, whereas 24% often suffer from stress in some way or other. Teaching stress is greater for research assistants from the social sciences and co-occurs with a higher degree of teaching concern, research stress and research concern. The research assistants in natural sciences experience less teaching stress than those in social sciences, but more than those in humanities.

Research concerns
8% of the research assistants never feel concerned about the research assignment, 35% report that they often worry about at least one aspect of the research assignment. Research concerns are stronger particularly as the individual research orientation is weaker and, to a lesser extent, also as the satisfaction with the status of research assistant is higher.

Research stress
About 8% of the research assistants never experience stress resulting from the research assignment, 31% often suffer from stress. In other words, it seems that research stress is higher than teaching stress. Research stress increases with growing research concerns, growing dissatisfaction with the status of research assistant and a less well-planned method of working.

Satisfaction with the supervisor
The most notable fact is that 80% of the research assistants are of the opinion that they are in rapport with their supervisor. Negative assessments are given by about 25% of the research assistants, with regard to the supervisor's available time, his/her professional abilities and stimulating influence, and the learning effect. The satisfaction with the supervisor increases as the supervision is more intensive and more explicitly prearranged and as the progress of work is better planned.

Satisfaction with the department
About 60% of the research assistants judge the general atmosphere in their department as pleasant. The opinion about the department is more positive especially if the research orientation as well as the teaching orientation of the department is stronger.

Satisfaction with the status of research assistant
According to 65% of the respondents the legal status of the research assistant leaves much to be desired. The assessment of the status of research assistant is more positive especially as there is greater satisfaction with the way the department functions.

It appears that research problems cause teaching problems, and not vice versa. Furthermore, concerns are found to lead to stress, and not vice versa. Thirdly, the discipline turns out to have a direct effect on teaching problems and on the assessment of the status of research assistant, notwithstanding the correction for individual and process characteristics.
Fourthly, it is clear that the problems are substantially influenced by the method of working and the characteristics of the department, besides individual background characteristics, motives and orientations. Most essential to the assessment of the supervisor is the nature of the supervision.

5. DISCUSSION

An effort has been made to construct a more manageable model by including only the stronger relations. This leads to a global causal model (see scheme 1.) that can serve as a basis for further research.

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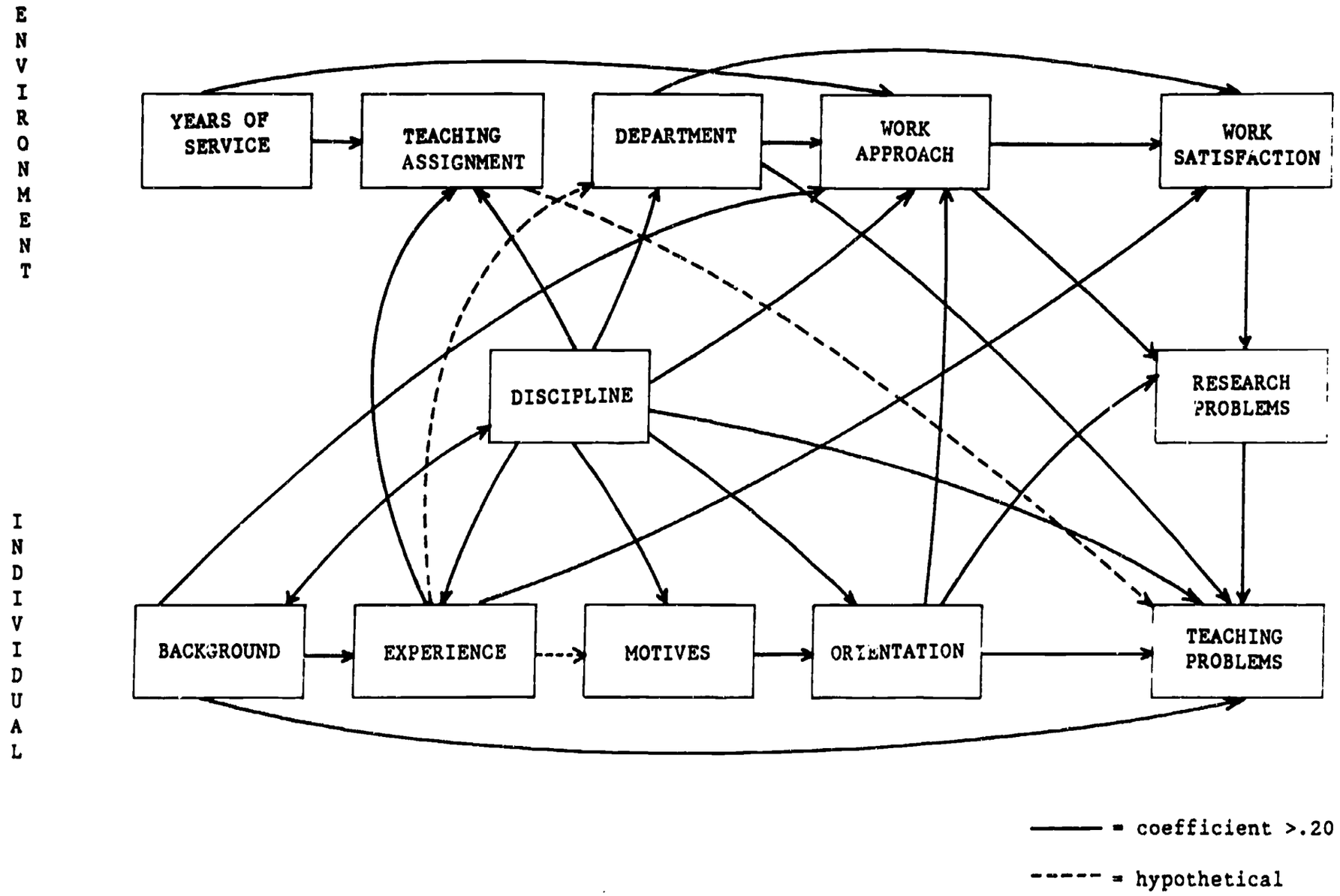
Tabel 1: CAUSAL MODEL FOR ASSESSING PROBLEMS OF DUTCH RESEARCH ASSISTANTS: R2 PER VARIABLE AND STANDARDIZED COEFFICIENTS (DIRECT EFFECTS)

		R2
Working environment		
Teaching orientation of department		9.9%
1. Age	.177	
2. Natural sciences	-.347	
Research orientation of department		8.7%
1. University research motive	.165	
2. Teaching experience	-.185	
3. Age	.151	
Teaching assignment		30.0%
1. Research orientation of department	-.130	
2. Teaching experience	.258	
3. Years of service as R.A.	.262	
4. Social sciences	.296	
Supervision		14.6%
1. Research orientation of department	.233	
2. Years of service as R.A.	-.186	
3. Sex	-.251	
4. Natural sciences	-.162	
Planning		26.2%
1. Research orientation of the R.A.	.363	
2. Years of service as R.A.	-.191	
3. Social sciences	-.263	
Working autonomously		16.9%
1. Research orientation of department	-.309	
2. Research orientation of the R.A.	.146	
3. Age	-.221	
Individual characteristics		
Teaching experience		17.8%
1. Age	-.227	
2. Natural sciences	-.414	
3. Social sciences	-.243	
Teaching motive		29.8%
1. Teaching experience	.155	
2. Age	-.172	
3. Natural sciences	-.368	
University Research motive		12.5%
1. Years of service as R.A.	.137	
2. Natural sciences	-.458	
3. Social sciences	-.269	
Teaching orientation (of R.A.)		22.7%
1. Teaching motive	.317	
2. Teaching experience	.154	
3. Natural sciences	-.236	
4. Social sciences	-.217	
Research orientation (of R.A.)		8.3%
1. University research motive	.183	
2. Research orientation of department	.164	
3. Years of service as R.A.	-.140	
Problems		
Satisfaction with supervisor		41.8%
1. Research orientation of department	.149	
2. Teaching orientation of department	.163	
3. Planning	.221	
4. Teaching orientation of the R.A.	.205	
5. Supervision	.412	
6. Teaching experience	-.182	
Satisfaction with the department		36.5%
1. Teaching assignment	.155	
2. Research orientation of department	-.324	
3. Teaching orientation of department	-.311	
4. Supervision	-.197	
Satisfaction with status of R.A.		42.9%
1. University research motive	-.139	
2. Planning	-.112	
3. Working autonomously	-.147	
4. Satisfaction with department	.533	
5. Teaching experience	.222	
6. Natural sciences	-.138	
Research concerns		25.2%
1. Research orientation of R.A.	-.467	
2. Satisfaction with status of R.A.	.139	
Research stress		30.2%
1. Planning	-.196	
2. Satisfaction with status of R.A.	.201	
3. Research concerns	.309	
4. Years of service as R.A.	.123	
5. Sex	.130	
Teaching concerns		30.1%
1. Teaching orientation of department	-.196	
2. Research orientation of department	-.134	
3. Satisfaction with supervisor	.140	
4. Research concerns	.305	
5. Years of service as R.A.	-.130	
6. Age	-.320	
7. Natural sciences	-.235	
Teaching stress		49.5%
1. Teaching assignment	.120	
2. Teaching orientation of department	.195	
3. Planning	.163	
4. Research orientation	.204	
5. Teaching concerns	.301	
6. Research concerns	.265	
7. Research stress	.295	
8. Teaching experience	-.128	
9. Sex	.135	
10. Natural sciences	.189	
11. Social sciences	.318	

X_2 = 152 df = 165 p = .74

goodness of fit index: .929



SCHEME 1 FINAL GLOBAL CAUSAL MODEL FOR ASSESSING PROBLEMS OF DUTCH RESEARCH ASSISTANTS