

RESEARCH ON LEARNING AND INSTRUCTION IN THE NETHERLANDS

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Abstract

This article describes the historical background, the theoretical orientations, the major themes, and the methodological aspects of research on learning and instruction in The Netherlands. Some information is given about the organization, i.e. the position of instructional (educational) psychology, the funding of research, and the journals. Possible ways of cooperation between the Netherlands and the Federal Republic of Germany are proposed.

Historical background

Educational psychology has got an old tradition in The Netherlands and Germany (Frijda & de Groot, 1983). In the thirties, psychology was strongly based on the ideas of the "Denkpsychologie" of the Würzburg School (Duncker, Selz, Külpe and Bahle in Germany, and Revesz en Kohnstamm in The Netherlands). After two decades, educational psychology was influenced by Gestaltpsychology and by behaviorism. In the fifties and sixties these two approaches dominated. Strikingly, the amount of progress in behaviorism in America was not taking place in Europe in such a strong way. A strong psychology of thinking and intelligence was and remained one of the central European research topics.

De Groot's main work on chess thinking (1946) was the first step into a direction of modern information processing psychology. In the fifties and sixties Soviet psychology was introduced by van Parreren and Carpay (1983). Soviet psychology was based on a socio-cultural-historical theory introduced by the Soviet scientist Vygotsky. Since the mid-seventies, research in the areas of learning and instruction and training has been proceeding at a rapid rate. Particularly within the broad area of cognitive psychology important progress had been made. Nowadays the Western European (i.e. the Dutch) approach can be characterized as "institutionali-

zed pluriformity": 1. Soviet psychology: "action oriented"; 2. Cognitive psychology (America): "information processing"; 3. or confrontation/integration of both approaches (de Corte, 1982). In the eighties the instructional-design theories were introduced (Gagné/Briggs, Landa, Merrill, Reigeluth). Instructional design is concerned with understanding, improving, and applying methods of instruction. As a discipline, it is concerned with producing knowledge, optimal "blue-prints"-knowledge, of diverse methods of instruction, optimal combinations of methods, and about situations in which each of these instructional methods is optimal (Reigeluth, 1983).

Since 1980, a Special Interest Group (S.I.G.) has been coordinating and stimulating a great portion of research on learning and instruction. More than twenty research-projects in progress at the moment have been financed by the Foundation of Educational Research. The S.I.G. has several sections (every section having its own research program): text-processing, problem-solving, teacher-behavior, social interaction/competence, learning disabilities, learning/instruction and information-technology

Theoretical orientation in instructional (educational) psychology

- Sovjet-psychology (socio-cultural-historical theory)

The socio-cultural-historical theory was introduced in instructional psychology by the Soviet scientist Vygotsky (1896-1934). A basic notion of this theory is the concept of activity (Bol, Haenen & Wolters, 1985). This concept presupposes a search for the causes of cultural/historical and genetic development, especially of higher mental functions and consciousness in phylo- and ontogenesis of man. How the individual child develops will depend upon its social and historical context and how well the cultural inheritance is mastered in the course of upbringing and education by performing actions. The concept of activity was made explicit later on by Rubenstein, Leont'ev, Lurija and Galperin.

In The Netherlands, van Parreren and Carpay (1980) strongly (and successfully) introduced Soviet psychology. Activity psychology has acquired a vast body of knowledge with regard to learning and teaching, and has developed a useful theoretical framework to improve educational practice. Some of the relevant Soviet publications have been translated into Dutch or English. The information exchange between Western and Eastern Europe is still growing (Bol, Haenen, & Wolters, 1985). The major research topics are: concept learning, psychomotor learning, mathematics, language, spelling, cognitive development, problem-solving, and metacognition.

- (American) cognitive psychology (the information processing approach)

Since the mid-seventies research in the broad area of cognitive psychology (with European roots: Selz, K lpe, de Groot!) has made important progress. Within cognitive psychology learning is a function of what the learners think and feel about their environments. The research is focused on the critical role that human cognitive processes, such as attention, motivation, knowledge acquisition, verbal and imaginal encoding, and cognitive styles, play in influencing human behavior. Cognitive psychology is nowadays in The Netherlands the most important approach in research on learning and instruction (Beishuizen, Hamaker, van Hout-Wolters & Koster, 1983; de Klerk & Knoers, 1984; Dijkstra, Dudink & Takens, 1983; Dijkstra & Span, 1986). The major research topics are: text-processing, problem-solving, metacognition, teacher-cognition, psychomotor learning, concept learning, partly combined with a growing interest in applications of information technology (computers, interactive video, compactdisc). Research on learning and problem-solving is increasingly domain-specifically oriented: on mathematics, thermodynamics, physics etc.

Comparison of Soviet psychology and cognitive psychology

The activity theory of Soviet psychology can, compared to the American psychology, be characterized as more oriented on integrated theories, more philosophical, more genetic (developmental), more teacher/treatment oriented, and more focused on cooperative learning ("collectivism"). In the Soviet approach there is an integration of motivational, cognitive, social, and developmental components of the learning-process. De Klerk (1983) stated that cognition (in cognitive psychology) and action (in Soviet psychology) are in fact two expressions of the same phenomenon. The similarities between both approaches are (Lodewijks, 1981):

- direct relations between learning and development;
- relation between instruction and development;
- study of learning processes;
- the learner is conceptualized as an active agent;
- learning is being studied as a process of qualitative changes;
- oriented on transfer: from specific to general;
- descriptive and prescriptive theorizing;
- educational research on instruction, diagnoses, and remediation.

Researchers in The Netherlands are combining theories and principles from American cognitive psychology and Soviet action psychology. Examples can be found in the areas of problem-solving, arithmetics, and metacognition (see for problem-solving for example Mettes, Pilot & Roossink, 1981; de Leeuw, 1983). Research in the S.I.G. covers the study of learning, development and/or instructional processes and can be characterized as follows:

- descriptively and prescriptively-oriented research;
- theories on learning and instruction;
- process-oriented theories;
- aimed at more or less real-life-educational settings ("ecological validity");
- directed at improving (optimizing) the process of learning and instruction;
- studying teaching-learning processes from a micro-perspective of instruction.

The research can be more or less mono- or multi-disciplinary. Test-construction is also possible.

In The Netherlands, there is a tendency towards a close relation between cognition and motivation (Boekaerts, 1983). In the future it might be necessary for the S.I.G. 'Learning and Instruction' to cooperate with the S.I.G. 'Motivation and Education'.

Methodological aspects

The methodological approach and research themes will be described as based on the research that is taking place within the Special Interest Group (S.I.G.) 'Learning and Instruction'. It should be stated in advance that an inventory of the research on learning and instruction in The Netherlands is not fully caught by a description of the research within this S.I.G., because, for example, developmental psychology and psychometrics are also making important contributions to instructional psychology. Furthermore all the S.I.G.-research is financed by the National Foundation for Educational Research in The Hague. But there is also a lot of research that is financed by the University directly.

Within developmental psychology methodological approaches as longitudinal research and cohort analysis are applied. Within psychometrics traditional test construction and test analysis methods are used and, besides that, modern item-response theory approaches are used (there is even a so-called Dutch school with respect to item-response theory). These methodological aspects will not be treated here (van der Linden, 1986)

The central research question of the S.I.G. is: How can it be explained that specified teaching- and learning processes arise and develop in a certain way and which factors are fostering this?

The research question implies, but not very explicitly, that two types of research are taking place within this group. The first part of it is pointing to descriptive/concluding research (how it can be explained); the second part points at prescriptive/intervening research (which factors are fostering this). Within both types of research the experimental method mostly is applied. A new treatment (for example a method for learning to solve mathematics problems) is constructed and compared with an existing treatment for effects on dependent variables (learning product measures), or existing treatments are compared for their effects. Besides learning products, learning process variables are studied (for example, protocol analysis, eye movement data, response time, help requests). Learning process data offer the possibility to explain and understand the effects of educational/instructional arrangements.

The relation of learning process variables to learning products is studied by means of correlation analysis. Sometimes student characteristics are taken into account. In that case, aptitude-treatment interaction analysis is performed and/or path analysis is applied.

New instructional arrangements can be constructed more or less intuitively without much theoretical foundation. They can also be developed rather straightforwardly from a theoretical frame of reference. There is a strong tendency to reject the first kind of research ('blosse Empirie'). A strong theoretical embedding of research questions and instructional design is highly favoured. This kind of approach makes it possible to understand why a treatment is successful or not. Besides that, the outcome of a study can deliver data to support, weaken, or modify a theory. The fact that most research is theoretically embedded does not imply that it is not practically oriented. There is a strong urge to do research that is ecologically valid. One of the criteria for getting funds is that a study has relevance for the situation within the classroom. The study must have at least potential relevance for educational reality. This means, for example, that instead of studying Tower Hanoi or Orcs-and-Hobbits problems problem-solving with quadratic equations is investigated.

Themes

Within the S.I.G. 'Learning and Instruction' different research topics are distinguished and discussed within separate work-groups. These topics will be mentioned below.

Cognitive learning and problem-solving is one of the themes. Descriptive and prescriptive/intervention research is taking place, for example studying expert-novice distinctions within solving thermodynamics problems or medical problem-solving, and designing and evaluating methods to train students to use heuristic methods in solving mathematics problems.

The search for general laws and rules that was strived for a decade or more ago has been more or less abandoned. Problem-solving and cognitive learning is nowadays conceived as a domain (subject matter) specific skill. Attention is given to the mental models and knowledge structures that are acquired by the student during learning and problem solving activity (Mettes, in press). Student characteristics such as motivation, fear or failure and structuring ability are also taken into account (Beishuizen, 1986; de Leeuw, 1983; Simons, 1984; Boekaerts, 1978).

Text processing is a second important research theme. The theoretical orientation is aimed at finding the underlying factors of the processes and products of text processing activities. These factors are, on the one hand, the skills, strategies, and metacognitive activities of the student (Boekaerts, 1983), and on the other hand, the variables within the text. Schema theories are important in this respect. Schemas that the student has at his/her disposal direct the information searching processes and function as storage and retrieval systems. The theme is a very broad one, because elementary to higher order skills are studied: recognition of phonemic and graphemic codes, word recognition and spelling (Assink, 1985; van Daal, Bakker, van der Leij & Reitsma, in press), sentence and story comprehension, and studying texts from study books (Schmidt, 1982). These skills are being studied separately (van Dam, Brinkerink-Carlier, & Kok, 1985; Peeck, van den Bosch & Kreupeling, 1982) or the relation between them is studied sometimes in a longitudinal way (Mommers, 1986). Prescriptive studies are, on the one hand, aiming at the training of elementary skills that are conditions for higher-order skills, for example training of technical reading in order to improve story comprehension. On the other hand, higher order skills are trained directly (Beukhof, 1986; van Hout Wolters, 1986).

Within both described themes that are known up to now students of regular education are studied. A special kind of research is taking place directed at students with learning disorders, being hampered by special defects while learning cultural skills like reading, writing and arithmetic. The research is aimed at: 1. finding the determining factors of these problems" lacking or poorly developed elementary skills that are indispensable for the performance of a more complex task, for example, phonemic coding as a condition for technical reading, or student characteristics like hyperactivity or hemisphere-dominance; 2. the construction and evaluation of diagnostic instruments; 3. the development and evaluation of instructional arrangements to compensate for or to remedy the weak skills or characteristics (van Daal et al., in press).

An important factor within the teaching-learning process is the teacher. The quality of the teacher, the adequacy of his/her decisions, for example, the way in which the student is encouraged and helped, are at least as important as the quality of the textbook. Research regarding teacher behavior as an intervening variable between textbook and student is another research theme that has emerged during the last few years.

Besides descriptive research (for example, studying what is going on in the teacher's head to determine on which factors his/her decisions are based, or investigating how freshmen teachers cope with stress), prescriptive research is done (for example, how to train teachers to behave systematically according to certain principles).

Not only teachers are teaching. Students can cooperate and teach each other while solving problems. The social interaction between students (peers or groups) as a means of mutual teaching and learning is another research theme within The Netherlands. The type of cooperation, characteristics of the peers or group members (homogeneous/heterogeneous), environmental factors, and the kind of tasks are important variables influencing social interaction and learning (v.d. Linden, 1986; van Oudenhoven, van Berkomp & Swen-Koopman, in press; Vedder, 1985). The theoretical orientation for this kind of research is derived from cognitive psychology, social psychology, and developmental psychology.

Not only teachers and students can act as tutors. Modern information technology offers means to guide the learning processes of students. Teaching aimed at and adapted to the individual student is made possible in this way. Although research within this field has been done for many years, there is a rapidly growing interest among instruc-

tional psychologists in The Netherlands to use the computer, in one way or another, to guide the knowledge acquisition processes of students. Also the growing use of computer-guided instruction for students with learning disorders is striking. Apart from computer-guided instruction, studies on teaching programming languages and on the effects of LOGO instruction are within the scope of interest (Breimer & van Hees, 1985).

Computer-guided instruction can take on several forms. Besides drill-and-practice like and tutorial programs, programs to use information retrieval systems (Beishuizen, 1986; de Leeuw, van Daalen & Beishuizen, in press) and intelligent tutoring (knowledge based) systems (Bierman & Kamsteeg, 1985) have been and are being developed to teach, for example, spelling rules, technical reading, text processing, and solving mathematical and thermodynamics problem solving.

Within most of the themes expertise from different (sub) disciplines is needed. For example, research within the area of learning disorders requires contributions from scientists with a background in pedagogy, developmental psychology, psychometrics, cognitive psychology and instructional technology (van Daal et al., in press). This illustrates the statement of Lodewijks (1984) that the study of teaching-learning processes is not a matter of one (sub) discipline. This is also exemplified by the research regarding learning potential measurement (the construction of learning tests to assess the zone of proximal development - Vygotsky) used, o.a., to distinguish between learning-disabled and learning-retarded children (Meyer, Perrenet, Zeillemaker, de Leeuw, Groen, Kok & Blokland-Vogelesang, 1985). Viewpoints from psychometrics, cognitive psychology, instructional technology, developmental psychology, and special education are relevant in this respect. Other examples from other research themes could be mentioned to illustrate Lodewijks' statement. Suffice it to give a last example, by pointing at the already mentioned multi-theoretical orientation of social interaction teaching and learning.

Position of educational psychology

In The Netherlands, educational psychology is both a part of psychology as well as a part of the interdisciplinary science of education (together with the sociology, pedagogy, economics and law of education). At four universities (Groningen, Nijmegen, Leiden and a cooperation between

the two universities of Amsterdam and Utrecht) educational psychology has been integrated in interdisciplinary programs. At one university (Twente) a special interdisciplinary approach with a technological "flavour" exists. The department of instructional design is somewhat comparable to a department of educational psychology. At Tilburg university, however, educational psychology is just a part of the discipline of psychology (monodisciplinary).

Furthermore, it is important to note that in The Netherlands there is, on the one hand, a rather large group of psychologists who limit their research and teaching to what is called instructional psychology (emphasis on the processes of learning and instruction) and, on the other hand a large group of educationalists performing research and teaching on the much broader field of education (curriculum development, innovation, evaluation etc.) The latter mostly functions within departments of pedagogy or within the interdisciplinary programs. Furthermore there are some developmental and social psychologists with an interest in matters contiguous to educational psychology. Last but not least, educational psychology is taught to future teachers in separate teacher-training institute or in departments of universities. There are only incidental connections between the educational psychologists, teaching psychologists and pedagogists and those who train teachers. Though there are some specialists in subject matter didactics (German Fachdidaktik), their number and influence is very small. Research on subject matter didactics is, mostly, done by educationalists and educational psychologists.

Educational psychologists are members of one or more of three organizations: the division of educational psychology of the Dutch Psychological Society (with an emphasis on practical and professional problems); The Dutch Society for Research on Education (uniting psychologists, pedagogues and sociologists of education) and the Special Interest Group on Learning and Instruction (founded by the Dutch Foundation for Educational Research in order to get judgments of new research plans by investigators amongst themselves and to promote tuning and integration of research-projects). Furthermore, there is an organization of educationalists and educational psychologists working in counseling departments of the universities.

Funding of research

University researchers still have a small chance to perform free research projects, but time and space for this

kind of research becomes more limited everyday. Much university research is now organized in integrated research projects in which several researchers cooperate on the basis of an officially approved program of research. The funding of these programs by the government is guaranteed for five years. Between five and ten of these integrated programs now exist within educational psychology. Furthermore, much educational research is funded by the National Foundation of Educational Research in The Hague. This institute finances three kinds of research: projects requested by the government (40%), projects requested by schools (40%) and projects proposed by investigators (20%). The budget of the Foundation is about 21 million guilders a year. There is also a Foundation for purely scientific research that in theory also finances research on learning and instruction. In practice, however, it is very difficult to get funds for this kind of research via this organization, because of the great competition with many different disciplines. There is, as yet, hardly any private funding of research.

Journals

Most of the Dutch research on educational psychology is published in the Tijdschrift voor Onderwijs Research (journal of educational research), Info, Pedagogisch Tijdschrift (pedagogical journal) and Pedagogisch Forum. All articles in these journals have abstracts in English.

Cooperation with Germany

We think that closer contact and cooperation in research and theorizing on educational psychology between German and Dutch colleagues is worthwhile and necessary. Part of this can be reached via EARLI. However, bilateral contacts may prove to be useful in addition to the general European cooperation that often proceeds slowly.

For Dutch researchers the language-problem will be less problematic than for German researchers. Many Dutchmen learned to speak German as well as English in schools. We prefer to speak English. However, if necessary for communication and cooperation, we can add some poor German too.

We think that bilateral cooperation is important for two main reasons:

- a. in order to promote theorizing on instructional psychology and to encourage an European style;

b. in order to carry out international projects that, in times of decreasing funds, might improve our research and our chances of getting funded.

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