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ABSTRACT

The Faculty of Public Administration at the University of Twente in Enschede (Netherlands) asked for a course in study skills to improve the passing rates of public administration (PA) students. Interviews with students and a questionnaire about study skills confirmed the need for such a course, but the University's previous experience suggested that existing courses were note adequate. The PROcedure to Promote Effective and efficient Study skills (PROPES) was developed and implemented in 1991. PROPES involves teacher mentoring, early confrontation with study pace (a measure of the number of examinations, weighted by difficulty that a student has to pass, divided by the number he or she must pass to finish in 4 years) changing attitudes, submitting a diagnostic questionnaire, and giving short courses in study skills training. Research results indicate that the PROPES group of 136 students improved their study pace and study effectiveness more than did the equivalent control group. PROPES students improved in experiencing less stress, using knowledge more often, receiving more signals about the learning process, and more often studying with friends. A screening function was partially met by PROPES, in that very high-performing students did not make use of PROPES because they did not need help, and low-performing students would not participate because of lack of motivation. Three figures and five tables present study findings. (SLD)

PROCEDURE TO PROMOTE EFFECTIVE AND EFFICIENT STUDY SKILLS (PROPES)

with PA-students

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1. Introduction.

In 1989 the board of the faculty of Public Administration of the University of Twente was concerned about the low passing rates of their first year students. The percentage of students that passed the number of exams necessary to graduate within four years, was about 30% instead of the planned 70%. Because of this the board requested the Educational Centre to organise training in study skills. But low passing rates are not necessarily due to poor study skills, they might also be caused by poor teaching skills, an imbalance between timetables for different courses and unrealistically high standards of achievement etc. All kinds of factors on different levels, like curriculum level, course level, teacher level and student level, might be responsible for low passing rates.

Therefore some lecturers and students were interviewed about those aspects. Also all first year students of 1989/1990 received a questionnaire about their study habits. Based on these data we concluded that the Department of Public Administration has spent much energy in improving the curriculum and the best teachers were giving courses in the first year. Apart from this a few courses could still be improved. However, another conclusion was that some students were in need of better study strategies. Our survey showed that low-performing students were not very willing to change their study habits. Most of them have just one solution to accelerate their low study pace: 'to work harder'. Even students, who spend a lot of time studying kept saying that they had to spend more time in studying.

The problem we faced could be formulated as follows:

"Given the situation, in which a faculty has already taken several measures to improve the curriculum and the courses for first year students and in which the passing rates stay low, which measures can be taken on student level to improve the study pace of these first year students ?"

In the mid seventies the Educational Centre had given courses study skill training for students several times. The training was based on certain instructional design rules, which accentuated the active participation of the students. Although registration for these training-programs was voluntarily, after a few sessions many participants dropped out. A few years of the same experience induced the Educational Centre to integrate study skills in regular courses. Several experiments with integration of course-specific study skills (Terlouw & Pilot,1990) resulted in better performances. Although these results were rather positive, some students still performed low because of their lack in general study skills like organisational strategies, planning, motivation etc.
All this had every reason to look for new developments in research literature on study ... thods.

2.1. Some conclusions from research on study skill (training).

Learning to learn implies two important learner characteristics: motivation and intelligence. Psychological research on study skills has been developed in two directions: motivational theories (attribution theory, VIE-theory) and (meta-)cognitive psychological theories (like information processing theories) (Pintrich a.o.,1986; Weinstein & Mayer,1986). In recent literature we see both approaches become more and more integrated (Zimmerman, Bandura, Martinez-Pons, 1992).
But research on study skills extended beyond the laboratory. The need for ecological validity actuated further integration of both approaches with instructional design theories. All this emphasizes adaptive teaching to individual differences (Corno & Snow,1986), just as intensive participation and activation of the students (Shuell,1988; Glaser,1991; Jonassen, 1991).

2.1.1. Some findings from research, based on motivational theories.

In relation to study skills the concept 'locus of control' (a main concept from the attribution theory) implies the following. "To the extent that students agree with counsellors and teachers on the predominant causes of their failures, they may benefit optimally from courses designed to improve their skills and proficiency in domains where they are lacking basic knowledge, such as, for example, study strategies. However, if students do not believe or realize that some personal or educational factors caused their failure, they probably will be less receptive to corrective attempts aimed at improving these shortcomings" (Van Overwalle, 1989a). Based on further research on this concept Van Overwalle a.o.(1989b) concluded: "Just telling students during a one hour course to underline main ideas in the text or to formulate questions for testing their retention may be insufficient to produce more accurate recall of important elements. ..... Previous research indicates that a simple explanation of the procedure is often sufficient for older students to identify main themes, direct their study to these elements and to generate adequate questions (see Brown & Smiley,1978; André & Anderson,1979).... How to integrate attribution change with strategy training within a freshmen population, however, remains a question for future research."
This citation illustrates the need of attribution theorists to integrate their concepts with those from cognitive psychological and instructional theories.

The concept 'self-efficacy' refers to the expectancy of succeeding at a task resulting from a belief in one's overall performance competence (Wood & Locke,1987). The term 'self-efficacy is a further exploration of the term 'expectancy' from the Valence-Instrumentality-Expectancy (VIE-) Theory. Zimmerman a.o. (1992) distinguished 'belief in efficacy for self-regulated learning' and 'belief in efficacy for academic achievement', the first influencing the second. Doing this Zimmerman a.o.(1992) integrated one concept from motivational theories (self-efficacy) with a concept from cognitive psychological theories (self-regulation).

Pintrich a.o. (1986) wrote a state-of-the-art article, which included: "Cognitive approaches have been strongly influenced by attribution theory (Weiner,1979). ... Attributional models stress the importance of the role of perceived ability and effort in achievement dynamics. ... Eccles's (1983) model details relationships among socializers (i.e. family, school and peer influences) and students' goals, self-concepts, expectancies, attributions, and achievement behaviour.... Hence, effort is a double-edged sword (Covington & Omelich, 1979), because effortful strategic behaviour may increase the potential for success;

however, if failure occurs, these students must conclude they lack ability". These authors concluded: "These more dynamic and differentiated constructs suggest promising linkages between motivational and cognitive variables to be explored in future research".

2.2.2. Some findings of research, based on cognitive psychological research.

Within cognitive psychology the term 'intelligence' has been replaced by the concept of 'information processing'. Weinstein & Mayer (1986) distinguished two different kinds of activities that influence the encoding process : 1) teaching activities, and 2) learning strategies. Categories of learning strategies are: basic and complex rehearsal strategies; basic and complex elaboration strategies; basic and complex organizational strategies; comprehension monitoring strategies and affective and motivational strategies.
By adding 'affective and motivational strategies' Weinstein & Mayer (1986) support Pintrich's conclusion about the integration of both approaches (cognitive and motivational) of study skills.

A promising concept within cognitive psychology concerns 'metacognition'. Weinstein & Mayer (1986) wrote "the term metacognition has been used to refer to both students' knowledge about their own cognitive processes and their ability to control these processes by organizing, monitoring and modifying them as a function of learning outcomes. The use of metacognitive strategies is most often operationalized as comprehension monitoring. Comprehension monitoring requires the student to establish learning goals for an instructional unit or activity, to access the degree to which these goals are being met, and, if necessary, to modify the strategies being used to meet the goals. ....
Comparisons of good and poor comprehenders have consistently shown that poor comprehenders are deficient in the use of active learning strategies needed to monitor understanding (Golinkoff,1976; Meichenbaum,1976; Ryan,1981)... It appears that comprehension monitoring can be taught using relatively brief educational programs".
Furthermore Boekaerts (1991) emphasized the concept 'self-assessment' in relation to 'comprehension monitoring' or 'self-regulation'. She wrote "self-assessment should be a major component of any competence category and that is a key variable in independent learning. Only through realistic self-assessment will the learner gain self regulatory control over goal-directed behaviour and become relatively independent of the teacher. In order to be able to assess this performance realistically, the learner must have internal standards of performance. These internal standards serve three major functions. In the first place, they form the basis of self-efficacy judgements before starting with the learning task. In the second place, the internal standards form the basis for self-assessment after performing (parts of) the task. This skill will make the learner less dependent on the teacher for feedback and on reinforcement and can be considered as an essential part of self-regulation. In the third place, internal standards may foster further growth and progress in that they form the input of future selves'.
Zimmerman, Bandura and Martines-Pons (1992) did research on the integration of both concepts, self-regulation and efficacy. "From a social cognitive perspective self regulated learners direct their learning processes and attainments by setting challenging goals for themselves, by applying appropriate strategies to achieve their goals, and by enlisting self-regulative influences that motivate and guide their efforts. Self-regulated learners exhibit a high sense of efficacy in their capabilities, which influence the knowledge and skill goals they set for themselves and their commitment to fulfill these challenges. This conception of self-directed learning not only encompasses the cognitive skills emphasized by metacognitive theorist, but also extends beyond to include the self-regulation of motivation, the learning environment, and social support for self-directedness".

Simons (1989) accentuates "For such training programs (training in selfregulation; author), however, we need more information about individual differences in selfregulation. As yet we do not know to what extent students have adequate conceptions and metacognitive knowledge, nor do we know how good students are at regulation processes. Good training programs, in our view, should depart from a sound diagnosis of the entering behaviour of the students".

We subscribe the conclusion: "Instructional strategies need to deal explicitly with motivational retraining as well as (meta-; author)cognitive skills and strategies.... Attributional training programs also may be useful, but only as part of a larger program that focuses on skill training. Changing attributions without changing actual skill and performance may be misleading by convincing students they have needed abilities, when in fact they do not" (Pintrich a.o.,1986; Glaser,1991).

2.2.3. Some findings of research, based on study skill training.

Literature on instruction and instructional design in relation to study skill training showed that different disciplines and departmental teaching cultures ask for different study skills. Entwistle (1988) stated: "It seems that departments perceived as teaching effectively and enthusiastically, and as providing freedom for students to choose their own topics and modes of learning, facilitate a deep approach of learning (Hodgson,1984). Departments which don't provide opportunities for choice and which impose a heavy workload are likely, unwittingly, to push students into surface approaches. While departments affect approaches to studying, they do not seem to affect either achievement motivation or study organization. Thus a complete model of student learning would have to include both the relatively consistent study habits and motivational patterns, as well as the interactions of departmental teaching methods and assessment procedures with students' approaches studying".
Pintrich a.o. (1986) accentuated "one of the hopes of educators has been to adapt instruction to individual learners; learning strategy research suggest that we may also improve learning by adapting learners to teaching and the tasks".
Como & Snow (1986) examined some hypotheses about the adaptation of teaching to individual differences among learners, some of the research reports that supports these hypotheses, and some of the instructional programs. They initiated a Theory of Adaptive Teaching, based on the idea that the majority of students need more aptitude support than conventional teaching provides, and that different kinds of specialized support will likely be needed for different kinds of students.
Weinstein (1988) made an instrument to collect data about individual differences between students concerning their study methods. The LASSI (Learning And Study Strategies Inventory) is based on two guidelines; the questionnaire should measure overt and covert thoughts and behaviour, a) that relate to successful learning, and b) that could be altered through educational intervention".

In the Netherlands Vermunt & Van Rijswijk (1988) developed the ILS (cognitive style inventory), based on concepts like deep level and surface level processing. Based on these ideas they also developed some instructional design rules to train students in deep level processing. These rules were derived from the well known concept of 'learning functions'. These learning functions imply: expectations, attention, encoding, comparison,

hypothesis generation, repetition, feedback, evaluation, monitoring on combination, integration, and synthesis (Shuell, 1988). "Instruction in learning strategies can affect learner characteristics by making specific strategies and methods available to the learner. The use of particular learning strategies during learning can affect the encoding process, which in turn affects the learning outcome and performance" (Weinstein & Mayer,1986).

2.3. Instructional design rules for study skill training.

Within the cognitive psychological theories the ideas about 'metacognition' and 'selfregulation' got much attention and are very promising.
Both directions (cognitive psychology and attribution/motivational theory) seem to become integrated more and more. Cognitive psychologist realise information processing strategies need to be completed with affective strategies. Ideas about 'instrumentality' recognizes the need of training and instruction in information processing strategies (Glaser,1991; Jonassen,1991). Actuated by this literature search we formulated several instructional design rules for measures on student level, that might be taken by a faculty to improve study pace (given the situation that a faculty has taken measures on course-, teacher- and curriculum level).
These instructional design rules are:

* stimulate students to be responsible for their own learning process,
* stimulate students to reflect on:
  - their study pace, and
  - their own study methods, like
    . cognitive information processing strategies (complex rehearsal strategies, elaboration strategies and organisational strategies for complex learning tasks, comprehension monitoring strategies)
    . metacognition and selfregulation
    . affective strategies
* stimulate students to develop an adequate problem definition
* use of diagnostic instruments to discover individual differences between students
* convince students of the profits of adequate study methods on the short and the long term
* take care of a clear and explicit demonstration of the strategies,
* realise intensive exercise and practice for all students
* give feedback on the results of the exercises and
* stimulate students to evaluate their own learning process.

3. PROcedure to Promote Effective and efficient Study skills (PROPES).

Based on the above mentioned instructional design rules for study skill training we developed a PROcedure to Promote Effective and efficient Study skills (PROPES).
This procedure consists of 5 steps, including one which is conditional for the other four.

Step 0. Involvement of teacher mentors.
This conditional step implies the involvement of teacher mentors. Each faculty of our university makes use of teacher mentors. A teacher mentor is a teacher who supervises a group of 15 students. Most classes are given in very large groups (all first year students together). To compensate this massality, all first year students are divided in small groups and each group has his own teacher mentor. Traditionally three times a year the teacher mentor meets the students of his group individually to talk about study results.
Step 0 implies to stimulate these teacher mentors to participate in the implementation of PROPES (step 1, 2 and 3). In order to do this the teacher mentors get a training-course in PROPES.

Step 1. Early confrontation with trend in study pace.
The first step involves a kind of a provisional advice. The Dutch government has provided by law that boards of a faculty give their first year students an advice at the end of their first year study. This advice concerns their ability to go on with the study or to leave and look out for other opportunities. The first step of PROPES stimulates the process of students' reflecting on their own study pace and motivation by confronting them with research results on trends in study pace of a former cohort from the same faculty. The research results show very clearly that "the study pace of the first term predicts the study pace at the end of the first year with an overwhelming adequacy", or "a once delayed study pace is very difficult to change". Immediately after the first term the teacher mentor brings together his group to talk about trends in study pace and consequences of these trends for a provisional advice after the first year.

Step 2. Changing attitudes to low study pace.
The second step involves the confrontation of first year students with experiences and ideas of fellow students from the second year of study. This step involves showing a *videotape* on which 5 interviews with fellow students are recorded (Overwalle a.o.,1989a). In these interviews each student tells his or her own story. All those stories have four aspects in common: the experience of failing an exam, the search for a cause, the improvement of study skills and the subsequent success in the examination. The reasons for this step are as follows. Many students attribute their low passing rates to one cause: not working hard enough. In many cases attributing exam failure to this cause is a mistake. By showing students that the causes of failure are quite differentiated and that they can be changed, the students become now aware of possible causes of their own underachievement. Due to this awareness some students might change their study habits on their own. Other students might need more support to change their behaviour. Therefore we developed the following step.

Step 3. Submitting a diagnostic questionnaire.
The third step involves giving students the opportunity to *diagnose* their strengths and weaknesses in study skills by means of a questionnaire (Weinstein,1988; Vermunt & Van Rijswijk,1988). Based on these results the students get an advice. The advice varies from references to parts of a book about study methods to training in study skills. The reason for this step in the procedure is twofold. In the first instance we assume that students differ in their mastery of several skills. Training in study skills should take into account these differences, because it is a needless waste of time to teach students skills they have already mastered. The other reason is that some students need only advice and some reference to a book, while others really need to be trained. The teacher mentor invites each student individually to talk about the results of the questionnaire and the study results.

Step 4. Giving short courses in study skill training.
The fourth step involves the training in different study skills. Only those students who were advised about training in a certain skill, are allowed to participate in that particular course.
The curriculum offers the opportunity to register for six courses, that vary from one meeting of two hours to three meetings of two hours each. Each course handles one study skill.

The six courses are about: timemanagement, selfregulation, orientation on learning goals and note taking, studying academic textbooks, systematic problem solving and examination strategies (Weiner,1988; Anderson & Armbruster,1991; Van Hout Wolters,1990).
The general design of each course implied the same elements in the next order:
1) acquaintance and explanation of course goals
2) reflection on existing study habits
3) orientation on other study methods
4) exercise in the new study skill related to a rather easy task
5) exercise at home in the new study skill regarding a rather complex task
6) reflection on learning experiences
7) eventually: repetition of 3 through 6 for another study skill.
The tasks and exercises students had to perform, were directly related to the domain specific knowledge of the regular courses during that period of time (Bransford a.o., 1989).

By means of these 5 steps of PROPES first year students are confronted quite early with their study pace, so they might reflect on this and their motivation. As a consequence they become conscious of study problems and possible causes. We expect this will result in more adequate attributions of their achievements. But adequate attributions are not always enough to change study skills. The procedure provides means for specifying attributions by developing a questionnaire and for behaviourial change by giving advice and offering opportunities for training in study skills.

4. Research methods.

4.1 Research questions.

Research on the effects of PROPES concentrates on effects on the meso and micro level. Because low passing rates were the main motive for the Department of Public Administration to order for a study skill training, the first research question is:
-1- What are the effects of PROPES on study pace and study results ?
Whatever the outcomes of this first question may be, the next question tries to give more information about the relevant factors or interactions of variables within PROPES that might have caused the outcomes of research the first question.
Therefore the second research question is:
-2- Are the goals of step 1 to 4 achieved ?
The main goal of PROPES is making students more responsible for their own learning process. This also implies that each step screens students who continue with the next step or continue on their own. I call this the 'screening function' of PROPES.
So the third research question is:
-3- Does PROPES perform the 'screening function' ?

Because the research to answer the above questions was rather extensive, we decided to answer the first research question extensively, and the other two questions partly. More detailed research findings on questions two and three will follow in other publications.

In the academic year 1990/1991 the PROPES was partly implemented due to practical circumstances. The videotape was not ready at that time.
In the months december and january 1991/1992 the PROPES was fully implemented in two faculties of the Twenty University (Faculty 'Public Administration' and 'Informatics').

This publication handles only about the results with PROPES in the Department of Public Administration in 1991/1992.

4.2. Research design.

To answer the first research question we used the 'interrupted time-series design with an equivalent no treatment control group'. To measure the effects of PROPES on study pace and study results we used data from the departmental student administration. During the first year and the beginning of the second year we assembled marks of each student after each term (PA 91/92). Because we do research in an educational development project we choose as a control group student from a former cohort (in this case from cohort 1989/-1990) (PA 89/90). These students were matched on two relevant variables: 1) study pace and 2) study results during the first term in the first year.
Because cohort-effects might influence the results we choose for a second kind of control group. This control group was selected from cohort 1991/1992 from the department of Business Administration from the same university. These student were also matched on the above mentioned two variables (BA 91/92).
Figure 1 shows an overview of the interrupted time series design with two kinds of equivalent no-treatment control groups.

terms	1.1	PROPES	1.2	1.3	1.4	2.1
experimental group (PA 91/92)	O1	X	O2	O3	O4	O5
controlgroup 1 (PA 89/90)	O1		O2	O3	O4	O5
controlgroup 2 (BA 91/92)	O1		O2	O3	O4	O5

Figure 1: *interrupted time series design with two kinds of equivalent no-treatment control groups.*

To find an answer to question two and three we made use of the quasi-experimental 'untreated control group design with pretest and posttest'.
During the implementation of PROPES the students were asked to answer several short questionnaires. Step 3 of PROPES includes a diagnostic instrument to analyze strengths and weaknesses in study skills. This instrument could also be used for research purposes.
At the end of the first year all students got the last questionnaire (we refer to next publications for more details about these last questionnaires).

5. Results.

5.1. Effects of PROPES on study pace and study results.

Related to this research we formulated the following definition of study pace and study effectiveness. This last concept is a specification of study results.
The *study pace* of an individual student is the number of exams (including the weight of these exams; not every course is as difficult as the others) in a certain period of time, divided by the number of exams (including their weight) the student has to pass in that

certain period of time in order to finish the study within four years.
The *study effectiveness* of an individual student is the sum of all examination marks (multiplied by their weight) in a certain period of time, divided by the total number of exams (including their weight) the student has to pass within a certain period of time in order to finish the study within four years. Figure 2 shows the formula for both definitions.

study pace	study effectiveness
$SPind\text{-}t = \frac{SUM\ (EXAMind\text{-}t \times WEIGHT)}{SUM\ (EXAMnorm4y\text{-}t \times WEIGHT)}$	$EFind\text{-}t = \frac{SUM\ (MARK\ of\ EXAMind\text{-}t \times WEIGHT)}{SUM\ (EXAMnorm4y\text{-}t \times WEIGHT)}$

Figure 2: *Definitions of study pace and study effectiveness.*

The first research question concerns the effects of PROPES on study pace and study effectiveness. Table 1 shows the mean and standard deviation in study pace of the experimental group (PA '91) and both kinds of control groups (PA '89 and BA '91). A graphical representation of these data is to be found in figure 3. These data reveal students' tendency to perform lower during the second term and to improve a little during the third term of the first year. The fourth term concerns summer vacation and improvement during these months is dependent on former results and therefore they are rather uncertain. The study pace during the first term of the second year again shows a slight dip. Exception to this tendency happens in the experimental group (PA'91). Instead of a dip in study pace in term 1.2 and an improvement in term 1.3 the experimental group shows an improvement in term 1.2 and a dip in term 1.3. This effect is significant at a 0.001 level.
Besides this the data show an other significant effect. The low study pace during term 2.1 in the faculty Business Administration ('91).

STUDY PACE during term:	PUBLIC ADMINISTRATION						BUSINESS ADMINISTRATION						F-prob.	
	'89		'90		'91		'89		'90		'91		PA between	BA between
	X	*sd*	X	*sd*	X	*sd*	X	*sd*	X	*sd*	X	*sd*		
1.1	.71	*.70*	.60	*.44*	.63	*.36*	.63	*.35*	.65	*.35*	.80	*.89*	.330	.104
1.2	.65	*.36*	.55	*.31*	.77	*.37*	.54	*.32*	.62	*.38*	.65	*.33*	.000 ***	.082
1.3	.84	*.47*	.93	*.41*	.59	*.30*	.77	*.30*	.83	*.28*	.66	*.29*	.000 ***	.000 ***
1.4	.06	*2.69*	.38	*.43*	.32	*.31*	.23	*.25*	.22	*.35*	.21	*.27*	.345	.915
2.1	.53	*.37*	.48	*.31*	.57	*.36*	.49	*.24*	.56	*.36*	.36	*.23*	.189	.000 ***

Table 1: *Oneway analyses of variance in study pace between three cohorts of two faculties.* (PA=Public Administration; BA=Business Administration; X=mean, sd=standard deviation; *=p<0.05, **=p<0.01, ***=p<0.001).

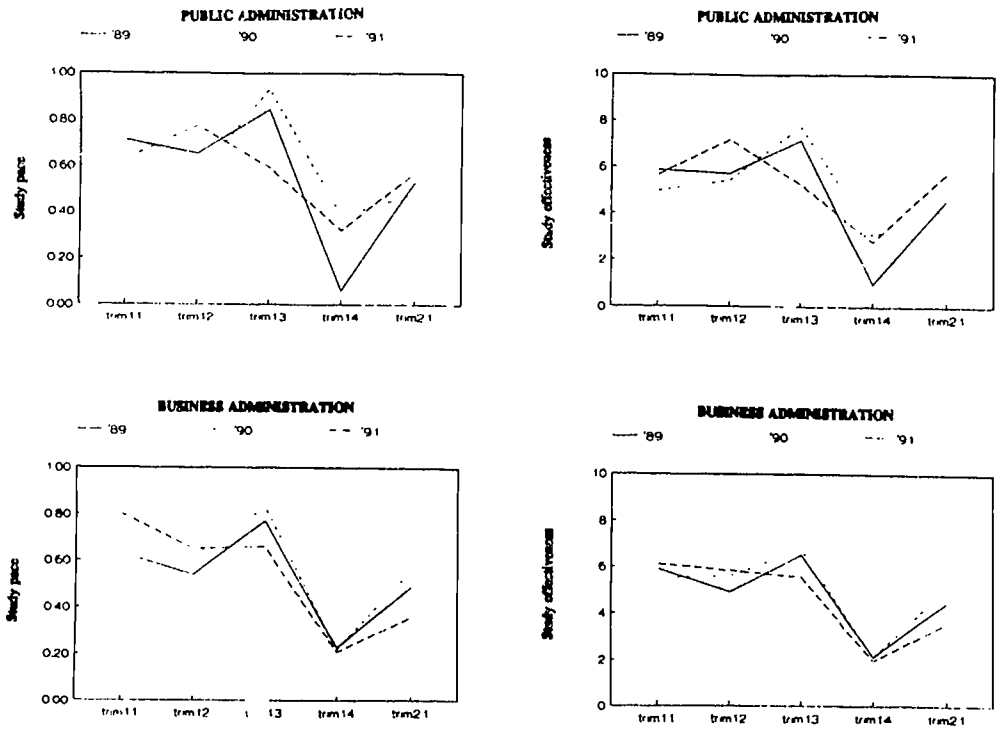

Figure 3: Study pace and study effectiveness of students from three cohorts of the departments PA and BA during five terms.

Table 2 shows the means and standard deviations in study effectiveness of the experimental group and both kinds of control groups. These data reveal an analog tendency as the data on study pace. This is not surprising, because study pace and study effectiveness are related operationalisations of effects. Study pace is a more global measure than study effectiveness. Beforehand we expected few effects of PROPES. In case we should not find effects in terms of study pace, an effect on a more refined measure like study effectiveness might as well be possible. In this research however we found effects on both measures.

STUDY EFFECTIVITY during term:	PUBLIC ADMINISTRATION						BUSINESS ADMINISTRATION						F-prob.	
	'89		'90		'91		'89		'90		'91		PA between	BA between
	X	sd	X	sd	X	sd	X	sd	X	sd	X	sd		
1.1	5.86	4.71	4.94	2.89	5.64	1.84	5.90	2.05	5.49	2.06	6.11	6.14	.155	.554
1.2	5.71	2.32	5.42	2.07	7.17	2.18	4.94	1.77	5.62	2.70	5.85	2.02	.000 ***	.016 *
1.3	7.14	3.22	7.75	2.96	5.25	1.75	6.51	2.03	6.75	1.75	5.56	1.91	.000 ***	.000 ***
1.4	0.97	>10	3.02	3.16	2.76	2.04	2.11	2.01	2.09	2.73	1.94	2.22	.399	.857
2.1	4.57	2.71	4.25	2.20	5.71	2.41	4.43	1.58	5.05	2.46	3.53	1.54	.000 ***	.000 ***

Table 2: *Oneway analyses of variance in study effectiveness between three cohorts of two faculties.* (PA=Public Administration; BA=Business Administration; X=mean, sd=standard deviation; *=p<0.05, **=p<0.01, ***=p<0.001).

Based on these analyses we might conclude that PROPES has significant positive effects on study pace and study effectiveness during the second term of the first year. Because PROPES was implemented in the middle of the second term these effects on study results at the end of the second term are short term effects. These short term effects however seem to become undone during term 1.3. Although the study pace and study effectiveness of the experimental group (PA '91) in term 2.1 is higher than these of the control groups we hesitate to claim this result as a long term effect of PROPES. This results seem to be due to a rather low performing control group (BA '91) in term 2.1.
In short, research data show significant short term positive effects of PROPES on study pace and study effectiveness. The results of the next research question will illuminate more about possible reasons for this short term effects.

5.2. Some findings about goal achievement of PROPES.

The theoretical model of PROPES is illustrated in figure 4. In short: PROPES is implemented to promote students becoming conscious of their possible study problems (step 1), to direct their attributions (step 2), to promote an adequate problem definition (step 3) and to train specific study skills (step 4). All this is meant to stimulate low performing students to change study behaviour, based on the assumption that positive changes in study methods will contribute to study results. The next parts of the model are not inserted in PROPES, because we first wanted more indices of effects of the most essential part of the model. Behavioral changes were measured by means of the diagnostic questionnaire on study methods. Students answered the same questionnaire in the beginning of the first term and at the end of the third term. Thus, these changes in study habits concerns changes as experienced by the students themselves.

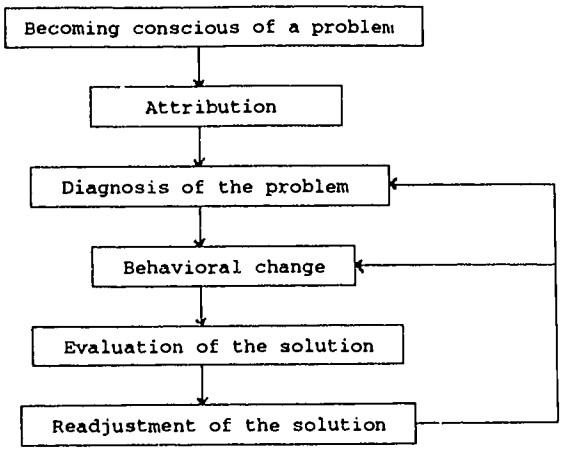

Figure 4: *Theoretical model of PROPES.*

The diagnostic questionnaire included eleven scales and 30 subscales: gathering information (preparing lectures, course participation and orientation on the subject matter), studying textbooks (structuring, studying details, personalization, memorization and critical reading), problem solving (analyzing problems, systematic problem solving, quantity of exercises), taking exams, experiencing no stress, metacognition (learning conceptions like: knowing facts, gaining insight and knowledge application), setting goals (for a certificate, a profession, a career, and personal interest), planning time, selfregulation (receiving signals about the own learning process, concentrating, taking measures and coping with stress), sources of regulation (external, other students, self and unknown) and time investment.
The results of the t-test (pairwise comparison between scores on the diagnostic questionnaire in term 1.1 with the scores in term 1.3) are shown in table 3. These data show significant positive changes in study habits, like experiencing no stress, selfregulation and source of regulation. Further analysis has given more details about these data, which means that students tended:
* to look more for structures in their textbooks,
* to experience less stress,
* to apply their knowledge in personal situations,
* to receive more signal about their own learning process,
* to cope better with stress, and
* to study more often with friends from the same department.

These changes in study methods were correlated with changes in study pace and analyzed by means of multiple regression. To measure study progress we used several time intervals (see table 4). Time interval 1.3-1.1 means the progress in study pace during the second and the third term of the first year; time interval 1.4 -1.3 means the progress in study pace during the fourth term (in this case summer holidays). Based on these data behavioral changes and progress in study pace were related. These data showed significant relations between scores on scales like 'studying textbooks', 'metacognition' and 'planning time'.

	X1.1	sd	X1.3	sd	Pt-test	α
gathering information	51.16	6.24	51.73	5.57	.548	-
studying textbooks	90.78	15.30	91.54	12.95	.693	-
syst. problem solving	57.22	6.42	55.86	11.16	.621	-
taking exams	18.92	2.87	18.41	4.14	.406	-
experiencing no stress	33.22	7.06	34.78	6.92	.034	*
metacognition	36.59	4.08	37.41	4.29	.260	-
setting goals	52.92	7.11	52.46	7.77	.737	-
planning time	26.54	6.01	26.68	4.97	.888	-
selfregulation	74.46	12.37	78.70	9.02	.014	**
source of regulation	58.89	15.34	62.30	11.17	.019	*
time investment	34.82	14.50	36.86	11.29	.494	-

Table 3: *Results of a pairwise comparison of test scores on the diagnostic questionnaire in term 1.1 and term 1.3.*

Analyzing the subscales we discovered that:

* students who said they paid more attention to details in textbooks, improved their study pace,
* students who said they realised studying implied less 'knowing facts' improved their study pace, and
* students who said they more often planned their study time, improved their study pace.

These results (table 4) also indicate that changes in study habits are related to progress in study pace during the second term of the first year, after PROPES was implemented. The changes in study methods even do explain progress in study pace on longer time intervals. Besides this these behavioral changes seem not related to the decline in study pace during the third term. All this seem to affirm the general idea behind the model of PROPES. Students, who participate in the first three steps of PROPES seem to change some study habits and to improve their study pace during the second term. But we still have to explore the extend to which the goals of each single step are reached.

changes in study methods	changes in study pace at certain time intervals						
	1.2-1.1	1.3-1.2	1.4-1.3	2.1-1.4	1.3-1.1	1.4-1.1	2.1-1.1
information gathering	-	-	-	-	-	-	-
studying textbooks	* .02	-	-	-	* .03	** .003	** .002
syst.problem solving	-	-	-	-	-	-	-
taking exams	-	-	-	-	-	-	-
experiencing no stress	-	-	-	-	-	-	-
meta-cognition	*** .001	-	-	-	*** .001	** .01	** .01
setting goals	-	-	-	-	-	-	-
planning time	** .002	-	-	-	** .005	-	-
self-regulation	-	-	-	-	-	-	-
source of regulation	-	-	-	-	-	-	-
time investment	-	-	-	-	-	-	-
R2	.46	-	-	-	.43	.34	.34
F-waarde	8.89	-	-	-	7.80	7.84	7.46
F-prob.	0.000 ***	-	-	-	0.001 ***	0.002 **	0.002 **

Table 4: *Relation between changes in study methods and progress in study pace during several time intervals.*

5.3. Some findings on the screening function of PROPES.

The screening function assumes students to be responsible for their own learning process. The faculty offers the opportunity for guidance in study methods by means of PROPES during the second term of the first year. Students decide by themselves to make use of this offer or to refuse. Therefore we expect that (very) high performing students will not make use of the PROPES, because they don't need any help. We also suppose that very low performing students won't participate in PROPES, because they are not motivated to study or because their study results are so bad they doubt on their capacities and are thinking of leaving the university.

Table 5 shows the number of students, participating in PROPES and taking one or more steps from PROPES. These numbers show that after each step about one third of the students goes further on their own. A remarkable point is the very low interest in the short courses in study skill training. Just one student participated in the time management course. It seems that the same problem as in the seventies repeats itselve, despite the attention for attributional and motivational aspects in PROPES. In the next paragraph (par.6) we will discuss this rather persistent disinterest in study skill training.

PROPES	STUDY PACE in first term of first year						total
	0-20%	21-40%	41-60%	61-80%	81-100%	>100%	
no steps	15 56%	5 31%	10 32%	8 32%	4 13%	3 60%	45 (33%)
step 1+2	3 11%	3 19%	11 34%	7 28%	12 39%	1 20%	37 (27%)
step 1+2+3	6 22%	7 44%	11 34%	7 28%	13 42%	1 20%	45 (33%)
step 1+2+3+4	1 4%	-	-	-	-	-	1 (1%)
step 3	2 7%	1 6%	-	3 12%	2 6%	-	8 (6%)
total	27 100%	16 100%	32 100%	25 100%	31 100%	5 100%	136 (100%)

Table 5: *Study pace of PA-students during the first term and participation in PROPES.*

Table 5 also shows the relationship between students' study pace during the first term of the first year (just before PROPES started) and participation in PROPES.
This table shows significant differences (chi-square; $p<.05$) between two groups of students (students who do or do not participate in PROPES). Very low and very high performing students participated less in PROPES, than other students, just as we expected.
An other implication of the screening function is that after step 1, 2 and 3 (confrontation, attribution and diagnosis) the lower performing students will go on with step 4 (training in study skills). Data about performance level in term 1.1. and participation in step 1+2 or 1+2+3 or 1+2+3+4 show no significant differences. Rather high performing (80-100% study pace) students participated more than we expected in step 3 (answering the questionnaire about study methods). Yet this is not surprising, when we suppose these students are looking for an confirmation of their own ideas about their study habits.
Furthermore the data revealed that low performing (20-40% study pace) students participated less in step 4 then we expected. The resistance to study skill training still seems to be present.
In brief, the data show that the screening function of PROPES functioned partly as we expected. Very low and very high performing students did not participate in PROPES. Nevertheless, more high performing students answered the questionnaire about study methods and less low performing students subscribes for a training in study skills than we

expected.
But we still have to explore the next questions:

- did students with a low study pace during the first term (20-40%) decide justly not to participate in the courses for training in study skills and to continue on their own ?
- was the decision of high performing students (80-100% study pace in the first term) to participate in PROPES correct or redundant ?

6. Conclusion and discussion.

The faculty Public Administration of the University of Twente asked for a course in study skill training to improve students passing rates. Analysis of the educational situation showed that several educational measures to improve the curriculum had already taken place and the best teachers were committed to the first year courses. Although a few courses still could be improved from an educational point of view the low passing rates were a serious problem. Interviews with students and a questionnaire about study methods also affirmed the need for study skill training. However, experiences with study skill training at this Dutch university in the seventies proved many drop outs after a few training sessions. All this was enough reason to look for new developments in literature on study methods. Based on this literature search we developed the PROcedure to Promote Effective and efficient Study skills (PROPES)(step 0: involvement of teacher mentors; step 1: early confrontation with trend in study pace; step 2: changing attitudes to low study pace; step 3: submitting a diagnostic questionnaire; step 4: giving short courses in study skill training).
In 1991 PROPES was first implemented at the beginning of the second term of the first year. Research results showed that the exparimental group improved their study pace and study effectiveness more than the controlgroups during the second term, immedeately after PROBES was implemented. However, this positive effect became undone during the third term.
Research data also proved that students who particated fully or partly in PROPES improved their study methods on certain aspects, namely: experiencing less stress, more often using knowledge, receiving more signals about their own learning process, better coping with stress and more often studying with friends.
Besides this the results indicated that students' improvement of time planning was positively correlated with progress in study pace. Students who realised that studying is less a matter of 'knowing facts' and students who studied more detailed also improved their study pace. These last results seem rather contradictory. Maybe the next interpretation will explain this results. When students leave secondary school, they have certain study habits. Experiences with university teaching proved that in the beginning students often think they understand the subject matter of teaching. However, after the first exams they discover their answers were too general and missed essential details. This makes them aware of the need to study in more detail. They realise these details are necessary to complete a good understanding of the complex subject matter. So details become essential to gain a better insight in complex subjects. In this situation details are no longer unrelated facts which you just have to learn by heart.
The screening function of PROPES was partly fulfilled. Very low and very high performing students did not participate in PROPES at all. Besides this more high performing students answered the diagnostic questionnaire then we expected. This result is not surprising, because this activity asks less time and the results might satisfy these students curiosity. Low performing students, however, participated less in the short courses study skill training. This finding confirms the well known demotivation of our students for study skill

training.
In short, the results of this research revealed a short term positive effect of PROPES on study pace and study effectiveness during the second term of the first year. These effects seem to be related to changes in study methods, like 'better planning of time', 'realising that studying is not just a matter of memorising facts', and 'discovering that details are important to gain insight in complex subject matters'. However, these results are short term effects. In regard to the short courses study skill training students resistances are rather persistent. Maybe secondary school experiences have made them 'fed up' with these sort of things. During informal meetings we asked students about this resistance. They mentioned reasons like 'we already know all about it', 'it is seconda school stuff', 'only nerds make use of these courses' or 'these courses are for bunglers'.
When we take into account the theoretical model of PROPES (fig.3, p.12) we see only the first part of the model was operationalised in PROPES. Aspects like 'evaluation' and 'readjustment' are not included in PROPES. Therefore we suggest to embody step 5 and tep 6 in PROPES, so the evaluation and readjustment will become integrated in the procedure. Because the meetings, as they were organised to implement step 1 and 2, were rather successful, we propose to organise step 5 and 6 in the same way: another meeting with their own mentor groups at the beginning of the third term to evaluate and readjust and to reflect on the concept of 'selfregulation' and to develop internal standards for self-assessment (others than time-investement). Maybe the submitting of short courses must be repeated each term or integrated in the meeting of mentor groups.
Based on this research we might conclude that the basic ideas of PROPES are promising and it is worthwhile to go on readjusting the procedure on certain aspects and to continue which further research on possible effects.

Point of discussion.

An interesting point of discussion still may be following.
With PROPES we tried to stimulate students' responsibility for their own learning process. PROPES stimulated behavioral change, but the positive effects were just for a short term. Students seem not very willing to participate in study skill training. Do we have to convince first year students of the benefits of study skill training ? Statistical information, gathered by scientific research on study skills and study results seem to convince only the scientists themselves.
To initiate long term behavioral change we need to readjust PROPES in the earlier mentioned way. But others propagate integration of study skill training into the obligatory part (domain specific courses) of the first year programme.

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