Educational dialogues and the fostering of pupils’ independence: the practices of two teachers

DAAN LOCKHORST, THEO WUBBELS and BERT VAN OERS

If the purpose of an educational system is to guide pupils towards achieving independence, then certain conditions about the design and conduct of that system must be met. In this paper, those conditions are formulated from a socio-cultural perspective on learning and development. This paper examines the extent to which those conditions were fulfilled by teachers judged ‘good’ by their pupils and by school management in a case-study in two Montessori secondary schools. Because discourse is assumed to play a central role when pupils work on assignments with the teacher assisting them, dialogues occurring in various teaching-learning situations were analysed. The types of language genre used by the teachers and pupils were found to be important characteristics of the ongoing dialogues. The main results were that ‘good’ teachers excel in the adoption of a personal approach to pupils, but they work much more intuitively than systematically or deliberately to stimulate pupils’ development of higher mental functions.

Keywords: classroom communication; Montessori method; teacher–student relationships; teaching styles; student development

Society, schools, teachers, and parents emphasize the importance of pupils’ developing independence. Although this objective is clearly stated in many school platforms and statements of aims, how it should, and can, be realized in classroom settings is not so clear. In our opinion, this lack of clarity follows from inadequate definition of what constitutes ‘independence’ and from an absence not only of theory about the educational conditions that can foster independence but also of practical recommendations for realizing these conditions. By drawing on socio-cultural theory, we attempt to

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contribute to developing a theory on educational conditions for fostering pupils’ independence. Discourse plays a central role in socio-cultural theory (Mercer 1995, Wells 1999, Cazden 2001); education that considers the development of independence as an important purpose requires linguistic activities such as dialogue and discussion.

In this study we focus especially on the learning dialogue (and also, in the empirical section, on formulating the conditions for such dialogue) that reveals the extent to which the conditions for fostering pupils’ independence are fulfilled in the practice of two teachers considered ‘good’ by their pupils, colleagues, and principals. The data for the empirical part of the paper were collected in two secondary Montessori schools in the Netherlands in 1999 and 2000. These schools differ from other Dutch schools in their pedagogical approach, but not in their curricular aims or examinations. They can be considered in the forefront of schools that emphasize pupils’ capacity to study independently, an expectation of schooling increasingly demanded in the Netherlands and in many other countries.

Fostering independence

In order to adequately define the concept, we distinguish two aspects of independence, drawing on van Oers (1996). The first aspect is to have a clear self-consciousness: the sense of wanting and being able to act and judge as an individual person. This aspect of independence also refers to the individual’s identity, which provides a source of continuity in the individual’s thinking and acting, and is formed in part by the culture in which the individual lives and develops (Holland et al. 1998). The individual’s capacity to act and think, and thereby to develop his or her identity, is also determined by the reactions of the environment and a sense of being respected by others.

The second aspect of independence distinguished here consists of the availability of the higher mental functions needed for acting in different tasks, such as those requiring problem-solving, decision-making, or cooperation (Presseisen 1991). Higher mental functions are basic cultural competencies that draw upon natural dispositions but have gradually been extended across generations of people to include sophisticated forms of thinking and acting with the help of signs and symbolic tools (Vygotsky 1978, Daniels 2001). Higher mental functions can be further differentiated into general functions and functions specific to particular disciplines/activities. Examples are decoding (i.e. the conversion of language and symbols into images), encoding (i.e. the conversion of experiences, knowledge, and views into symbols), comparing, synthesizing, and analysing.

The conditions that education must meet to foster pupils’ independence are not self-evident a priori. In fact, the educational conditions needed to foster pupils’ independence can only be formulated by drawing upon a clearly articulated theory of learning and development.

In the second half of the 20th century, the active involvement of the individual in his or her own learning process came to be emphasized in both educational research and educational practice. Information-processing theories and constructivist ideas also became fashionable as a result of this
emphasis on actively involving the individual. According to these views, individuals build their own knowledge bases by means of activities they undertake and their learning from those activities. In addition, educational research has shown that co-operation plays a critical role in pupil learning and development (e.g. Brown and Campione 1996). In the socio-cultural theory on teaching and learning, a central theme is participation in activities and co-operation. We therefore adopt this theory to help us identify the educational conditions under which pupils’ independence can be fostered.

A socio-cultural theory of teaching and learning

In the following section, the specific educational conditions needed to foster pupils’ independence are considered in terms of socio-cultural theories of teaching and learning. As will be seen, the social aspects and the more general cultural aspects of fostering independence can be distinguished. In addition, the development of higher mental functions needs to be examined.

Social aspects of fostering independence

Socio-cultural theories of teaching and learning assume that learning and development emerge from the interaction or co-operation with others through modelling, the exchange of ideas and experiences, and joint reflection or discussion (e.g. Rogoff 1990). People are in constant contact with peers and others—either directly or indirectly by means of texts, the internet, and a variety of other forums for the exchange of meaning. Living together with more experienced others provides opportunities for imitation, one of the main processes underlying development (e.g. Chaiklin 2003). The more experienced person can serve as a model, coach, or assistant, and the interaction happens within the so-called zone of proximal development, the area in which the pupil can perform with the aid of others but not on his or her own. The individual’s zone of proximal development is not perceived as a fixed quality, but rather as the outcome of an ongoing dialogue between teacher and pupil (Wells 1999, Chaiklin 2003). According to Wells (1999), the pupil shapes this dialogue through his or her interest and by posing questions, whereas the teacher shapes the dialogue by providing inspiration and challenges. The pupil’s zone of proximal development is constantly defined anew in the interaction between teacher and pupil. The need of the pupil to learn and participate (Wenger 1998) coincides with the tendency of teachers to instruct and the propensity of elders to provide support. Within the structured and purposeful setting of formal education, the processes of teaching and learning can thus unfold.

From a socio-cultural perspective (and also in general understanding), language is an important tool for human interaction and co-operation. Within the context of learning and development, the language and explanations provided by models are often imitated and internalized by pupils. In the long run, such imitated or internalized language can guide pupils’ actions, and the initial instruction provided by a more experienced person
thus becomes self-instruction (Wells 1987). In the words of Bruner (1986), the teacher provides a co-operating vicarious consciousness for the acts of pupils.

More experienced others, especially teachers and elders, create specific scaffolds and activities for purposeful and efficient learning (e.g. Moll 1990, Tharp et al. 2000, van Oers et al. 2008). During early childhood, these activities often have the character of play as a way to promote learning (e.g. Singer et al. 2006). In many home contexts, athletic contexts, creative settings, or intellectual situations, activities that make for efficient learning can be clearly discerned. Similarly, the instructional structure of formal education can also involve a sequence of such activities. Pupils construct new knowledge through such activities as analysis, synthesis, practice, memorization, and the application of existing competencies. According to Wells (1999), knowledge-acquisition works best as pupils co-constr knowledge with a teacher or other pupils, which entails that educational dialogue and pupil’s zone of proximal development should stand central in an educational enterprise. During co-operation with a teacher or other pupils, for example, the thinking of the pupil in question is externalized and thus made open for consideration, discussion, and critical examination by others.

Cultural aspects of fostering independence

The cultural aspect of socio-cultural theories of teaching and learning emphasizes the fact that the larger part of the content of education is cultural in nature. Stated more generally, culture is the content of human society as passed in formal and informal learning from generation to generation (Bruner 1996). Education thus has a two-fold function: on the one hand, to support the development of children into adulthood; on the other hand, to continue and foster the development of culture across generations. Young people are introduced to the culture of a society and come to participate in this culture in a schooled, responsible, and creative manner. Cultural knowledge thus forms an integral part of the growing independence of an individual.

From a constructivist perspective (e.g. Steffe and Gale 1995), pupils also play an active role in acquiring cultural content. New insights are derived from one’s experiences, or already existing insights are challenged by new experiences, which gives knowledge a personal meaning. Culture offers a broad range of values and views for young people to choose from and, although people are shaped by culture, they can also make themselves immune to it to a greater or lesser degree (Smolka et al. 1995).

The need to stimulate higher mental functions

In socio-cultural theories of teaching and learning, higher mental functions play a central role. As was explained above, higher mental functions (such as thinking, attention, and memory) are psychological functions that make use
of signs and cognitive tools. Accomplished within a particular context, they are consequently related to particular knowledge content. The activity of thinking, its content, and the situation are therefore highly interconnected.

By engaging pupils in meaningful activities during their education, complex thinking and the use of higher mental functions are trained (Tharp et al. 2000). Pupils work with particular content and assignments that require several higher thinking skills, and in doing so they are challenged to use those higher skills. Teachers monitor this process and guide pupils by means of modelling, co-operation, and joint reflection. The teacher takes advantage of certain situations to reflect upon potential skills and provides ample opportunities for pupils to exercise these skills. However, the environment must be organized to promote such reflection and experimentation. Sufficient space must be provided to study in small groups or individually. Pupils must be allowed to exercise their own capacity to act and judge (Moll 1990, Tharp et al. 2000). The curriculum, in particular the assignments, must challenge pupils to use various thinking and study skills. The teacher–pupil dialogue probably constitutes an important tool to develop understanding and independence on the part of pupils (e.g. Mercer 1995, Stables 2003). The impact of such learning dialogues on pupils’ independence has hardly been studied.

The learning dialogue

Being more experienced than pupils, teachers are significant conversational partners in educational settings. Teachers represent a particular discipline (i.e. particular manner of acting and thinking), which pupils must master on their own level. As already mentioned, a pupil’s zone of proximal development (ZPD) is gradually determined during the course of a learning dialogue. Through observation, assessment, and reflection, teacher and pupil co-operatively explore the next opportunities for pupil development. Joint regulation of the dialogue by the conversational partners is an important prerequisite for a productive dialogue (Wells 1999). Co-regulation (Fogel 1993) enhances the probability that the aid provided by the teacher corresponds to the learning needs of a pupil, and therefore has meaning for a pupil. Pupils must also be taken seriously as participants in a learning dialogue.

Wells (1999), with reference to Bakhtin (1986), uses the concept of ‘language genre’ to understand teacher–pupil dialogues. Within this context, language genre is defined as a ritualized pattern of utterances shared by the partners in a conversation. That is, the language acts demonstrated by the participants in a conversation are the result of the use of concise rules, which can also differ depending on the social function and objectives of the conversation in question. In order to specify the function of the language dialogue within the learning context in general and stipulate those conditions that can foster pupils’ independence, learning dialogues can be categorized in terms of the language genre used. Following Wells (1999), we thus formulated a system of eight language genres that can characterize the learning dialogue; the learning dialogue can pave the way towards the solution of a problem, or
be controlling, diagnostic, exploratory, instructional, modelling, reflective, or directive (see table 1, taken from Lockhorst 2003).

**Table 1. Eight language genres in an educational context.**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paving</td>
<td>The teacher divides the problem facing the pupil into small steps in order to pave the way towards a solution; teacher questions regulate the course of the dialogue.</td>
</tr>
<tr>
<td>Controlling</td>
<td>The teacher controls the knowledge acquisition of the pupil and poses typical teacher questions for which she or he knows the answer; teacher control may also concern the quality of the pupil's written work—for instance, neatness, organization, and completeness.</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>The teacher tries to define the type of problem for the pupil and outline the pupil's possibilities within his or her ZPD by posing information-seeking questions or questions for which the teacher does not already know the answer.</td>
</tr>
</tbody>
</table>
| Exploratory | Pupil and teacher explore a body of knowledge via a discussion with at least one of the following features:  
  - not only the teacher but also the pupil formulates a problem;  
  - both sides pose questions and contribute to the discussion;  
  - the teacher challenges the pupil by raising problems, providing suggestions, setting hypotheses, pointing out contradictions; and/or  
  - the teacher employs such rhetorical skills as irony, amazement, or humour. |
| Instructional | The teacher provides information and explains relations, theories, laws, tactics, or procedures. |
| Modelling | The teacher demonstrates a technique, procedure, or manner of reasoning; this can be done implicitly via his or her actions or explicitly via articulating his or her actions. |
| Reflective | The teacher stimulates pupils’ reflection upon his or her own actions in thinking and studying by posing information-seeking questions, by asking for the views of the pupil, and by providing or requesting suggestions; the partners may jointly reflect upon the actions of the pupil and consider new ways of acting. |
| Directive | The teacher provides instructions for pupils’ action. |

**Necessary conditions for a learning dialogue to promote pupils’ independence**

Given the theoretical framework provided above, it is possible to identify several critical conditions that learning dialogues must meet to promote pupils’ independence. To co-regulate and exercise pupils’ independence, for example, it is necessary to create a respectful environment in which such qualities of the individual as personality, emotions, opinions, talents, and ambitions are respected, and in which the legitimacy of the individual's participation is accepted. The teacher supports the pupil in building his or her self-respect by helping that pupil to reflect on his or her behaviour and products. The teacher offers ample opportunities to the pupil to take part in discussions and bear responsibility for his or her development. A respectful
environment is demonstrated in dialogues when the teacher follows the thinking process of the pupil and gives him or her room for initiative and contribution. The dialogues should have an exploratory character, and they should be more reflective than directive.

A second critical condition for a learning dialogue to promote the development of pupils’ independence is the so-called ‘instrumentalization’ of pupils. The teacher has to stimulate the development of the competencies and social skills needed for pupils to function independently. The necessary tools have to be provided, the orientation towards the problem situation must be monitored, and sufficient knowledge has to be provided. To accomplish this task, teachers have to be able to carry out different functions. Contingent situations within the pupil’s zone of proximal development must be created to foster the mastery of higher mental functions. The thinking and working of the pupil has to be assessed; the teacher must act as a model and help the pupil reflect upon his or her methods of studying and thinking; and the teacher must support the pupil’s development in general.

**Method**

**Setting**

The extent to which learning dialogues between teachers and pupils meet the conditions necessary to foster pupils’ independence was examined in the present study of two teachers. The research was conducted in the Netherlands in two different secondary Montessori schools in which the development of pupils’ independence was one of the main objectives. Our aim was to study the nature of the learning dialogues aimed at promoting pupils’ independence under the most favourable circumstances, with as few disciplinary disturbances as possible, and in a group setting with a significant degree of social stability to enhance the probability of learning dialogues with significant amounts of learning content.

The two teachers whom we studied had the reputation of being good teachers in the eyes of both the pupils and their school principals. To select the teachers, we asked the principals to indicate teachers whom they valued as being good and teachers who had relatively few disturbances in their classrooms. The first author verified the teachers’ reputations within the school community by being present in the school for some time to register the spontaneous utterances of other teachers and the pupils about the selected teachers. The teachers nominated by the school principals were found to have a good reputation.

The two teachers were both biology teachers, and the present research was conducted among pupils who were 14-years-old on average and in pre-university secondary education. We audio-recorded those situations in which the pupils worked with teacher assistance in small groups or individually. The research was thus naturalistic by nature because we did not control for various aspects of the context (Lincoln and Guba 1985). It was further assumed that the teacher would have to react to unexpected pupils’ questions and actions under such circumstances—an important
feature of the present research which was largely exploratory and thus qualitative in nature (Yin 1994). Comparison of the two teachers allowed us to consider which aspects of the learning dialogues appeared to be specific to particular situations and which aspects appeared to be more general.

Predictions and research question

With regard to the characteristics of learning dialogues aimed at the development of pupils’ independence, based on our theoretical considerations, the following were predicted:

- Teachers would show respect for the identities of pupils by accepting their initiatives and views; encourage pupils to take responsibility for their own learning processes; and help pupils reflect upon their learning activities and achievements.
- Teachers would stimulate the development of higher mental functions such as thinking skills, regulatory skills, and social skills via modelling, guidance of pupils’ activities, provision of feedback, and incidental instruction.

The specific research question was as follows:

- To what extent are our predictions regarding the learning dialogues between teachers and pupils confirmed in actual classroom practice?

Data collection

Audio recording of the learning dialogues was the main method of data collection. These data were supplemented with observations in the classroom and interviews with both the teachers and the pupils. The observations were of an open nature, which meant that the observer simply noted any phenomena that were noteworthy in light of the research question and predictions. Shortly thereafter the notes were elaborated upon in memos (Miles and Huberman 1994), conclusions were drawn, and questions were formulated for further examination in the classes of the teachers.

The interviews involved questions examining those conditions that can foster pupils’ independence. The questions were formulated on the basis of past experiences of the researcher in the classes and the principle of iterativity (Miles and Huberman 1994). The interview responses were audio-recorded, elaborated upon thereafter, and summarized in a report that was presented to the interviewees for approval. During data collection, the nature of the assignments being worked on by the pupils was seen to play an important role in the course of the learning dialogues. Whether the assignments required the reproduction of knowledge or complex problem-solving, for example, was found to be associated with very different learning dialogues. For this reason, the textbook assignments used were collected for analysis.
Data analyses

First, the dialogues were analysed qualitatively. Relevant phenomena were noted and recorded. Relevance was determined on the basis of those aspects of the learning dialogue mentioned as critical for the course of the dialogue in the research literature. Further phenomena were noted on the basis of the judgement of the first author who has been a teacher for many years. The interviews were analysed in a similar manner: relevant phenomena were noted and recorded.

A provisional answer to the research questions was next formulated on the basis of the most striking patterns observed in the learning dialogues (Yin 1994). Any lack of clarity or contradictions in the data were noted and discussed in the next interviews. In such a manner a more definitive answer for the research question could be obtained.

The utterance frequencies, frequencies of different themes, and language genre frequencies were next calculated for the learning dialogues in an attempt to supply quantitative support for the qualitative results (see table 2). Only those categories relevant for the present research were used; these included the different types of questions that can be posed by teachers and pupils, together with positive and negative evaluations on the part of the teacher. In addition, the number of discourse initiatives undertaken by the teachers and the pupils were counted because discourse initiatives are important for the co-regulation of a dialogue.

Grounded theory (Glaser and Strauss 1967) was used to determine the type of theme addressed in the learning dialogues. A dialogue can concern, for instance, either the learning content as presented in a textbook, or the learning process that concerns the manner in which the pupil processes the learning content and includes such thinking activities as strategic acting and the use of particular means to attain a particular end. The dialogue can also concern the study process in general (i.e. the manner in which the pupil organizes, executes, and values the study of a particular subject). Alternatively, the dialogue can concern research. Given that the subject being taught by both of the teachers was biology, the dialogue could thus concern the research content (i.e. a practical experiment, the orientation towards the experiment, the conduct of the experiment, and the reporting of the experiment) or the research process (i.e. the manner in which the pupil has carried out the research and has written the research report, the pupils’ orientation towards the research). Finally, language genre was coded according to the categories outlined in table 1.

The analyses included 118 and 148 dialogues for the two teachers, respectively. The results are presented in table 2. To determine the reliability of the coding, a second researcher coded the dialogues independently. The inter-rater agreement was generally found to be between 80–99%. The results in table 2 also show some very low agreement percentages and led us to conclude, on the one hand, that some of the coding categories were not defined sharply enough, and on the other hand, that a difference existed between the two coders because the first one participated in the observation of the teachers whereas the second one did not. Only those conclusions confirmed by the results for the two researchers independently are therefore
Table 2. Frequency of different characteristics of learning dialogues.

<table>
<thead>
<tr>
<th>Researcher</th>
<th>Teacher A</th>
<th>Teacher B</th>
<th>Teacher A</th>
<th>Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>inter-rater agreement (%)</td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Number of dialogues</td>
<td>118</td>
<td>148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language utterances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiative</td>
<td>80</td>
<td>82</td>
<td>99</td>
<td>82</td>
</tr>
<tr>
<td>Approval</td>
<td>312</td>
<td>253</td>
<td>90</td>
<td>151</td>
</tr>
<tr>
<td>Disapproval</td>
<td>57</td>
<td>83</td>
<td>81</td>
<td>51</td>
</tr>
<tr>
<td>Explanation</td>
<td>496</td>
<td>504</td>
<td>99</td>
<td>309</td>
</tr>
<tr>
<td>Suggestion</td>
<td>167</td>
<td>268</td>
<td>77</td>
<td>180</td>
</tr>
<tr>
<td>Instruction</td>
<td>86</td>
<td>129</td>
<td>80</td>
<td>78</td>
</tr>
<tr>
<td>Knowledge question</td>
<td>111</td>
<td>121</td>
<td>96</td>
<td>32</td>
</tr>
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<td>Information-seeking question</td>
<td>222</td>
<td>194</td>
<td>93</td>
<td>282</td>
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<tr>
<td>Reasoning question</td>
<td>143</td>
<td>178</td>
<td>89</td>
<td>37</td>
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<td>Pupil</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Initiative</td>
<td>125</td>
<td>65</td>
<td>68</td>
<td>167</td>
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<tr>
<td>Question</td>
<td>263</td>
<td>326</td>
<td>89</td>
<td>204</td>
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<tr>
<td>Dialogue theme</td>
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<td></td>
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<td></td>
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<tr>
<td>Learning content</td>
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<td>58</td>
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<td>42</td>
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<tr>
<td>Learning process</td>
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<td>Research content</td>
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<td>19</td>
<td>73</td>
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<tr>
<td>Research process</td>
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<tr>
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<td>13</td>
<td>92</td>
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<tr>
<td>Language genre</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Paving</td>
<td>18</td>
<td>16</td>
<td>94</td>
<td>0</td>
</tr>
<tr>
<td>Controlling</td>
<td>24</td>
<td>31</td>
<td>86</td>
<td>16</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>1</td>
<td>0</td>
<td>—</td>
<td>0</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Researcher</th>
<th>Teacher A</th>
<th>Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Exploratory</td>
<td>27</td>
<td>35</td>
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<tr>
<td>Instructional</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>Modelling</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Reflective</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Directive</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>
considered and, in the text, the mean values for the two researchers are then presented for these results.

To gain greater insight into the learning materials used by the two teachers, the relevant assignments were categorized according to the types of thinking skills they required (Marzano et al. 1988). The results of these analyses and inter-rater agreement are presented in table 3. Table 3 shows that of the skills that could be coded reliably the most frequently required skills are information-gathering, recall, and generation of ideas. This implies that the tasks require only a small array of higher mental functions.

### Results

In connection with our research question, two general predictions were formulated. First, the teachers were expected to show respect for the pupils’ opinions and perspectives, give the pupils responsibility for their own learning, and help the pupils reflect upon their actions and progress. Second, the teachers were expected to stimulate the development of higher mental functions.

*Prediction 1: The teachers will show respect for the pupils, give them responsibility for their own learning and help them reflect upon their actions and learning*

In table 4, the relevant results from the different sources of data are summarized with regard to the first prediction. As can be seen, the observations in the classes, the analyses of the dialogues, and the remarks of the pupils in the interviews all showed that the two teachers created conditions which are favourable, according to our theory, for developing pupils’ independence. The different aspects of our first prediction are clearly confirmed by different

### Table 3. Number of assignments requiring various thinking skills.

<table>
<thead>
<tr>
<th>Thinking skills</th>
<th>Biology assignments school A</th>
<th>Biology assignments school B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
</tr>
<tr>
<td>Focusing</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Information-gathering</td>
<td>34</td>
<td>45</td>
</tr>
<tr>
<td>Recall</td>
<td>55</td>
<td>57</td>
</tr>
<tr>
<td>Organization</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Analysis</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Generation</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>Integration</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Evaluation</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>108</td>
</tr>
</tbody>
</table>
Table 4. Summary of data concerning prediction I.

<table>
<thead>
<tr>
<th></th>
<th>Teacher A</th>
<th>Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class observation</td>
<td>● rather rigid discipline</td>
<td>● rather rigid discipline</td>
</tr>
<tr>
<td></td>
<td>● informal relationship with pupils</td>
<td>● takes the side of pupils</td>
</tr>
<tr>
<td></td>
<td>● great enthusiasm for subject</td>
<td>● informal relationship with pupils</td>
</tr>
<tr>
<td>Qualitative analyses of dialogues</td>
<td>● frequent co-regulation</td>
<td>● frequent co-regulation</td>
</tr>
<tr>
<td></td>
<td>● teacher reacts to emotions and judgements of pupils</td>
<td>● teacher values rigorous explanation</td>
</tr>
<tr>
<td>Dialogue themes</td>
<td>more than 60% of dialogues concerned learning content</td>
<td>more than 50% of dialogues concerned processes</td>
</tr>
<tr>
<td>Language genre</td>
<td>● more than 50% paving, controlling or instructional</td>
<td>● more than 50% instructional or directing</td>
</tr>
<tr>
<td></td>
<td>● about 25% exploratory</td>
<td>● about 20% exploratory</td>
</tr>
<tr>
<td></td>
<td>● diagnostic, modelling and reflective are rare</td>
<td>● modelling and diagnostic are rare; reflective appears to occur more often but inter-rater agreement is low</td>
</tr>
<tr>
<td>Language utterances</td>
<td>● pupils often take initiative and pose questions</td>
<td>● pupils often take initiative and pose questions</td>
</tr>
<tr>
<td></td>
<td>● teacher expresses approval four times as much as disapproval</td>
<td>● teacher expresses approval twice as much as disapproval</td>
</tr>
<tr>
<td></td>
<td>● teacher gives suggestions more often than orders</td>
<td>● teacher gives suggestions more often than orders</td>
</tr>
<tr>
<td></td>
<td>● teacher poses many reasoning questions and stimulates thinking</td>
<td>● teacher poses information seeking questions but not of diagnostic type and few reasoning questions</td>
</tr>
<tr>
<td>Pupil interviews</td>
<td>● pupils value help and non-judgemental approach of teacher</td>
<td>● pupils value helping and reasonable approach of teacher</td>
</tr>
<tr>
<td></td>
<td>● pupils value teacher’s enthusiasm for the subject</td>
<td>● pupils value attempts at pedagogical innovation</td>
</tr>
<tr>
<td>Teacher interviews</td>
<td>Purpose: development of pupil self-respect and self-confidence with regard to own thinking skills; stimulate motivation for the subject</td>
<td>Purpose: co-operation with pupils</td>
</tr>
<tr>
<td>Analyses of curricular materials</td>
<td>strong emphasis on reproduction with the exception of assignments supplementing those in textbook</td>
<td>strong emphasis on reproduction</td>
</tr>
</tbody>
</table>
aspects of the qualitative and quantitative data. In our opinion, the presence of these features should not come as a surprise, because they actually define what can be considered 'good teaching'.

The majority of the dialogues we analysed showed co-regulation. Given the relatively high frequencies of pupils' initiatives and pupils' questions (see table 2), the pupils clearly feel free to participate in the discourse and ask questions. The pupil interview results also confirm this conclusion. The sample transcript in the Appendix illustrates an instance of co-regulation.

The two teachers have different teaching styles. Teacher A shows considerable enthusiasm for the subject of biology, as indicated by the relatively high number of dialogues concerned with learning content. This conclusion is confirmed by class observations and interviews with both the pupils and the teacher himself. Teacher B concentrates more on the manner in which the pupils perform their assignments. Many of the learning dialogues thus concern the pupil's learning process or study process (see table 2). Both styles of teaching lead to active discussion and collective exploration, as illustrated in the sample transcript (see Appendix).

We can thus conclude that both teachers fulfil our first prediction to a considerable extent. However, they both pay very little attention to the actual thinking processes of the pupils (see our analyses for the second prediction below).

According to our second prediction, the teachers should stimulate the development of higher mental functions on the part of their pupils in the use of assessment activities to identify the thinking strategies used by the pupils, the modelling of particular functions, or the explanation of higher mental functions. Diagnostic, modelling, and reflective dialogues might be particularly useful for this purpose.

Prediction 2: The teachers will stimulate the development of higher mental functions

The most important observations concerning the second prediction are summarized in table 5. As can be seen, about 60% of teacher A's dialogues concerned learning or research content; more than 50% of teacher B's dialogues concerned learning or research processes. In the learning or research-process dialogues, the pupil's approach to the task at hand was discussed in a general sense. Both teachers discussed the learning or thinking strategies of the pupils only in a very few cases. The learning dialogues thus make it clear that the teachers do not analyse the activities of the pupils in terms of their thinking strategies or skills. The teachers mostly discuss the learning or research process by coincidence; contingent situations are not exploited in order to bring the thinking of pupils to a more abstract level.

In the interviews, the teachers also reported acting more on the basis of their intuitions than on the application of their knowledge of learning processes. The data further show that the two teachers rarely undertook diagnostic activities. The diagnostic genre occurs seldom and diagnostic
Table 5. Summary of data concerning prediction 2.

<table>
<thead>
<tr>
<th>Class observation</th>
<th>Teacher A</th>
<th>Teacher B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative analyses of dialogues</td>
<td>animated exchange of ideas about content with pupils</td>
<td>teacher prefers thorough explanation</td>
</tr>
<tr>
<td>● teacher rarely probes pupils’ thinking</td>
<td>● teacher provides brief directions; dialogues are brief</td>
<td></td>
</tr>
<tr>
<td>● teacher is mainly content-focused</td>
<td>● teacher rarely probes pupils’ thinking</td>
<td></td>
</tr>
<tr>
<td>Dialogue theme</td>
<td>more than 60% of dialogues were content-focused</td>
<td>more than 50% of dialogues were process-focused</td>
</tr>
<tr>
<td>Language genre</td>
<td>● 25% exploratory</td>
<td>● 20% exploratory</td>
</tr>
<tr>
<td>● diagnostic, modelling and reflective were rare</td>
<td>● modelling and diagnostic were rarely present; reflective appears more often but inter-rater agreement is low</td>
<td></td>
</tr>
<tr>
<td>Language utterances</td>
<td>information-seeking questions with diagnostic character are rare</td>
<td>information-seeking questions with diagnostic character are rare</td>
</tr>
<tr>
<td>Pupil interviews</td>
<td>teacher helps with tips and the posing of small questions: paving</td>
<td>teacher is helpful and explains very well</td>
</tr>
<tr>
<td>Teacher interviews</td>
<td>● encourages pupils to value to think along</td>
<td>● values pupils’ initiatives</td>
</tr>
<tr>
<td>● infrequent use of diagnostic and reflective statements/questions in order to stimulate pupils’ spontaneity</td>
<td>● comprehension is more important than the literal text and questions in the textbook</td>
<td></td>
</tr>
<tr>
<td>Analyses of curricular materials</td>
<td>little need for productive functions</td>
<td>little need for productive functions</td>
</tr>
</tbody>
</table>
questions are rarely posed. Information-seeking questions were mostly posed by the teachers with regard to the activities of the pupils and rarely with regard to their thinking. Misunderstandings were recorded on many occasions and, in most cases, the teacher did not appear to respond to the problem being experienced by the pupil(s). Closer inspection of the relevant dialogues further showed the teachers do not notice that the pupils are not using the appropriate thinking skills. Even more remarkable is the fact that the misunderstandings are sometimes eliminated by the persistent posing of questions by the pupils themselves or by their correction of the teacher. That is, co-regulation appears to compensate for a lack of diagnosis. In one dialogue, in fact, the teacher is so persistent in his own thinking that the pupil’s problem does not get solved and the discussion ends in complete vagueness (Lockhorst 2003).

The modelling genre was also rarely used by the two teachers and, when the teacher did serve as a model, it only happened implicitly in their work with a pupil. The teacher did not model intentionally, according to the interviews.

The backgrounds for the lack of attention to the thinking skills of the pupils were found to differ for the two teachers. Teacher A explicitly reported infrequent use of diagnostic and reflective activities to avoid frightening the pupils or breaking their spontaneity and motivation. According to this teacher, pupils at this age should gain a lot of experience without much emphasis on the actual learning content. Teacher B, in contrast, reports feeling that he does not have enough knowledge of pupils’ learning processes.

From the different sources of data, as shown in tables 4 and 5, it can be concluded that intentional attempts to explicitly foster the development of higher mental skills of pupils were not part of the behavioural repertoires of the two teachers studied here. In this sense, our expectations of what teachers considered good actually do was not corroborated by the data. When a teacher is able to analyse pupils’ learning as a process in which the learner uses different thinking strategies and skills to attain a particular result (Lockhorst and Van der Meer 1996, Topping and Trickey 2007) he or she may be better equipped to guide pupils. In the sample transcript referred to above and presented in the Appendix, for example, the teacher could have encouraged the girls to compare factory-farming and organic agriculture. In such a comparison, the pupils would then have brought their report to a higher level of abstraction and possibly acquired a valuable analytic method.

The teachers are not deliberately dealing with the development of pupils’ higher mental functions. The possibility of fostering the development of higher mental functions also appears to depend upon the assignments that the pupils are given to complete. As can be seen from table 3, the analyses show that the assignments do not often require skills that call for creativity and/or self-production on the part of pupils.

In conclusion, our second prediction is only partly confirmed by the present data. The two teachers studied here did not deliberately stimulate pupils’ development of higher mental functions to a significant extent. When they helped pupils to develop their thinking, it usually happened by coincidence.
Conclusions and discussion

To interpret our results it is necessary to remember that the present study was restricted to examining the relationship between the intended curriculum and the implemented curriculum within daily school practice (Robitaille and Garden 1996). Whether or not the pupils actually showed greater independence or the exact nature of the attained curriculum was not examined in the present study.

The final conclusion in this study is that the two teachers were quite good in the personal approach of pupils, but they functioned less well in their instructional role with respect to stimulating pupils’ independence and developing higher mental functions. They did not stimulate pupils’ higher mental functions to the extent that we had expected, and, whenever they did, they tended to act more intuitively than intentionally. Consequently, the value of their teaching for pupils can be judged to be smaller than might be possible if the prerequisites which we outlined were realized more fully. This was a surprising conclusion from our theoretical considerations about what good teachers do.

Both teachers were found to derive their designation as ‘good’ from their capacity—at least in part—to establish and maintain good relations with their pupils. This was particularly evident in the co-regulation that occurred in the dialogues. The freedom which the teachers offered their pupils meant that they also supported the pupils with the problems they experienced. Unfortunately, this support was not always given in an appropriate way and did not foster pupils’ independence very often. In future research, the relations between co-regulation of the learning dialogue and the actual effectiveness of this dialogue for fostering pupils’ independence might therefore be considered.

In the present study, a new method to analyse the pedagogical relations between teachers and pupils was explored. The low inter-rater agreement on certain categories calls for more concise definitions of the relevant concepts or greater practice with the system. In addition, it is recommended that the diagnostic question be introduced as a separate category within the system used to code the language utterances of the teachers.

Given the exploratory character of the present study, it was decided to perform the research under clearly favourable circumstances (Lockhorst 2003). This choice—in addition to the limitations inherent to the case study—reduces the generalizability of the conclusions. In addition, the pupils in both classes studied here were in pre-university secondary education, the highest level of secondary education offered in the Netherlands. This meant that the pupils probably functioned more easily than would other pupils within the educational model employed in this research, but this fact also limits the generalizability of the findings. In the learning dialogues studied here, many instances of co-regulation were discerned, which meant that the pupils regulated the learning dialogue together with the teacher. Stated differently, the pupils operated on basically the same level as the teacher, and the question is whether all pupils are willing to do this, capable of doing this, or interested in doing this. Edwards and Mercer (1987) found the difficulties that pupils experience with understanding their teachers’
intentions varied, for example, with the social milieu of the pupils and the level of education being pursued. Repetition of the present research with pupils from the lower levels of secondary education is therefore recommended. It may be instructive to research on this lower level the way in which teachers guide pupils to develop higher mental functions necessary for strategic actions and to reflect on their own progress in their study.

The present results showed that the two teachers, by drawing intentionally upon their knowledge of pupils’ learning processes, did not help their pupils develop their higher mental functions. If this finding receives support in future research, it can be concluded that teachers lack training, or that they are unable to apply that knowledge to enhance the study strategies and thinking skills of pupils. In future research, intervention studies aimed at making teachers recognize the importance of fostering the development of higher mental functions should therefore be conducted. Similarly, the influence of the instructional methods used by teachers on their support strategies may be examined in future research.

It is possible that the lack of attention to the learning process in the dialogues we studied was due to an under-estimation of the importance of such attention. It is also possible that the teachers find such attention incompatible with the view that they have of their own acting (Pajares 1992). Such attention may require a form of teaching that the teachers do not welcome. For example, many teachers favour more instructional than diagnostic modes of teaching.

In closing, this study was conducted in schools that are characteristic of the educational system in the Netherlands today. The activities of the pupil stand central in these schools and the classes of the teachers studied. Pupils are expected to study independently, and thus without direct guidance from the teacher who then functions as a consultant or helper. Unfortunately, the recent developments in the educational system in the Netherlands and this emphasis on independent pupils’ functioning make the role of the teacher quite unclear at times, and numerous complaints and doubts about the suitability of the system and the role of the teacher have therefore been heard (Inspectie van het Onderwijs 2001). The present study shows the role of the teacher as consultant and helper to only be sufficiently determined when a clearly defined educational model has been outlined. The socio-cultural perspective on teaching and learning appeared to be a useful starting point to develop such an educational model. This perspective further emphasizes the co-operation with other pupils in addition to the co-operation with the teacher who serves as a model but, also, as the more experienced participant, supports the pupil in his or her zone of proximal development. This task is much more varied and complex than follows from the term ‘helper’.

The teachers in the present study were found to react more intuitively than intentionally to contingent observations, questions, and problems, and, as far as we know, this aspect of teacher functioning has not been studied previously to a significant extent. The present results show how the on going assessment (i.e. diagnosis) of pupils’ learning, co-regulation, and use of exploratory language can all help foster pupils’ independence. The exploratory language genre, in particular, guarantees the externalization of pupils’ thinking activities and therefore opens up pupils’ thinking to consideration,
discussion, and critical examination. Yet another—tentative—conclusion is therefore that greater opportunities for pupils to train their higher mental skills, and assignments that require creativity and the self-production of knowledge, should be incorporated into educational curricula. The learning dialogues that emerge from working on such assignments will then provide a teacher with ample opportunities to indicate strategies to be followed and skills to be deployed.

Acknowledgement

We thank the two teachers and their pupils for allowing and helping us to study their classrooms.

Notes

1. The calculation of the frequencies for the different types of utterances involved a modification of the system used by Wells (1999).
2. The reliability results do not completely meet the condition of 90% imposed by Weir and Roberts (1994); we nevertheless considered the reliability to be sufficient as a whole for use in our analyses.

References


Appendix: Sample transcript of a dialogue (from Lockhorst 2003)

The dialogue in this Appendix has been translated by the authors. [p] = pause or silence.

Protocol: Learning dialogue 07/04/00; 11h14 teacher B
Theme: Research content
Genre: Exploratory

1 Pu Steve, [p] uhh, this is not organic farming, is it?
2 T What?
3 Pu This [p] website, this is about, uhh [p] farming; factory farming, but that is [p]. Has it [p] has it [p] that is the opposite of organic agriculture, isn’t it? Because there those pigs are really and so free but not here. I mean, this is factory farming, but [p].
4 T Yes.
5 Pu Is this really organic agriculture? Does it belong to it as well?
6 T If it fits in the chapter, you mean?
7 Pu Yeah [p], yeah [p], yeah [p], we’re doing it on organic farming, but can we get information from this?
8 T Can you give reasons [p], can you think of reasons why it falls under this?
9 Pu [snorting] [p] Because of the word farming, but that, that, that will not do it, I mean [p].
10 T If you would just [p].
11 Pu [unintelligible]
12 T [p] If you would first sort out what it is, could you figure out, why it belongs to it or not?
13 Pu In my view, it doesn’t belong to it, because in organic agriculture and so that’s exactly what it [p], uh [p], that you have freely running pigs that at least can roam around freely [p].
14 T mmmm [p].
15 Pu [p] In this case it’s not so, just the opposite of [p] because here they say like [p] I’ve objections against factory farming and so [p] and [p] victims and money grabbers; why there is so little support for animals [p].
16 T Yes.
17 Pu [p] That’s just not so in organic agriculture, is it? I mean then [p], then those pigs are free and that [p].
18 T So this is [p] this is in fact negative.
19 Pu This is in fact [p] yes, that [p] that is for me the opposite of organic agriculture.
20 T Yeah, but [p], but [p] uhh [p], negative reports about such types of industry [p] uhhh [p] fits after all in a [p] a chapter ‘Humans and Environment’? I mean [p] it is [p].
21 Pu Yes, but we [p].
22 T [p] It is actually about [p] it is about the environment [p] this.
23 Pu Yes, but we’re working on ecological cattle-breeding, and it doesn’t have much to do with that, does it?

24 T Oh [p] you’re asking yourself if it fits into ecological cattle-breeding, not if it fits into ‘Humans and environment’. In ‘Humans and environment’ [p].

25 Pu No!!

26 T [p] But in this?

27 Pu No, we’re doing [p] we’re just doing a project only about [p].

28 T Yeah, yeah, yeah [p].


30 T Yeah [p], no [p], then [p], uh [p], then you’re right, yes [p], that [p], then these are all quite different points.

31 Pu Yes, but look we just had such a nice poster, just click on it [unintelligible].

32 T Oh, yeah [p].

33 Pu Can’t we just add it and so.

34 T Go ahead.

35 Pu If it is the opposite, we can mention that in such a chapter [p] or [p].

36 T It’s all right with me. [chuckle]

37 Pu Or do you think that [p].

38 T Just do, you may [p] you may of course use here the information as [p] as a contrast [p] or [p].

39 Pu Yes.

Remarks

1. The teacher [T] was actually talking to two girls [Pu] in this dialogue, but their voices were virtually indistinguishable and could not be separated for purposes of transcription.

2. This dialogue occurred in addition to the activity of looking at the website on the screen.

3. The pupils primarily take the initiative (1, 31, 35). It is not clear how the dialogue ended (39); it is therefore possible that the teacher simply walked away or the pupils turned away.

4. The fact that the teacher sometimes asked the girls about their line of thinking illustrates use of the diagnostic language genre (6, 24, 26).

5. A misunderstanding has occurred. The pupils have a question about the difference between organic agriculture and factory farming (5). This confusion easily occurs with the Dutch terms ‘biologische landbouw’ (i.e. agriculture with organic farming as one possibility) and ‘bio-industrie’ (i.e. bio-industry or farming using latest bio-technology). The teacher, however, interprets the pupils’ question more formally: If the subject fits into the topic of the chapter, then it is acceptable (6). The misunderstanding may be due to the parties not listening carefully enough to each other, a focus on the screen image or the occurrence of background noise. In any case, it is remarkable that the teacher does not let the pupils finish when they try to explain their question. The teacher immediately proceeds in his own interpretation of the question (8) which is contrary
to what the pupils have asserted (1). The misunderstanding is only
resolved much later (24).
6. The teacher helps the pupils solve a content problem which they could
not resolve themselves. Together with the pupils, the teacher creates
clarity with respect to the relevant concepts and the pupils play a
substantial part in this. Because of their perseverance in the discussion
(23), they finally find a solution for the problem (and the misunder-
standing). This is an excellent example of the social construction of
knowledge and support for the zone of proximal development.
7. The use of a particular reasoning strategy is indirectly under discussion
here, namely: the use of contrast. The teacher wants to elaborate further
but the discussion fades off.