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Teaching in a play-based curriculum: Theory, practice and evidence of developmental education for young children

BERT VAN OERS and DEBBIE DUIJKERS

This article focuses on the possibilities of teaching in a play-based curriculum, which has become an issue of international relevance. As a domain of study, the Developmental Education approach was taken in the early grades of Dutch primary schools (grades 1–4, ages 4–8). The article describes the theoretical basis of the approach and how it is elaborated in a play-based curriculum for early years classrooms. Particularly the teachers' strategies for the promotion of development will be discussed in more detail. Finally, the article presents a piece of the evidence base of this approach by reporting a research on vocabulary acquisition. Despite methodological limitations of the empirical study, the evidence suggests that teaching in a play-based curriculum is not only theoretically plausible and practically feasible, but also seems to be effectively useful for the attainment of positive outcomes (on vocabulary learning) as compared to a strictly teacher-driven approach.

Keywords: Play; curriculum; teaching; developmental education

Early years education in pre-school and primary school has been dominated for a long time by strongly *child-centred* approaches, for example based on the ideas of Montessori, or Froebel (see Morgan 1999). Over the past decades, however, societal pressure on schools has been growing, due to increasing demands on schools for economically valuable outcomes and accountability. In the mean time theories of cognitive learning also developed considerably, which reinforced the trust in goal-directed management of learning processes in schools. In this turmoil of events since the 1960s, the dominating concept of education changed into a *teacher-driven approach* that conceived of education as a process of transmission of culture through unequivocally defined goals, deterministic methods, direct instruction, and empirically validated theory (see for example Slavin 1996, Muijs and Reynolds 2001). Accordingly, early childhood education also entered a period in which young children were to be prepared for the

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school career and had to learn the prerequisites for school learning, particularly with regard to literacy and mathematical performance.

In the same period, however, many educationalists, pedagogues, and practitioners were deeply concerned about both the child-centred approach that in their view did not foster all children's developmental potentials, and the teacher-driven approach that allegedly reduced children to trainable production factors in an economically driven society, and incited schools to neglect their pedagogical responsibility of promoting broad development of autonomous cultural identities in children. Many people from this critical movement were inspired by the works of Vygotskij,¹ who conceived of children's development as a cultural process of identity development in which education had a significant role to play (see for example Vygotsky 1997, Kozulin *et al.* 2003, van Oers *et al.* 2008). A core idea of this approach is the assumption that child development is a largely cultural-historical process based upon the child's appropriation of cultural tools in the interaction with adults and more knowledgeable peers (see Vygotsky 1978). This idea is nowadays elaborated in different early childhood education programmes that are implemented in early years classrooms on a daily basis in a number of schools and for a long time (see *Tools of the mind*, US, Bodrova and Leong (2007); *Key to learning*, UK, Dolya (2010); *Developmental Education*, The Netherlands, van Oers (2009)). The issue for the present article is to explain the theoretical basis for the Developmental Education approach and how it is applied in early years classrooms, characterized as a play-based curriculum. In a Vygotskian approach to development, the appropriation of cultural tools like language is an important educational task, and we will take the teaching of vocabulary as a paradigm case for demonstrating the potentials of the Developmental Education approach. Whereas teaching in a play-based curriculum may sound contradictory to many people, the present article will also show how this is possible, and argue for play as a valuable context for learning and teaching.

Vygotskian tenets of developmental education

It is widely known that Vygotskij's view on human education was based on assumptions about the social origin of the human mind (van der Veer and Valsiner 1991, Valsiner and van der Veer 2000). The human mind develops through appropriating cultural tools in interactions with more knowledgeable cultural others. Particularly the historically developed cultural tool of language plays a crucial role in the developmental process of human beings as it enables people to communicate with each other and with themselves. It is through the interiorization of the interpersonal use of language (communication) that the cultural mind develops (Wertsch 1985, Tomasello 2008). Education has an outstanding role to play in supporting the use of communicative tools for promoting the cultural development of pupils. Through communication the adult can give the child access to new cultural experiences that go ahead of the child's actual level

of development. 'Good learning', according to Vygotskij, is learning which is 'in advance of development' (Vygotsky 1978: 89). Such 'good learning' can promote development. This notion of '*development-promoting learning*' is the basic starting point for the 'Developmental Education' curriculum.

Vygotskij's emphasis on the important role of the adult in promoting children's development inevitably confronted him with questions about the developmental potentials of (young) children, as well as with problems concerning the conditions and limits of this adult interference. In his view, the developmental potential of human beings was never restricted to what they had achieved in past learning (the actual level of development). Developmental potential is significantly related to what children (or more generally people) can learn with the help of more knowledgeable others, a notion that he referred to as 'the zone of proximal development'.

In the elaboration of our Developmental Education curriculum, we also employed this idea of the zone of proximal development (ZPD), but qualified this notion beyond the usually quoted definition that operationalizes the ZPD as 'the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration of more capable peers' (Vygotsky 1978: 86). The problem with this 'discrepancy-formula' of the ZPD is that it can actually legitimize approaches to learning that fit in with teacher-driven transmission types of learning, since direct instruction can also be seen as a way of providing help to pupils in order to achieve new learning outcomes that are beyond the child's actual level of development. Vygotskij himself was well aware of this problem when he wrote:

We have said that the child in collaboration can always do more than independently. But we have to add: not infinitely more, but only within specific limits, strictly defined by its developmental level and intellectual abilities. (Vygotskij 1982: 248)²

In his explanation of this point of view, Vygotskij pointed out that the zone of proximal development should be seen in the context of activities that are meaningfully accessible for the child. In this context Vygotskij also refers to the notion of imitation and states that 'imitation', basically, is the core of the zone of proximal development (Vygotskij 1982: 250). And elsewhere he writes: 'Using imitation, children are capable of doing much more in collective activity or under the guidance of adults' (Vygotsky 1978: 88). Hence, we are led to a qualified definition of the zone of proximal development, that does not refer to any action that can be learned with help, but to those new actions *within the context of meaningfully accessible activities* that can be appropriated under the guidance of more knowledgeable others. That is to say: the ZPD lies within sociocultural activities that a child can and wants to imitate. It is important to note here too that imitation for Vygotskij was not a process of mechanically copying of actions. Basically, the ZPD refers to any sociocultural *activity* that a child can accomplish with the help of others (Vygotskij 1984: 263), and agency within such activities depends on the participants' abilities to benefit from assistance of others (Edwards and D'Arcy 2004).

With regard to young children's learning, Vygotskij saw the zone of proximal development particularly in these children's role play. In his explanation of the function of play for development, Vygotskij pointed out that it is role-play that makes the adult culture accessible for young children. By participating playfully in the adult world, the child can imitate adult activities and meaningfully enter a zone of proximal development that creates opportunities for development-promoting learning, provided the child is properly assisted (see Vygotsky 1978: 102). However, such play also gives the child a new form of desires, not only the wish to master specific new actions, but the desire to adopt a personal role in the play activity, including the mastery of the rules involved. Play, according to Vygotskij, is the basic medium for child development: 'The child moves forward essentially through play activity. Only in this sense play can be considered a leading activity, that determines child development' (Vygotsky 1978: 103).

The notion of play as a leading activity was not profoundly elaborated by Vygotskij. It is obvious, however, that play as a leading activity qualifies the young child's zone of proximal development in an important way. The notion of play as a leading activity was further elaborated by El'konin (1972), who pointed out that play is the main and developmentally most productive context for learning of children at the age of 4 to about 7. El'konin (1989: 67–69), however, also stresses the cultural–historical status of play and states that play should not be seen as a natural characteristic of children, but as an educational strategy in industrial societies to give children access to adult life and cultural activities, and thus create the opportunities for the child to appropriate complex tool-mediated adult actions with the help of cultural others. Karpov (2005) gives an extensive treatment of play as a leading activity and particularly documents with empirical evidence the significance of the adult's role for children's development during this leading activity.

Following the Vygotskij–El'konin line of reasoning, the Developmental Education curriculum adopts the idea of play as a main descriptor of the context for learning and development for children in the age range of 4–8 (see for example van Oers 2009). However, a further definition of play was needed in order to implement this concept in the curriculum. Neither Vygotskij nor El'konin were very specific in their definitions of play.

Given the ambiguity of the notion of play (see Sutton-Smith 1989), it is important to be clear about its meaning. Traditionally play opens a way to a child-centred approach to children's learning, but this would be a misrepresentation of the intentions of Developmental Education, which acknowledges the important role of the adult in young children's development. Particularly for the implementation of a play-based curriculum it is important to be clear about the relationship between playing and learning, and about the position of adults towards play in order to distinguish this approach from a child-centred approach (which refuses the adult to take part in children's play), as well as from teacher-driven approaches (that tend to separate playing from learning, and even tend to reduce the opportunities of play in the school context, see Wood and Atfield 2003, Zigler and Bishop-Josef 2006, Hirsh-Pasek *et al.* 2009).

Using the point of view of activity theory (as developed by Vygotskij's colleague Leont'ev (1975)), we interpreted play as *a specific format of cultural activities*. All cultural activities can be formatted in different modes, organizing the actions of the participants in characteristic ways. For instance, a very strict activity format (like in drill-and-practice) prescribes strict rules to the actors, allows them no freedom as to the decision how, why, and when the actions should be accomplished, and does not require any personal involvement in the actions. On the other hand we can also observe activities in human beings (like in role play) where rules are present, while the players always maintain some degree of freedom with regard to how the activity should be played (even sometimes with regard to the prescribed rules!), and also show a high level of personal involvement. In our view, formats of cultural activities can be defined on the basis of these three parameters: presence of *rules*, level of *involvement*, and *degrees of freedom*. Role-play can now be defined as a sociocultural activity, formatted in such a way that there are:

- (implicitly or explicitly) shared *rules*,
- some *degrees of freedom* for the participants with regard to how the activity should be carried out, and
- *high levels of personal involvement*.

The advantage of this approach to role play is that it makes no restrictions as to the status of the participants, as long as they recognize the format of play and don't disturb any of the essential parameters of this format for themselves or for the other players. Being basically a cultural activity this conception of play intrinsically acknowledges the participation of adults (see also Wood and Atfield (2003), who also acknowledge the significance of the participating adult in children's play; also Karpov (2005)). Moreover, as cultural activities essentially include the function of learning, we can also integrate learning and play, by considering the changes in the playing actions or in the content of the activity as demonstrations of learning. Learning and playing cannot be separated, in our view. As we shall demonstrate later in this article, the participation of the adult or more capable peers in a role-play can even lead to embedded goal-directed learning and instruction, which makes playing a potentially rich educational context for learning in early childhood education.

With these theoretical notions in mind, we have been working at the construction and implementation of a play-based-curriculum in primary school classes grades 1–4 (aged 4–8 years). It may be obvious, however, that such a curriculum can only be developed gradually, following the steps of the growth of educators' own psychological understandings of play, learning, and development. And, similarly, the process of implementation in classrooms is also a step-by-step process of collaboration among many experts like teachers, innovators, teacher coaches, and researchers. In the next section we will describe the curriculum in a little more detail, particularly focusing on the role of the teacher in children's play.

Teaching in a play-based curriculum

In the following, we will give an impression of the dynamics of learning processes in the context of a play-based curriculum. In advance, however, a brief clarification must be given on the notion of curriculum. We use this word in the original sense of ‘trajectory’ and more specifically the trajectories of learning that pupils go through during the school years. The play-based curriculum is not a prescriptive syllabus to be followed by the teacher on a day-to-day basis. Rather, the teacher constructs the curriculum in close interaction with the children in the classroom, informed by the children’s interests, the teacher’s mandatory goals and his personal ambitions. The teachers merge their personal and formal goals with the children’s interests in order to guide them towards the teaching goals that are mandatory for the schooling at that age. Evidently, this play-based curriculum is no ‘*laissez-faire*’-event. Children in the play-based curriculum have to appropriate specific cultural tools and competences for participation in cultural practices: e.g. learning to read, to write, to do mathematics, to live together, and to develop motoric skills and specific interests and motivations etc.

In the true Vygotskian sense, teaching in this play-based curriculum is to become (like life) a *creative act* in which the teacher constructs novelty within the constraints and provisions of the situation (see Vygotsky 1997: 346–350). Needless to say that this is not an easy endeavour and in the implementation process we are not mongering illusions that this can be achieved easily overnight. In fact, learning to teach in this play-based curriculum will take a longer trajectory of teacher learning, guided by teacher educators and a whole supportive infrastructure consisting of educators, colleague-teachers, and authors of ‘good, exemplary practices’. Transforming teaching from a technocratic transmission process into a meaning-driven process that brings together cultural and personal meanings is a long-lasting process (see Tharp *et al.* 2000; van Oers, *in press*).

In the following, we will give a brief impression of a play-based teaching-learning process by describing a paradigmatic classroom example, followed by a brief elaboration of one category of tools a teacher can use for promoting worthwhile learning processes within joint activities.

An example from the classroom

The descriptions of classroom examples are taken from observations in Developmental Education schools, working with the programme ‘Basic Development’,³ as described in the works of Janssen-Vos (2003, 2008) and Pompert and Janssen-Vos (2003). Play situations of the type described below occur all the time in the play-based curriculum with varying contents (museum, post office, a vet’s practice, hospital, travel agency, bakery, shoe store, etc). Every 6–8 weeks the teacher chooses a new theme that is translated into a sociocultural practice (activity) in which children can adopt roles, employ the role-bound tools, and learn about the rules and tools within the context of that play. The choice of the

theme can have different bases: a significant event in the community (e.g. one child got involved in a car accident), events in the year (e.g. going on vacation), or a specific interest of the children (e.g. dinosaurs, or World Championship Football). In the transformation and elaboration of the theme-related practice, children are involved as much as possible: they help in setting up the situation (e.g. the travel agency office), and the main topic of the current script. Children are important co-actors in the choice of the significant tools, set-up of specific goals, definition of relevant rules, story to be played out, etc.

The following is a paradigmatic classroom situation from the Basic Development programme (after Janssen-Vos 2008: 82):

A grade 1–2 combination class (children of 4 and 5 years old together) has visited the school doctor. This was an impressive event for the children and the teacher decided with the children to set up in the play corner of the classroom a consulting room of the doctor. In a conversation the teacher and children decide what they need for making a real consultation room, and they collect things from everywhere to set up the situation. They brought paper and pencils, but also a weighting scale, a measuring rod, a stethoscope. Gradually the children started playing. They were highly involved, acknowledged some of the rules (like the rules for measuring), but also used their relative freedom in the ways they played out the activity. The teacher is also in the waiting room as a patient, but plays multiple roles: an educational assistant (sometimes the children themselves ask for help), sometimes a critical observer (the teacher asks questions and focuses attention in a natural way, similar to how children among each other ask questions or shout ‘look here what a big number!!!’), sometimes as a patient.

The children start weighting and measuring. Pascal plays the doctor and wants to know exactly the weight and length of Hannah, and to write it down on a piece of paper. The teacher asks: ‘Can you see how much Hannah weights?’ And Pascal looks at the scale and asks: ‘This mark, Miss, how much is that?’ And the teacher answers: ‘Look at the scale, Pascal, there are numbers on it. Here you see 15, that is 15 kilos. The next mark is 1 kilo more, so that is 16 kilos. So yet another mark further is ... What would that be? ... And Pascal answers: ‘... 17 kilos, so this must be 18 and this is 19. Hannah is 19 kilos!’

He wants to write it on his paper: ‘That is a one and a nine’.

This brief fragment is just one event from a continuous series of interactions in a play context. What we have witnessed here is the teacher’s spotting of a teaching opportunity that she uses to help the child with improving its participation in this type of activities. The other participating children have observed this activity and may have learned from it too. In many cases we see that the surrounding children actively participate in the collective thinking process and sometimes significantly contribute to it.

Although not present in the play session described above, in several similar sessions the teacher focused on the writing of numbers, writing or reading recipes, or on building social relationships. In this way the teacher interacts with all children, in the whole group, in a small group, or individually. Most of the time the teacher imagines in advance what type of

actions she wants to provoke, but she also picks up on the emerging questions, interests, or actions of the children. Sometimes a play-embedded instruction is given (like in the example), which is generally accepted as meaningful by the children as it contributes to their wish to participate self-dependently in the activity.

Tools for teachers in a play-based curriculum

In the teacher training process, teachers are intensively assisted by their coaches in the appropriation of specific teaching tools for the productive use of children's play activities as meaningful contexts for learning. For a further characterization of the play-based curriculum, we will focus on a tool which is supposed to support the teacher in the process of evoking learning within the context of play. This tool, called 'Impulse', is a collection of strategies that aims at the elaboration of children's activities into new meaningful actions that constitute a basis for further learning. The following impulses are part of the expert teachers' repertoire who aims at setting up *productive play* (Janssen-Vos 2008: 109–116):

Orienting

Teachers explore the situation and related activities with the children, and focus the children's attention on specific aspects or actions. In a role-play in a doctor's practice the teacher explores the children's personal experiences and shares them with others. Children focus on the details of such a practice: what is going on there? What kinds of things are involved? Which roles are involved? Et cetera. Through this orientation children can also get engaged in the set-up of the situation or the script of that situation.

Structuring and deepening

Just providing a situation and tools is often not an optimal way of introducing productive play. Young children need open structures in order to get involved in role-play activities and benefit from it. The teacher develops a story (script) with the children that is played out by referring to a common story or by opening the scene with a particular act: e.g. the teacher enters the scene as a concerned mother with a sick child, who has a broken leg. What are we going to do? In general, the teacher tries to set the scene with the children by introducing a problem and discussing what is to be done? What do we need? Such questions give more detail, structure, and depth to the activity.

Broadening

This impulse aims at connecting the role-play activity with other activities and capacities of children. In the doctor's play, children are encouraged

to think about the waiting room and how to decorate it, for instance with leaflets, advertisements or informative posters, and warnings. This activity draws children into writing and drawing of specific practice-related texts. In the travel agency children may get involved in collecting or making leaflets of (exotic) countries, but also in consulting an atlas, and calculating prices of trips, etc. A successful broadening of children's activity always is felt as a contribution to the children's play.

Contributing

Important innovations of children's play can be achieved by introducing new tools into the play that answer specific needs of children. In the play of the school doctor, for instance, the doctor and her assistant want to measure the height of all children in the class. They write down all the numbers on a paper and the teacher then introduces a way of graphically representing the outcomes by way of lines of different lengths. Our classroom experiences and research over the past decade have demonstrated that the introduction of schematizing into children's play should be considered a meaningful contribution to children's play (van Oers 1994), with significant positive effects on the development of mathematical thinking (see Poland 2007, Poland *et al.* 2009).

Reflecting

During the activity the participating teacher constantly gets the children involved in little moments of discourse on the ongoing activity: how is it going, is this what you want? Can you do it otherwise? What does this mean? Are you sure? These discourses stimulate children to think about their actions and to translate them into comprehensible narratives, including new questions. Such reflections have important functions for the evaluation of the activity, but also for starting new orientations that may lead to new (broadening, contributing, deepening) activities.

As we know from extensive innovation literature, any substantial innovation requires serious attention for the training of the teachers who have to do the job in their daily practices with children (see among others Tharp *et al.* 2000, Fullan 2001, Hargreaves 2005). In our own group's work, the teacher education activities related to the implementation of Developmental Education ('Basic Development') into classroom practices also spends serious and long-lasting investments in teachers and schools. Only then we found that the classroom activities of these expert teachers turn out to be productive in terms of children's learning outcomes.

In the next section we will demonstrate—although cautiously—the feasibility of the approach, with the help of research in the domain of vocabulary learning. As explained before, vocabulary teaching in early years

classrooms (5-year-olds) is taken as a case for demonstrating the potential of teaching in a play-based curriculum like Developmental Education. Following Vygotskij's emphasis on the role of language and literacy for human cultural development, promoting language development is seen as an important learning objective in Developmental Education classrooms.

The next section describes a piece of research that may support the value of the Developmental Education approach and its teaching strategies. It is, however, a small scale study with some methodological limitations (as characteristic for much practice-based research), which cannot be taken as definite proof of the superiority of Developmental Education. In our view, however, it can be taken as an empirically-based example of the feasibility of Developmental Education for the improvement of early years play-based classrooms.

Exempli gratia: Vocabulary learning in a play-based curriculum

The body of evidence for the value of playing as a context for learning in different areas is definitely growing (see for example Hirsh-Pasek *et al.* 2009). In our research we are permanently collecting data on learning outcomes of children in the play-based curriculum of Developmental Education. Our outcomes in this study (based on a quasi-experimental pre-test-post-test design with control groups) may add to this body of evidence and further demonstrate the value of Developmental Education in the early years of primary school, particularly with regard to vocabulary learning of 5-year old pupils. The study was carried out by Duijkers (2003). The research is based on the comparison of two approaches to teaching young children: one is a common practice, based on direct instruction as is frequently practiced in the Netherlands, the other is the Developmental Education programme. The next section starts with a closer description of the two practices with regard to vocabulary teaching.

The two approaches of early learning

In the Netherlands both the teacher-driven (task-based) and play-based (Developmental Education) approaches for early childhood education are in use in primary schools. Although there are no research-based estimates for the exact number of schools committed to either approach, we have indications that $\sim 5\%$ of the Dutch schools is following the Developmental Education approach. The popularity of the programme-driven approach will be even more. Both approaches have in common that children are conceived as active learners, and both share the conviction that learning requires teacher-pupil interactions, as well as peer co-operation. With regard to the time spent per week in vocabulary learning activities, both programmes are alike. Schools committed to either of these approaches participated in our research project. We will briefly describe each approach.

A teacher-driven approach

The early education programme 'Piramide' is conceived here as an example of the teacher-driven approach. Piramide was developed in the national Dutch institute for test development (CITO) by van Kuyk (2003, 2004). Piramide is a programme for the 3–7 year olds. Theoretically the programme starts out from a number of different theories and articulates the importance of both the children's own initiatives and the teacher's initiative. The programme is said to combine both initiatives by scheduling on a daily basis free play, independent learning, and work with the teacher in projects and cursory programmes (focusing on knowledge and abilities from the school curriculum). Free play and work with the teacher in projects and cursory programmes are separate activities. Although the teacher can support and encourage children in their play, she is not supposed to teach during play. Teaching takes place in the context of projects and embedded cursory programmes. Most of the learning outcomes of the programme result from such projects and tutoring. The role of the teacher and the fixed programme are strong determinants for the pupils' learning and development. That is why we characterize the programme as a whole as a teacher-driven programme.

For the stimulation of vocabulary development a language corner is set up. For the younger children this is a corner with picture books, simple reading books, pictures with written words on the wall, exhibition of the alphabet and elementary words like 'door', 'chair', etc. The school year is programmed on the basis of 12 projects that last ~ 3 weeks each. Each year starts with a welcome project and proceeds along the sequence of projects in a fixed order. Each project is based on a specific theme ('My body', 'In the supermarket', 'Water in the house', etc.).

Most of the vocabulary teaching takes place within the projects and the cursory works with the teacher. The course of the projects is described in a project book that the teacher should follow. The core of the projects exists of neatly described sequences of tasks for individual learning, group work (co-operative learning), or tutor learning under guidance of the teacher. As an example we describe part of the project 'Water in the house' (from grade 1, 4–5 year olds), as described in the programme's manual (figure 1).

The children are supposed to answer the teacher's questions or repeat the teacher's words. The whole working procedure obviously follows a typical IRE-format (initiation-response-evaluation) that is so common in traditional classrooms (see Cazden 2001). For the teacher the relevant vocabulary is explicated in a network of concepts (only the circle 'showering' is completely translated here; the other circles are also filled in with words, but not completely translated here; from van Kuyk (2003: 87)) (figure 2).

The programme contains many of such prescribed projects and tasks. Most of the time the children are engaged in tasks that draw their significance mainly from the programme itself. Although the children are often involved in teacher-led task-based activities, the activities remain isolated

Playing with water
Goal: the children repeat previously learned concepts by playing with water

Put an empty water table with one or more basins or buckets in the classroom or on the play ground. Do the activity with the whole group by giving children assignments by turns, or let small groups of children experiment with the materials. Let the children help with filling the buckets with water from the tap and emptying these in the water table and basins. Say for example the following:
We are going to play with water
Where can we take water?
Do you hear the water streaming into the bucket?
Feel, is the water warm or cold?
Add a little bit of warm water
Does the water feel like a nice temperature now?

Translated from Van Kuyk, 2001, page 83

Figure 1. Activity description for vocabulary learning (from Piramide manual).

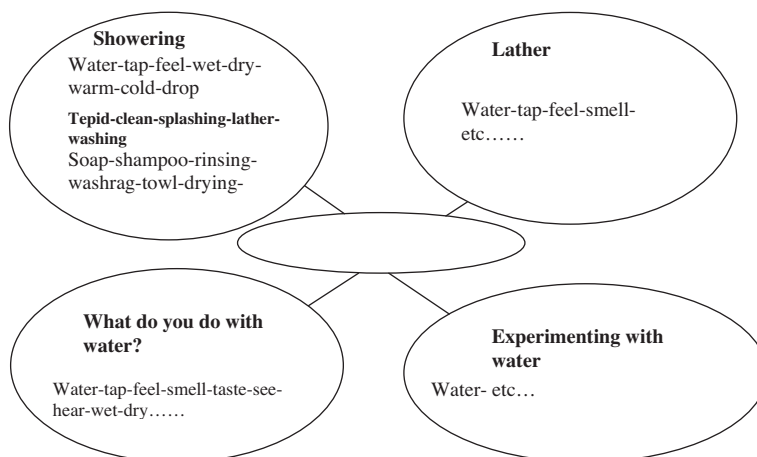


Figure 2. Target words in teacher-driven programme.

and external from their lives, and allow children only a peripheral participation. In one of the tasks the children watch the teacher washing the dishes; after each item washed, the teacher shows it to the children, says its name, and the children have to repeat the word after the teacher. So they say (and allegedly learn) 'plate', 'knife', 'fork', 'dish rack', or even 'sun glasses', and 'pencil sharpener' (see van Kuyk 2001, lesson 6).

As the description of the programme already suggests, the vocabulary development is to a great extent based on teacher-driven, task-based learning. The tasks are prescribed and ordered by the programme. Our classroom observations confirm this. During project time in this research school, most of the time the children are engaged in individually accomplishing tasks related to the target words. Basically, the process is grounded in associating a word with a particular experience or a part of the experiential world ('fast mapping', see Bloom 2001).

In different empirical evaluations it was demonstrated that the children that have been involved in this programme have generally better scores on standardized tests than a competing reference programme (Kaleidoscoop) that gives more room to the children's own activities and experiences in learning. According to Dutch standards, the Piramide programme gives quite good results on the standardized tests, developed by this same institute (CITO). The longer the children have been involved in the programme the better the results, as compared to the Dutch national norms. The tests used are mainly based on formal paper and pencil tasks, consisting of questions to which a standard answer must be given (in a multiple-choice like way).

A play-based approach to vocabulary learning

Vocabulary development in 'Developmental Education' takes place in the context of activities in which the pupils and teacher are involved as participants in different roles. In playing out their roles the children encounter different communicative problems, e.g. in communicating with other roles in the activity: doctor with the patient, shop keeper with client, bus driver with passenger or mechanic or person from the gas station, museum director with visitors, etc. In playing out these scenarios the need for new relevant words frequently arises. As explained by Bruner (1983), new words are usually learned as means for better regulating the joint activity. This is what happens in 'Developmental Education'-classrooms with regard to vocabulary development. The development of the activity in the project is not based on prescribed tasks, but on the basis of meaningful self-assignments of the pupils in negotiation with other participants in the activity (including the teacher). Through participating in the activity the teacher can of course use the impulse tool and deepen or elaborate the activity to a certain extent by asking questions, raising problems, or just using new tools and relevant words, that the children can appropriate by imitation within the context of the current activity. As an example, picture the following situation, where the teacher is employing different impulses for the promotion of vocabulary learning: when participating in the children's 'kitchen-play', the teacher can direct the children's actions to specific objects or actions. When the children are making apple-pie, the teacher suggests for example: 'we have to take these little *lumps* out of the flour'. A child responds: 'yes we need this thing with the little wholes'. Teacher: 'All right, we need a *sieve*'. In the following activity the teacher uses this word several times and the children can actively use and appropriate this word during this activity. It is clear that the teacher cannot stick rigidly to a pre-determined list of 'words-to-learn', but she is not completely at the mercy of coincidences. The teacher can regulate the shared activities and optimize the chance of emergence of needs for specific words. This is what a teacher in the Developmental Education-programme does in her involvement in children's play activities. In this way, both teacher and pupils introduce words into the activity that are unknown for part of the participating pupils. The words that emerge

during the classroom activities in our research are often not pre-planned and not emphatically focused on the words in the target list that was the basis for the pre- and post-test (see below).

Comparing vocabulary learning in two different contexts

Set-up of the study

In her research project, Duijkers (2003) investigated vocabulary learning in two different classrooms (in two different schools; $n = 42$). The dependent variable was defined as the number of new words that pupils learned from their respective thematic classroom projects. During the study no special interventions were made (except for the pre- and post-test measurements).

One of the classrooms followed the Teacher-driven approach of the Piramide programme (labelled here as T-school), the other was based on the Play-based approach of Developmental Education (labelled here as P-school). During the study, both schools continued their teaching as usual. The above given descriptions of the Teacher-driven and the Play-based approaches can be taken as valid characterizations of the practices of these schools' classroom practices. Actually, the examples given above as illustrations are taken from both schools' project-based practices. In the T-school, the teacher is quite directive with respect to the course of events in the project; as requested by the programme manual, she demonstrates objects or events according to the manual and mentions their names; she asks children to repeat or act according to a given instruction. In the P-school the teacher serves as a coach and supporter of pupils' actions. When children encounter a problem or use an object, the teacher examines if they can explain what they are doing, know the name; the teacher assists the pupils in the accomplishment of their activity and enriches pupils' vocabulary where she thinks it is possible, required or solicited by the pupils.

The school that followed the Piramide-program (T-school) was selected for this study as it applied the Piramide approach validly, closely following the teacher-driven projects from the manual, as described above. The Developmental Education (P-school) school included in the research project was acknowledged as a good practice for Developmental Education, applying the approach since 11 years. This school also worked strictly along the lines of the play-based curriculum, as described above. The schools couldn't be selected randomly from a larger pool, as there were not many schools available at the moment of the research, which met the desired matching criteria of region, proportion of second language learners, years of experience with the educational concept, and comparable contents.

Both schools were located in an urban environment in the west of the Netherlands (T-school in Haarlem and P-school in Amsterdam). In the T-school 20 pupils between the ages of 4–6 participated; in the P-school 22 pupils of the same age range participated. No selection of pupils within the class was made. All pupils participated in the study.

Both schools had an ethnically mixed population, but the number of pupils who learned Dutch as a second language (DSL) was bigger on school T than on school P: 12 (60%) vs 7 (32%). Both schools had ample experience with their respective approaches. Teachers in both conditions were female and with regard to their expertise in working with the respective approaches, the participating teachers could be considered equally experienced.

The study was set up as a comparative study on the basis of a pre-test—3 week practice—post-test design. Pupils in the T and P conditions were compared with regard to *active and passive mastery* of a set of theme-related target words, as well as with regard to the *development of semantic content* of these words as a result of the schooling at the two different schools. The performances of the pupils with regard to vocabulary development on both schools were both quantitatively and qualitatively analysed.

Despite our careful attempts to match the schools as much as possible, there were still a number of differences between the schools. We will address these problems in a special section below (Methodological note).

A methodological note

It is a well-known fact that experimental analysis of educational programmes in ecologically valid contexts like classroom practices has inherent methodological problems, regarding the control of all possible distinctive variables. In practice, complete control through a-select sampling and randomization mostly turns out to be impossible, and we have to confine ourselves to those variables that are supposed to be relevant on the basis of the theory, and on which information is available or can be gathered.

In our research project it turned out to be impossible to find two schools with different educational programmes (P and T), that were identical on all other relevant variables. We had to make the choice between not doing the research at all, or doing the research with the best possible conditions (although not ideal). In our case we chose schools that were available in the same urban region, and that seemed comparable on face. However, these schools unfortunately turned out to have different numbers of ethnic minority children. We have taken this into account in the statistical analyses.

Moreover, when using existing classrooms at different schools, researchers did not have the possibility to determine the content of the lessons during the research period. Consequently, both schools were involved in different types of activities and subject matters. At the start of our research project, the schools had already made their yearly planning. It turned out to be impossible to find schools that work on the same theme in the same period. Piramide schools (T-school) have projects of 3 weeks, while schools working with Developmental Education (P-school) generally work for ~ 6 weeks on a theme. At the time of the study the T-school had to be engaged in a project on *water*; the P-school had planned a project on *the kitchen*. So it was impossible to harmonize the classrooms with regard to the themes they were working

on during the study. As described above, we made the situations comparable by measuring the number of new words that pupils learned from their respective projects.

The problems mentioned should warn us against drawing too sweeping conclusions, but in our view it is possible to interpret the outcomes cautiously as piecemeal evidence in a broader argument about vocabulary learning in different classroom conditions.

Implementation

Due to the different contents, we could not work with a common set of target words on which both classrooms could be tested (in pre- and post-test), as this would result in a set of words detached from the pupils' current activities, or place one or the other school in a less favourable position. Therefore, we decided to test the pupils on their knowledge of *highly frequent theme-related words*. For the T-classroom we adopted the words (26) suggested by the programme. For each of these words the frequency of occurrence (FO) in the whole population of 6-year-old Dutch speaking children was determined with the help of the normalized taxonomy (Schaerlakens *et al.* 1999) which lists the frequency of occurrence of words in the passive vocabulary of Dutch and Flemish children at the transition from grade 2 to 3 (5–6 to 6–7 years of age). For the P-classroom we identified 26 words that were related to the Kitchen and that matched the FO of the words in the water project. With the help of this frequency list we could take care that all children were tested on the *mastery of theme-related words that had the same level of frequency in everyday usage*, and prevent that children in one group would be tested on words that were more (or less) difficult than the words in the other group. The mean FO of the target words in the T-group was 85.5%; in the P-group it was 82.5%.

All children were individually pre-tested on the mastery of the theme-related target words during the first week of the study (for procedure see below). Then, during a 3-week period the classrooms carried out their respective projects (according to their respective educational philosophies). Finally the children were again tested (post-test) for their mastery of the theme-related target words. So the investigation at each school took 5 weeks. Both schools were mostly investigated in parallel; there was only a 1-week delay between the schools. The decision to post-test the pupils after 3 weeks was a consequence of the 3-week periods of the projects in the T-school. We found it important that all children were tested after the same period of project work, even though this meant that the children from the P-school were already tested when their project was not yet finished.

Data sources and instruments

In the course of the study the investigator observed each child individually during 20 minutes in their everyday classroom activities, in order to gather information about the active use of the target words during the day. The activities in which the children were observed were randomly

chosen, and were most of the times *not project-linked activities* (e.g. during free play, on the play-ground, etc.).

In the pre- and post-tests both the active and passive knowledge of the target words was examined in an individual conversation with each child. For reasons given above, pupils were tested on different target words. Pupils from the T-condition were tested on the mastery of 26 words related to water. These words were prescribed by the programme, and included words like (translated in English) sponge, tap, wet, floating, shower, sinking, spraying, etc.). Pupils in the P-condition were tested on 26 words related to the kitchen. These words were randomly selected from a frequency list, and included words like: Baking, vegetables, tap, shopping list, sink, furnace, blending). The words in the P and T lists were comparable as to frequency of occurrence and the proportion of different categories (verb, noun, adjective).

The procedure in both conditions was identical for each child, and on pre- and post-test. First the active use of the target words was tested, mostly with the help of concrete material in order to make the situations as clear and vivid as possible for the children. So the word 'sinking' was tested with a bowl with water in which a little stone was dropped. The children were asked to name the phenomenon or event. In a few cases concrete demonstration was practically impossible (like with 'showering'); in those cases pictures were used. After their naming of the event the children were invited to tell a bit more about the meaning of the target word, in order to gather information about the semantic network of that particular word. We assumed that the active mastery of the target words would also encompass the passive use. In case the child could not name the phenomenon, event, or object actively, the target word was tested passively by showing the child four objects and asking for the target word. In the case that the child did not actively know the name of an event or an object (e.g. a 'sponge'), four objects were shown (e.g. soap, washing-up brush, washrag, sponge), and the child was asked to hand over the sponge. Of course, the child could answer this question correctly by exclusion if it happened to know the other words, but this is probably not an unusual strategy for passive word recognition (see Bloom 2001), that will be an equal advantage for children in both conditions. The same procedure and target words were used on the post-test.

The reliability of the pre-tests and post-tests was calculated on the basis of the collected test data. For all tests on both schools Cronbach α was calculated and the outcome was always between 0.82–0.95, which is well above the generally accepted threshold (that Cronbach's α should exceed 0.70 for a reliable test).

The observation material was explored and scored in terms of number of target words used by the children in their everyday interactions. The tests were scored for active word knowledge and passive word knowledge. In order to estimate the scope of the semantic networks associated with children's words, the researcher also analysed the children's talks and narratives for the occurrence of target words. The narratives of the children regarding the actively used target words were analysed and scored as the number of theme-related words that children associated with the target

words. We considered this as an indicator of the semantic network of the target word. The more theme-related words they associated spontaneously with this word, the higher the score, i.e. the greater the extent of the semantic network. In both pre- and post-test the number of additional words were counted and valued. It was not necessary that the additional words were the same on both occasions. The child that explained the word 'sponge' on the pre-test with 'cleaning' and 'polishing' got a score 2 for the semantic network; this same child mentioned 'water', 'squeezing out', 'brushing', and 'sopping' on the post-test and got a score of 4, and the gain score (4) was calculated on the basis of the *new* words mentioned during the post-test. If the child repeated words from the pre-test, then these words had not been counted for the gain score on the post-test.

Outcomes

All data were statistically analysed by Duijkers (2003) and with qualitative methods. The graphs in figure 3 give an overview of the main outcomes. It is evident from this that the performances of the P-school pupils on the post-tests are much better than those of the T-school. However, it is also

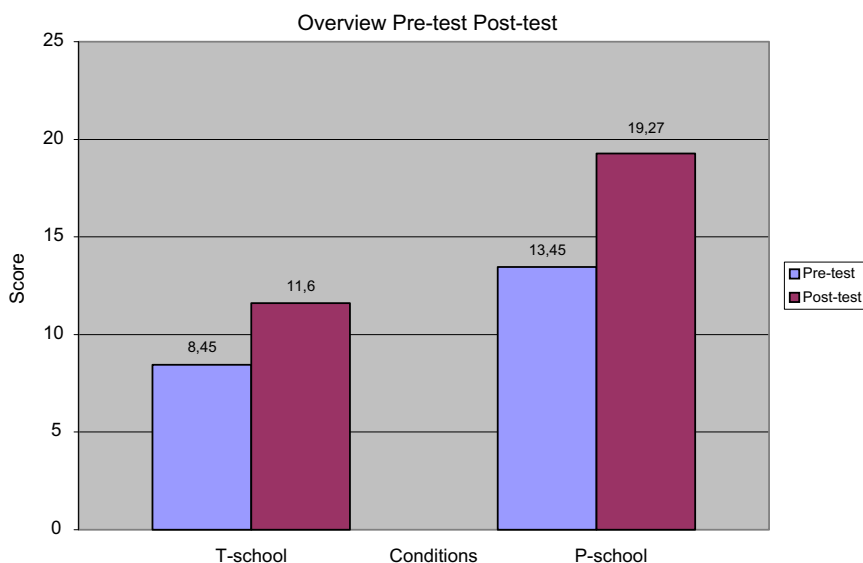


Figure 3. Overview of main outcomes (active mastery).

Table 1. Outcomes on pre-test and post-test.

School	<i>n</i>	Mean difference (active)	σ	Mean difference (passive)	σ
T-school	20	3.15	2.033	2.15	1.348
P-school	22	5.82	1.651	3.86	2.054
Statistics		$p = 0.000$ $t = -4.687$		$p = 0.003$ $t = -3.161$	

clear that (despite our attempts to match the groups in the two conditions) the P-group already scored higher on the pre-test. All differences turned out to be statistically significant ($p = 0.05$; $t = -3.608$, $df = 40$ for pre-test; $t = -4863$, $df = 40$ for post-test), both for the active and for the passive vocabulary mastery. The graph for the passive mastery is omitted, because it was quite similar to the one here exposed.

In order to evaluate these differences better, difference scores for the two groups were calculated, which indicate the gains of the groups with regard to the mastery of the target words. The mean difference scores for the active and passive mastery are displayed in Table 1.

This table shows that the P-school gained significantly more than the T-school, but here again we have to be cautious because of a possible Mathew affect: the P-school might show more progress because it had a better starting position. In that case the gains of this school may not be due to the different characters of the two educational approaches. Therefore we took yet another tack for the evaluation of the outcomes. Through regression analysis we tried to figure out which factors best predict the outcomes of the post-test scores on the active and passive vocabulary test. As predictors we introduced pre-test score, type of education, and DSL. It turned out that being a pupil who had Dutch as a second language (DSL) had no significant general effect on the outcomes. The variance of the post-test scores (active mastery) was mainly explained by the pre-test score (89.4%); adding the type of education to the regression equation contributed another 2.6% to the post-test, which is a statistically significant contribution (significance F change = 0.01). Hence, the play-based curriculum significantly contributes to the higher scores of these pupils on the post-test. A similar picture appears for the passive vocabulary (which will not be specifically discussed here).

An analysis of variance with the pre-test scores as covariant (in order to correct for the initial differences) confirms this picture: the differences between the scores on the post-test for both active and passive scores are significant in favour of the P-school. Moreover, there is a significant interaction between DSL and type of education ($F_{\text{active}} = 9.186$, $df = 1$; $p = 0.004$; $F_{\text{passive}} = 12.694$, $df = 1$, $p = 0.001$).

Finally, the extent of the semantic networks for the target words in the two schools were also examined. The mean semantic extent of the pupils on the T-school was 0.629, while on the P-school it was 2.082. A statistical analysis of these data showed that the pupils on the P-school have a significantly greater extent of the semantic network as a result of the type of education that they have got ($t = -7.558$; $df = 40$, $p = 0.000$).

Table 2. Use of theme-related words during activities.

Type of education	Number of theme-related words used during observations	Mean number of theme-related word per child	Number of children not using any theme-related words
T-school ($n = 20$)	13	0.65	12
P-school ($n = 22$)	147	6.68	1

From this quantitative analysis we can conclude that children in the Play-based curriculum (P-school) learned significantly more words during the 3-week project than the pupils from the Task-based school (T-school). Moreover, the words that they have learned turn out to be semantically richer and embedded in a more extensive semantic network. Presumably this contributes to the usability of these words in the children's activities.

A qualitative analysis of the observations of the children (during 20 minutes in varying situations) adds further significance to these findings. This analysis also shows that there are differences between the pupils from the two schools with regard to vocabulary acquisition.

Table 2 shows that the children in the play-based curriculum used the new theme-related words more frequently than the children in the task-based curriculum. During the observations it was found that the children in the play-based curriculum were more involved in interactions than the pupils in the task-based school (frequencies 22 vs 11 times). An unexpected but remarkable result was that children in the play-based condition also tended to use the new words on the playground, a phenomenon that was *never* observed in the T-based school.

With regard to our research question the outcomes of Duijkers' study are relevant, but have to be interpreted with much care. Taking the methodological weaknesses into account, they suggest a tendency that the vocabulary learning of children in a play-based curriculum (based on a meaning driven learning process) is in this study significantly better than the vocabulary learning of children in the T-curriculum (based on a teacher-driven approach). Duijkers' data support our expectations.

Conclusions and discussion

In this article we presented some arguments for a Vygotskian 'Developmental Education approach' for the early years of primary school, embodied in a play-based curriculum. The argument went along different lines: theoretical, practical, and empirical. Starting out from a Vygotskian approach to learning and development, our data suggest that a concept of learning can be developed that allows goal-directed teaching and learning by young children in the context of role-play under the guidance of more knowledgeable others. Our experiences in implementation processes emphasize that the education of the teachers is of crucial importance for a valid implementation. An essential part of this education implies the appropriation and classroom application of teaching tools that are relevant for the guidance of pupils in their play activities for the promotion of meaningful learning.

A number of different empirical studies have already supported the expectation of the developmental value of the Developmental Education approach (see for example van Oers (2010b) for the domain of early math education). The finding of Duijkers (2003) may give further support to our theoretical expectations regarding vocabulary acquisition: *the acquisition of vocabulary in children* in this study is better in an environment that

gives the pupils opportunities for taking part in meaningful joint activities (like play) in which the need for new words emerges from the activity, than when pupils are engaged in tasks that are externally provided and that prescribe in a strict way what pupils have to do and to learn. This research provides statistical and qualitative analyses of outcomes from vocabulary learning processes in two schools in the Netherlands (one Teacher-driven, one Play-based) and support the claim that in a play-based curriculum children probably learn more theme-related words with richer semantic content than in a teacher-driven curriculum.

In task situations (like on the T-school) pupils perform actions that draw their meaning primarily from the expected local success on this task. As was evident in our study, when the task was completed, the work seemed finished for the children and did not provoke further exploration of the meanings involved, nor transfer to out-of-school situations. It remains to be seen if the proposed activities in the T-programme will become genuinely meaningful for the children themselves. Moreover, it is not clear from these tests to what extent the children's expanded vocabulary has made them better communicators, or enhances their abilities to participate in regular sociocultural activities. The character of the questions in the test is often similar (not identical!) to the kind of tasks and queries in the programme. It is evident that the Piramide programme has at least helped the children to perform well on the test.

In a play-based programme, the words are developed as tools for communication and joint exploration and regulation of the activity. The needs for the new words is not prescribed in this programme but emerges from the activity itself. The data showed that the children in the play-based programme often used the target words in their interactions with other children, and by so doing the children explore the usability of these words as a means for communicating and interpersonal regulations. The meanings and words become integrated in a meaning system and will develop a richer network. The progress within the activity is based on the interests and questions of the pupils themselves, which increases the need for interaction and for new words to express their arguments and queries. These circumstances create ample opportunities for learning and vocabulary development. Our data suggest that involvement in sociocultural activities may produce a higher rate of vocabulary development, enrich the semantic network of the words involved, and probably also give a better transfer to out of school situations. This conclusion, however, must be taken with great care considering the limitations of the study.

First of all the study is limited due to the number of pupils ($n = 42$) involved. The number of pupils of this size may reduce the reliability of the found statistical differences and raise the chance of accepting a hypothesis that is actually false. However, the outcome of Duijkers' study adds up to a number of other studies in different subject matter domains (e.g. Poland 2007), which at least might suggest a consistent tendency towards a positive effects of teaching in a play-based curriculum. Further studies with a bigger number of pupils are needed to prove that pupils in a play-based approach outperform pupils from teacher-driven approaches.

Another methodological limitation relates to the differences in content in the two programmes. It is still possible that the difference in the themes in the two schools might have been caused by the difference in outcomes. Hence, it could be that the theme 'Kitchen' by itself is semantically more prone to using and learning new words than the theme 'water'. However, children presumably do have equal opportunities to get experience with both of them on a regular daily basis. Observations in both programmes do not show differences in involvement of the children in the respective activities. At this moment we do not have substantial reasons to presume that the differences of the theme may have caused the differences on the post-tests, but replication of the study with the same theme in both conditions would be necessary to figure this out precisely.

In a Dutch discussion, the play-based approach was once criticized as being unstructured and too open. Allegedly, this would harm the at-risk children, as the necessary high-frequency words then will probably not be explicitly taught to them. Duijkers research shows, however, that the at-risk children (here: DSL pupils) profitted more from this play-based (meaning driven) approach than from the Task-based programme. The activities in which the children are involved come from the everyday world that—by definition—call for the high frequency words. We assume that it may not be the goal-directed tasks imposed onto children that make them learn and develop vocabulary in an optimal way, but the appeal on their personal meanings and their abilities to take part in joint sociocultural activities.

Combined with other research outcomes (see for example van Oers 2003; 2010a, b), we wish to end with assuming that our study gives further support to the expectation that the concept of play as a format of activities that allows some freedom to the players, supports awareness of rules, and stimulates authentic engagement, is a promising concept for contexts of meaningful learning and teaching for young children. As we have seen, teaching in the context of play can be possible and productive.

This is what we elaborate and implement in our work on the Developmental Education approach in the entire primary education curriculum. It is our group's future challenge to substantiate this claim with theoretical elaborations, practical provisions, and further empirical research.

Notes

1. For the transliteration of Russian names we apply the international UN1987 standard. However, for the sake of easy recognition we have adopted author names of well-established works unchanged, even if this introduces a slight inconsistency in the appearance of names.
2. Translated from the Russian original by the author.
3. In Dutch these schools are called 'Ontwikkelingsgericht Onderwijs'. The specific programme for the Early grades is on the market as 'Basisontwikkeling' (Basic Development).

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