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The Role of the Task and Reward Structure in Cooperative Learning

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ABSTRACT *In cooperative learning both the task structure and the reward structure affect the quality of learning. How to optimise the effectiveness of cooperative learning by manipulating the task and reward structure is the central question in this paper. Two conflicting approaches are considered. In the developmental approach the task structure is seen as the key element in explaining why cooperative learning works or not. In the motivational approach the reward structure is seen as the core element. Evidence is presented that shows that cooperative learning cannot be effective unless the task and the reward structure are compatible. With simple tasks the reward structure hardly needs special attention. Feedback on task accomplishment is sufficient. With more complex tasks the reward structure needs more fine tuning with the task.*

Key words: *cooperative learning; primary school; task structure; reward structure*

INTRODUCTION

This article addresses the question how can either the task or reward structures or both be used to optimise the outcomes of cooperative learning. Below we will further define the concept of task structure. For now we describe the task structure as the problems students have to solve. The reward structure refers to means used by teachers, tutors or peers to regulate students' willingness to learn, their motivation for, intensity and way of learning.

It will be argued that the quality and effectiveness of cooperative learning depends on both the task and the reward structure. When the task structure is simple and the teacher supervises students' learning activities either directly or indirectly, feedback on task accomplishment is a strong reward, which is readily available in settings of cooperative learning. In these situations it seems as if no special reward structure is used. The reward structure should be considered carefully, however, when the task structure is complex.

Throughout this paper the concept of cooperative learning refers to task situations in school in which at least two students work together in problem solving.

When we refer to a particular type of cooperative learning in terms of group size and distribution of expertise, e.g. tutoring, we will make this explicit.

The relative influence of task and reward structure on cooperative learning has been dealt with by Slavin (1987) in the context of a controversy between two approaches to cooperative learning: the developmental approach and the motivational approach. Researchers in the Vygotskian and Piagetian traditions represent the developmental approach. In these traditions the extent to which cooperative learning gets off the ground is deemed to depend on the task structure. In his further analyses and description Slavin tends to use characteristics of the Piagetian tradition as typical of both the Piagetian and the Vygotskian traditions. He states that from the perspective of developmental approaches students need conflict arousing task structures if genuine cooperative problem solving is to get off the ground. A conflict comes about when students experience that a given choice of skills and knowledge which they have used for solving a problem presented in the task did not lead to a satisfactory solution, while finding a solution was expected. In the Piagetian tradition this kind of conflict is perceived as primarily an individual, cognitive conflict. Some of Piaget's colleagues or followers clarified that the requirement to work together with other students may raise the chance that a student experiences a cognitive conflict (cf. Russell, 1982; Doise & Mugny, 1984). Such a conflict can be a possible starting point for discussions about problem solving strategies. The presentation and discussion of different perspectives on and evaluations of proposed problem solving strategies also feed conflicts, which are referred to as socio-cognitive conflicts (cf. Doise & Mugny, 1984).

Throughout this paper we will refer more to the Vygostkian approach and other socio-constructivist approaches to learning than to the Piagetian. Evidence that conflict arousing task structures can play a role in facilitating cooperative learning is scant in the Vygotskian tradition (cf. Vedder, 1985; Van Oers, 1987). Cognitive conflicts are less important in this tradition than in the Piagetian. It is not so much the onset of an individual's activities triggered by what might be a cognitive conflict which is being explored, but development and learning which take place in ongoing social interactions (cf. Lomov, 1983; Kruger, 1993; Cole & Wertsch, 1996). An active person is presupposed. A learner's skills and knowledge are used, restructured and enriched in activities that are molded and restricted by a task interpretation or, in a collaborative setting, by task interpretations of the cooperating persons (cf. Moll, 1990; Brown & Campione, 1994; Rogoff, 1998; Mercer, 2000).

Slavin (1987) agrees that tasks like the ones used in Piagetian research may induce conflicts and impact on learning and development. However, he is convinced that this approach is not useful for stimulating and regulating learning in schools, since the type of task that are used are non-representative of the type of tasks used in school. Slavin represents the motivational approach (Slavin, 1983). This approach focuses on reward structures to explain the processes and outcomes of cooperative learning. He contends that cooperative learning is likely to be ineffective if students are not rewarded as a group, while at the same time they are held personally accountable for reaching the learning goals. This is his favourite reward structure, which is an external reward, but clearly different from simple feed-

back or even verbal praise upon task accomplishment, which are also external rewards.

Although Slavin (1987) suggests that the developmental approach is of no use to school settings, he still tries to reconcile the approaches. He tries to bring the approaches together by focusing on the role of giving and receiving explanations as the two important elements of cooperative learning which best explain learning gains (Webb, 1982, 1992). The elements are deemed important in both approaches and, what is more important, research shows that elaborated peer discussions and peer explanation are intensified when an adequate reward structure is used. He suggests that research using the developmental approach in a school context would benefit from using an adequate reward structure (cf. Slavin, 1987). Reward structures are meant to facilitate all students contributing effort, skills and knowledge to a joint problem solving process.

Slavin's attempt to clarify differences between the approaches and to reconcile them is of great value, but the scope of his attempt is limited. He considers the role of the task structure mainly from a Piagetian perspective, describing, or perhaps we should say mystifying, the task structure as an inherently conflict arousing structure. We will argue and show that characteristics of the task structure itself should be explored in order to resolve this apparent controversy.

Simple and Complex Task Structures

A task structure has a subjective and an objective side. The subjective side refers to the perception of the task structure, which has, according to Leont'ev (1979), a descriptive element which can vary in terms of completeness and adequacy. Leont'ev calls this the meaning of the task. It also has a more personal evaluative element. Leont'ev refers to this side as the sense of the task, the personal significance. Furthermore, at this subjective side it is helpful to distinguish between levels of information processing, as is done for instance in a distinction between low road and high road learning (Salomon & Perkins, 1989) or surface or deep approaches to learning (Schmeck, 1988). Every subjective task structure also has an objective counterpart, which is the task as it is or has been presented in text or in a teacher's instruction. It refers to the materials that are used to present the task to the students and that are needed to solve the task and to the goals entailed in the task. Russell (1982) added an important element to the notion of the objective task structure, namely criteria for judging what is a correct and publicly acceptable task and task solution.

Personal significance is where objective task characteristics and personal interest or motivation meet. If the personal significance of a task is strong a person does not need an external reward to focus his or her attention, to stay concentrated and persevere in solving a problem. Personal significance adds to problem solving what in other traditions is called intrinsic motivation (Deci & Ryan, 1985).

In this subsection we distinguish between simple and complex task structures and will define these as precisely as possible. It should be clear that the simplicity or complexity of a task structure cannot be determined independent of the students for

which the task is meant in the first place. This is implied in the notion that task structures have a subjective side described in terms of adequacy and completeness of the perception of the task and in terms of its personal significance.

Van Oudenhoven *et al.* (1987) published a study on the role of feedback given by peers on children's spelling achievements. The intended learning is a typical example of what Salomon & Perkins (1989) call low road learning (trial and error controlled by feedback, exercises with an almost automatic character). A simple instruction like 'make the exercises, let your neighbour check your answers and discuss the errors' led to a considerable improvement in spelling achievements. It seems that the prompt feedback in combination with the simple task structure can explain the findings. Simple task structures are characterised by:

- a restriction of choice as to the acceptable answers (e.g. particular conjugations in Dutch can either end with d, t or dt, or particular words can be written either with 'a' or 'aa');
- a possibility for trial and error controlled by feedback;
- the circumstance that a lack of agreement should not lead to losing track of the problem and its possible solutions;
- the circumstance that both the problem and the possible solutions (the different answers given by the students) are well represented in the subjective task structures.

The simplicity of the task structure allows for a simple type of cooperative learning to be effective. It is the kind of task and task situation which inherently leads to the correct solution, although it may involve the explanation and rehearsal of spelling rules and the formulation and rejection of wrong (and possibly correct) arguments. The reward structure is, as it were, defined by a combination of the simplicity of the task and the instruction to check each other's answers. In short, it does not need additional and special attention as long as students are working towards task completion.

Studies of tutoring programmes are also interesting in this respect. The programmes are not characterised by the use of a reward structure as proposed by Slavin, but by a reward structure entailed in the feedback by the tutors. Yet, many studies show that tutoring can provide a strong and rich learning setting affecting the cognitive as well as the social-emotional sides of both tutees' and tutors' learning and development (cf. Leland & Fitzpatrick, 1994; Goodlad, 1995; Merrill *et al.*, 1995; Simmons *et al.*, 1995). Shanahan (1998) makes an interesting observation in his review of studies on tutoring. He contends that the success of tutoring may be due to an emphasis in tutoring programmes on basic skills. He suggests that most studies focus on low level skills. This observation fits in very well with ours, that no special attention is needed for the reward structure when the task structure is simple, when students work towards task completion and outcome-oriented feedback from the tutor is available.

A third source of evidence can be found in studies on social facilitation effects in cooperative learning (cf. Gagné & Zuckerman, 1999). Social facilitation refers to an increase in effort by a person working in a group due to the feeling or awareness

that others, either an adult supervisor or a classmate, can evaluate ones performance. With respect to classmates this is more likely to happen with easy tasks, because here the cognitive requirements for controlling each other are limited (cf. Zajonc, 1965). With difficult or complex tasks many students will not be capable of controlling classmates' performance simply because the tasks are too difficult for themselves.

What about the Piagetian conservation tasks that Slavin referred to in his evaluation of the developmental approach: is it the cognitive conflict or the simple task structure which explains the positive outcomes of peer learning with these tasks? Cognitive conflicts are difficult to study, because we have no direct access to them. They are mostly inferred on the basis of learning outcomes (Roeders, 1985; Tudge, 1989). Moreover, scholars like Donaldson (1978) and Russell (1982) have presented evidence that findings of conservation experiments can be explained without inferring cognitive conflicts. These scholars do not use the concept of a simple task structure, but specify an important ingredient, namely knowing possible solutions and having a clear grasp of the criterion that a solution should satisfy. The conservation tasks used arouse very little uncertainty in students or allow that a peer or tutor can easily and convincingly reduce uncertainty. These are simple task structures. What is left of the cognitive conflict is the situation that two collaborating children would not automatically solve a problem in the same way. Russell (1982) and also Doise & Mugny (1984) showed that only when children were already close to grasping the correct solution of a conservation task in terms of acquired skills and knowledge would collaboration help them to make the step towards a correct solution. The importance of these eligibility criteria for participation in conservation experiments or the conditions which have to be satisfied in order to realise developmental progress in the experimental situation can hardly be overestimated (Doise, 1985). The learning process may be explained in several ways. The children may learn partly by modelling (the other child's solution, together with the instructions given by the teacher) or they may experience the existence of different perspectives on one and the same problem and become aware that a particular solution might be more correct than another. In any case, children make a step towards self-regulated, almost spontaneous learning without losing track of the task situation. Paraphrasing Ames & Murray (1982) and a more recent representation of the same notion (Schwartz & Bizuner, 1999), we can say that such simple tasks mean that in settings of cooperative learning two or more wrongs can eventually make a right.

Tasks which aim at deep approaches or high road learning, as it is called by Salomon & Perkins (1989), i.e. learning that involves a deeper understanding, detailed deliberations and hypotheses, require much more effort management and self-regulation. Such tasks require that students leave the safe grounds of already known and automated skills. Not all students are equally fond of doing this (Clifford, 1990; March, 1996). And not all students are capable of doing it in a satisfactory manner. If tasks become too difficult for students they may easily lose control of what they are doing and will not learn (McAuliffe & Dembo, 1994). Studies amply show that in cooperative learning settings with complex tasks learning also depends on the extent to which students use and restructure earlier acquired

skills and knowledge to grasp the task (cf. Webb & Farivar, 1994; Hoek *et al.*, 1999; Van Boxtel, 2000). The complexity of the task in relation to an individual student's resources for resolving it may make interactions with classmates or even a teacher indispensable. The discussions and conflicts help students to stand back from and reflect on their preliminary analyses of the problem and proposed solutions and to be and feel stimulated by others to focus on verbalising, generalising and testing their own and others' problem perceptions, arguments and proposals. Cohen (1994) shows that generally teacher regulation of cooperative learning may contribute to the quality of cooperation between students and to learning gains. However, Cohen warns against teacher regulation that interferes with the cooperative learning processes that constitute its quality and value in relationship to complex tasks. Outcome-oriented feedback and direct supervision and guidance would likely diminish students' efforts for self-regulation and risk taking (Black & Wiliam, 1998).

How can one stimulate students' willingness to get involved in such learning with more complex tasks if not all of them are emotionally and cognitively sufficiently prepared? In order to convince them that they should dive into the deep and work together in such a setting of cognitive and affective uncertainty, a reward structure as proposed by Slavin may be helpful. Through this reward structure students find that only by supporting the learning of their classmates on their team and by improving each others learning performance can they gain personal reward as well as a reward for the team's performance.

For years a discussion has been going on as to whether the positive value of intrinsic motivation can be undermined by using external rewards, irrespective of the available intrinsic motivation (Cameron & Pierce, 1994, 1996; Ryan & Deci, 1996). Here is not the place to discuss this matter. In daily practice teachers simply cannot and should not assume that all students' intrinsic motivation is of a type and quality that keeps students focused and concentrated on any learning task that they are confronted with. For some students it is obvious that schoolwork lacks personal significance, whereas for others it is difficult to tell whether they find sufficient personal significance in schoolwork. These two groups of students at least will have to be motivated to complete learning tasks in school. We assume that motivating these students can be accomplished by using an external reward structure, particularly when they are not perceived as controlling and when students experience a link between the reward structure and the activities they are involved in. This is particularly the case in situations of cooperative learning, in which the reward is linked to the effectiveness of the efforts towards supporting each other's learning (cf. Ames, 1992).

For a further exploration of the relationship between task structure and reward structure in cooperative learning we will present and evaluate a tutoring programme for reading intended to enhance students' reading speed and their use of reading strategies which should help students to improve their reading comprehension. Hence, the programme focuses on low level as well as on high level skills. Here we focus on implementation of the programme, particularly on the way students have dealt with the task structure. We will use this study to argue that although tutoring programmes may benefit from a special reward structure, this will not be the case irrespective of the task structure.

Step-on

Step-on is a class-wide tutoring programme for reading in The Netherlands. Seventh grade primary school children (10–11 year olds) tutor fourth grade children (7–8 year olds). The programme is based on the Vygotsky inspired notion that in order to become a process of language learning and co-construction of meaning, reading has to be structured as a learning process grounded in cooperation and communication between one less and one more experienced learner. Expectations about effects focus on both the tutee and the tutor.

Before tutoring starts tutors were trained in how to structure the cooperative effort and how to keep the tutees' motivation high over eight 45 minute sessions. Tutors were instructed to practice role shifting, which means that they practically implemented a model of reciprocal teaching (Palinscar & Brown, 1984). Moreover, they learnt strategies for approaching a text as a task for joint meaning construction. The strategies were aimed at activating prior knowledge, enriching the vocabulary, predicting how a text continues, controlling how well a text is understood and focusing on the main issues in summarising the text. Tutors are supposed to transmit these strategies to their tutees by slowly but steadily shifting the planning, execution and control of the learning activities from themselves to the tutees. Hence, they implement a typical Vygotskian model of learning characterised by a shift from other to self-regulation. The programme foresees 54 tutor sessions over 18 weeks.

The developers decided to include a special measure in the programme aimed at motivating tutors and tutees. The developers assumed that (i) the variety of tasks from which the students can choose and (ii) adding a set of particular fun activities to the tasks would motivate children to continue working with the programme. Particularly with respect to fun activities however, Blumenfeld (1992) suggests that these may distract from actual learning if they are not well integrated with the learning tasks. Tasks should be structured in such a way that having fun goes with learning. Students should not be brought to a position in which they can choose for either fun or learning.

Since this study focuses on the implementation of the task structure the findings with respect to the learning outcomes will be presented first. Two broad clusters of effects were measured: cognitive effects and socio-emotional effects. We found that the vocabulary of step-on students had grown *less* rapidly than that of control children. Tutors reported a higher level of school-related well-being than control children. No other effects (reading speed, reading comprehension and reading attitude) were found, neither in the cognitive nor in the socio-emotional domain and neither in the fourth grade nor in the seventh grade.

METHOD

Subjects

The study was conducted in The Netherlands. Implementation data were collected from tutors. A total of 261 tutors participated, aged 10–12 years, 131 boys and 130 girls. The children visited 12 different schools spread over the country. Schools were

TABLE I. Characteristics of the participating Moroccan/Turkish and Dutch students and their parents

	Moroccan/Turkish	Dutch
Number of girls	43	87
Number of boys	49	82
Mean age	11.3	11.0
Parents' average level of education	0.9	1.6

picked at random from a list of 150 schools participating in a special reading programme for disadvantaged children. This means that in terms of socio-economic status the sample is rather homogeneous. Immigrant children, especially Turkish and Moroccan children, are over-represented in these schools. Further information about the subjects and their parents can be found in Table I.

The schools gave information about the parents' highest achieved level of schooling. This information was recoded on a scale ranging from 0 to 3 (0 = did not complete primary school, 1 = did complete junior vocational stream, 2 = completed either a school for general secondary education or a senior vocational stream, 3 = holds a college or university degree). Not all children were equally disadvantaged. Dutch parents achieved significantly higher levels of education than Turkish and Moroccan parents (mean = 1.64, SD = 0.78 and mean = 0.93, SD = 0.61, respectively; $t = 6.26$, $P = 0.000$). In both groups most parents completed a lower vocational stream (immigrants 73%; Dutch 50%).

The boys were significantly but not substantially, older than girls (mean = 11.19, SD = 0.66 for boys and mean = 11.06, SD = 0.65 for girls; $F[1,240] = 5.10$, $P = 0.025$). We also found an effect of ethnicity. Moroccan and Turkish children were significantly older than Dutch children (mean = 11.36, SD = 0.72 and mean = 11.02, SD = 0.60, respectively; $F[1,240] = 15.33$, $P = 0.000$). The latter finding reflects the well-documented achievement gap between Dutch children on the one hand and Turkish and Moroccan children on the other (Alkan, 1998). Within the Dutch school system this gap is reflected in age differences through grade repetition.

Instruments

As part of the programme all tutors were requested to fill out an administration card at the end of every session. They were to enter the date, the title of the book or books they read and what kind of task they completed. For our purposes we distinguished three clusters of tasks: those involving vocabulary enrichment (strategy 2), those involving training in reading strategies (strategies 1–5) and fun tasks.

Many cards were incompletely or sloppily filled out. Only when we could read the date and the title of the book were these scored, and only when we could read the date and the name of the task was the type of task scored. The cards of 242

tutors (93%) were used to collect book titles. These titles were used to obtain further information about the quality of the books in the catalogue of the national library organisation.

The information about the tasks on the administration card was used to estimate the type and number of tasks used during the whole programme. We used only information from tutors who had specified the tasks for at least 10 sessions. Estimates could be calculated for 173 couples (66%).

Scoring

The children wrote 1101 different titles on the administration cards, of which 800 were found in the national register. These are all recently published or reprinted books. Old books are not included in the register. The register links each book to a code indicating for what age group the book is meant (6–9, 9–11 or 11–14 years), whether it is a book for a special group of readers (picture books, primers or books for children with reading problems) and whether it is fiction or non-fiction.

A second characteristic that we consider here is the code for the difficulty level of the books. This so-called AVI system distinguishes nine levels. In grade 2 (7–8 year old children) children are supposed to read level 2 to level 5 books (Struiksmā *et al.*, 1995). At level 2, 80% of all words are consonant-vowel-consonant words (e.g. cat), 20% of the words are CVCC, CCVC or CCVCC words and some easy, double syllabic words may be used. At level 5 sentences may continue on a new line, but new sentences are always started on a new line. The mean sentence length is seven words and the average number of syllables in 100 words is 127. We found information on the AVI levels for 286 titles.

RESULTS

The Books

None of the tutors had specified titles for all sessions. We estimated the average number of books which couples in a particular school would have read in 54 sessions. The estimation was made on the basis of specified dates and titles on the administration cards.

The resulting average between schools was 29.57 (SD = 13.84). This means that every second session the couples had to choose a new book. The averages by school ranged between 43.69 and 19.46. A possible explanation for the relatively large number of books that were read may be found in the further analyses of book characteristics.

Public libraries use a code, which indicates for what age group a particular book is suitable. They distinguish three groups: 6–9, 9–11 and 11–14. The tutees in the programme are 7 or 8. Normally they would read books in the first age category. Indeed, almost 85% of all titles were from this category (679 out of 800). Not all books, however, were equally suitable. Nineteen of these 679 titles referred to

picture books, 286 were primers and 46 were books for beginning readers with reading problems. As regards age adequacy, 41% of the books were suitable.

For some books we had more precise information on the difficulty level, the so-called AVI level. In the national library register we found an AVI level for 286 titles (26% of the 1101 titles on the administration cards). Grade 2 children would normally read books in levels 2–5. Indeed, most books (92%) fell within this range. Level 2 books, however, are actually only meant for the first few weeks in grade 2. Level 3 is suitable for most grade 2 children when they read individually. For the situation in which a tutor is supporting the reading process, levels 4 and 5 would be more challenging. However, the children chose relatively few books of these latter levels (22%).

The measures we used to evaluate the quality of the books suggest that less than half of all titles was really interesting, challenging, age and reading level adequate reading material in a tutoring setting. Too many books were simply too easy, explaining how it is possible that the couples on average read so many books.

Many children commented on the available book selection:

Johnson: ‘I would like to have books with more jokes’.

Kelly proposed: ‘Please, throw the old books away and buy some new books’.

Khallid suggests: ‘More difficult books, and books that are more fun’.

Ahikar has a simple wish: ‘Thicker books!’

Chantal is sensitive to the budgetary restrictions: ‘It would be nice if we could visit the public library to choose our books there’.

The Tasks or Strategy Use

A further step to explore the quality of the task situation concerns the tasks which the tutor couples have used. In the Methods section we gave a short description of each type of task. We decided to use three clusters of tasks: tasks aimed at vocabulary enrichment, tasks directed at reading strategies and fun tasks. Table II presents an overview of descriptive statistics based on the average scores of 12 schools.

Tutors chose to do reading strategy tasks more often than either vocabulary tasks or fun tasks. Fun activities were done least. Perhaps teachers have limited possibilities to choose these activities. Overall, the impression is that children were rather learning-oriented in their choice of tasks, but that many couples did relatively few tasks. Tutor couples did at least one task each session in only two schools.

TABLE II. Average use of tasks during tutor lessons by type of task (12 schools)

Type of task	Minimum	Maximum	Mean	SD
Reading strategy	14.26	55.67	25.03	12.07
Vocabulary	2.55	19.93	8.12	4.60
Fun activity	0.00	13.51	5.32	4.21

What If ...?

We can easily use the information from the implementation study to clarify why the tutor programme was largely ineffective: children did not choose the right books and the right tasks. The intriguing question remains, why? Would another reward structure focusing on task accomplishment have improved the intervention?

The stories in the books are essential to the task structure. The students have to work with and talk about the stories. If these are not suitable they cannot reach deep level learning and achieve the cognitive goals. In accordance with Slavin's motivational approach one could argue that children did not choose the right books because the programme lacked a reward structure which stimulated the choice of such books. Depending on a child's reading level, each of the available books in the library could have been provided with a particular reward, favouring the choice of more difficult books. This is a feasible strategy, although it implies a risk that children stick to the reward as the main motive for choosing the right books and do not get fascinated by story plots. For these children the reward does not facilitate a step towards an increased personal significance of reading.

Children were supposed to use and acquire strategies that would stimulate the achievement of cognitive goals: the growth of their vocabulary and the improvement of reading comprehension. At the same time, tutoring should enhance their motivation to read. To achieve this latter goal tasks were added defining fun activities with language, not clearly serving the achievement of cognitive goals. The consequence is that, at the task level, the two goals, language and cognitive growth and having fun, are made incompatible. Although the most frequently chosen tasks concerned vocabulary and reading strategies, children in some schools often chose fun activities. Using a reward structure focusing on the accomplishment of cognitive tasks might have intensified the use of these tasks, but would not have resolved the incompatibility of the learning tasks and the fun activities. A solution would have been to combine the task and reward structure at the level of every single task (fun activities contributing to students' reading comprehension). Hence, both the reward structure and the task structure should be considered in improving the programme.

DISCUSSION

The intention was to answer the question how can the relationship between the task and the reward structure be used to optimise the effectiveness of cooperative learning? We specified this question in the context of a theoretical controversy. This controversy has been clarified by Slavin (1987) as a conflict between the developmental approach in cooperative learning and the motivational approach. In the developmental approach the task structure is seen as the most important element, which explains why cooperative learning works or not. In the motivational approach the reward structure is seen as the core element of cooperative learning.

We have presented a study conducted by Van Oudenhoven *et al.* (1987) and referred to a conclusion drawn by Shanahan (1998) as evidence for our argument that cooperative learning can be effective without paying additional attention to the

reward structure, provided that the task structure is simple. The reward structure is, as it were, defined by the combination of the simplicity of the task and the instruction to check each other's answers.

The reward structure should be considered carefully, however, when the task structure is complex. In The Netherlands a tutor programme for reading was quite recently introduced. The evaluation study showed its ineffectiveness (Vedder *et al.*, 2001). We did not study the processes of cooperative learning, but only particular conditions for these processes, namely the task and the reward structure. It appeared that in terms of the task structure two important things went wrong. The children had read many books, but many were inadequate to achieve the programme's goals: better reading scores and stronger motivation to read. The second problematical element was the students' choice of tasks during tutoring. They completed relatively few tasks and even then spent too much time on fun activities. It is likely that these fun tasks actually distracted from a focus on the real content and problems and did not contribute to the motivation to improve reading skills (cf. Blumenfeld, 1992).

Multiple goals or single goals that are hard to achieve characterise complex task structures. They arouse uncertainty about possible problem solving strategies and possible solutions in most group members. These are typically task structures meant to get students involved in high road or deep level learning. The programme entailed a reward structure which was largely incompatible with achieving deep level learning. Implementing a more task-compatible reward structure may improve task accomplishment, but certainly does not warrant the realisation of deep level learning. We have argued that the reward structure cannot compensate for a problematical task structure characterised by incompatible tasks and inadequate books. Both task and reward structures need to be considered in their interdependence.

So far we have dealt with reward structures as instruments of external regulation used by a teacher, a tutor or peers. The concept of personal significance was also presented, as a kind of intrinsic motivation, and it was contended that students who experience a strong personal significance in completing particular learning tasks do not need an external reward structure in order to become involved in deep level learning in a cooperative setting.

Of course, when preparing settings for cooperative learning, neither researchers nor teachers would consider only the task and reward structure. There are many more conditions or inputs to cooperative learning that deserve and need attention, like grouping arrangements, group composition, students' attitudes towards and experience with cooperative learning, their communication skills and skills for conflict resolution. And while processes of cooperative learning are underway both foreseeable and unforeseeable processes of group dynamics need to be attended (cf. Cohen, 1994; Johnson & Johnson, 1994). For clarity and simplicity's sake and for the sake of the argument, we neglected them all.

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