



Supporting primary school teachers in differentiating in the regular classroom



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HIGHLIGHTS

- The STIP-approach combines tailored instruction and social inclusion.
- The STIP-approach supports primary school teachers in differentiation.
- Using the STIP-approach leads to more differentiation in task, content, and process.
- Children's learning outcomes are higher when their teacher differentiates more.

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ABSTRACT

Many primary school teachers experience difficulties in effectively differentiating in the regular classroom. This study investigated the effect of the STIP-approach on teachers' differentiation activities and self-efficacy, and children's learning outcomes and instructional value. Teachers using the STIP-approach for their science lessons were compared to teachers using their regular programme. 16 teachers and 306 children were observed and received questionnaires at four different times. Results show that using the STIP-approach resulted in more differentiation in task, content, and process. Moreover, children of STIP-teachers who showed many types of differentiation activities learnt more than children of STIP-teachers who differentiated less.

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1. Introduction

In order to give children the opportunity to maximally develop their talents, they have to be addressed at a level that meets their cognitive needs. As in Dutch primary schools of regular education, at-risk learners, average learners, and gifted learners of the same age are brought together, large variations of ability levels exist within classes. Especially in these classes, teachers have to differentiate and tailor their instructions in order to meet the cognitive needs of all these children (Heacox, 2002). In Dutch educational practice, this is often implemented by taking children out of the social context of the class. The at-risk learners are taken outside class by a remedial teacher, whereas the gifted child is put out of class to work individually and independently. Though positive from the cognitive point of view, differentiation outside the social

context of the class is undesirable from a social-emotional and societal point of view (Adams-Byers, Squiller Whitsell, & Moon, 2004; French, Walker, & Shore, 2011). Differentiation *within* the social context of the class, however, is rare (Doolaard & Oudbier, 2010; Reis & Renzulli, 2010). This can be explained by the finding of the Dutch Inspectorate of Education that roughly half to two third of the teachers have not mastered the complex skills of teaching, among which the skill of differentiating, and that the majority of teachers experiences difficulties in tailoring their instruction (Onderwijsinspectie, 2013).

VanTassel-Baska and Stambaugh (2005) identified different obstacles that impede teachers in differentiating. The most common concern that teachers raise when attempting to differentiate, refers to organisational issues, such as time and classroom management (Kerry & Kerry, 1997; Roiha, 2014). One of the characteristics of effective differentiation is varying instructional materials for differing instructional groups (Tomlinson et al., 2003). Many teachers, however, experience a lack of time to address all children individually or in small groups, they find it hard to organise, and feel uncomfortable at having their children work on assignments

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that differ in content or level (Hertberg-Davis, 2009; VanTassel-Baska & Stambaugh, 2005). A second major barrier to differentiating that was identified by VanTassel-Baska and Stambaugh (2005) is the lack of knowledge and skills. Tailoring instruction requires knowledge of what children of different ability levels need in terms of instruction, resources, and feedback, as well as the skill to apply this knowledge in class. However, many teachers do not know what children below and above the standard teaching levels need, what kind of resources can be used, how much assistance children need in using those resources, and how reasoning and critical thinking at different levels can be promoted.

An approach that aims at supporting teachers in differentiating in class is the STIP-approach. STIP stands for 'Samenwerken tijdens Taak-, Inhoud-, and Procesdifferentiatie' and can be translated from Dutch by 'Collaboration during differentiation in Task, Content, and Process'. The first goal of the STIP-approach is to create a learning environment in which all children within a regular class work together on the same subject. This goal is accomplished by using the jigsaw procedure, which was first proposed by Aronson and colleagues (Aronson, Bridgeman, & Geffner, 1978). In this procedure, children work together in a group on a theme. Characteristic is that each member of the group is responsible for one unique part within the theme and that all parts are necessary to reach the goal that all children in the group have in common. As such, all children need to learn about their own unique part and this knowledge must be shared with the other group members. Through this individual accountability and positive interdependence (Johnson, Johnson, & Smith, 2007), a learning environment is created in which all children within a regular class work together on a theme and have a common goal. Research has shown that this is an effective method to increase academic achievement in comparison to traditional instruction (Karacop & Doymus, 2013; Tarhan, Ayyildiz, Ogunc, & Sesen, 2013).

The second goal of the STIP-approach is addressing all children at a level that meets their cognitive needs. In order to reach this goal, the original jigsaw procedure is adapted by taking cognitive differences between children into account. This is accomplished by having teachers assign children to groups based on pre-assessment information and ongoing observation of their performances on related work. Children learn about their own unique part together with children that were assigned to the same group by instruction that matches the cognitive needs of that group. This differentiated instruction is implemented in three ways. The first is related to the theme and its unique parts. Within the original jigsaw procedure, the theme is divided into parts or topics that are equally difficult and randomly assigned to the group members. In the STIP-approach, however, topics differ in their level of abstraction and complexity, and are deliberately assigned to specific group members. As at-risk learners profit from content that is concrete and not too complex and gifted learners flourish and become more motivated from content that is abstract and call for complexity (Rogers, 2007; Tomlinson, 1996, 2001), topics within the STIP-approach are assigned accordingly. We call this 'differentiation in content'.

The second way in which cognitive differences between children are taken into account concerns the tasks and assignments that are presented in order to learn the content. Although the content is already adapted to the cognitive differences between the children, there are still differences in how they can learn this content best. Structured tasks that require smaller leaps of insight are more suitable for at-risk learners, whereas gifted learners can be appropriately challenged by greater leaps of insight (Tomlinson, 1996). In the STIP-approach, these differences are taken into account and we call this 'differentiation in task'. It is closely related to and influenced by differentiation in content and we are aware of the fact that Tomlinson and Allan (2000), for example, do not make

a distinction between the two. However, as the topics for all groups of children differ by definition of the jigsaw procedure, but as this can still mean that there is no differentiation in task, we consider the distinction between the two as useful in this context.

Finally, the third way in which cognitive differences between children are taken into account is the way in which the teacher supports or guides the children in their learning. In all cases, the teacher takes the role of coach, but the best way to coach them depends on the children's instructional needs. Again, as gifted children are capable of taking larger steps in their reasoning process, they often only need a question that hints at the right direction in order to come to a solution (van Dijk, Eysink, & de Jong, 2016; Shute, 2008). At-risk learners, on the other hand, generally need smaller steps in their reasoning process, and can thus best be supported by asking guiding questions or sometimes even giving parts of the explanation. We, as well as Tomlinson and Allan (2000), call this 'differentiation in process'. Tomlinson adds another type of differentiation, namely 'differentiation in product' referring to the products a child can use to demonstrate what s/he has learnt. In the STIP-approach, we do vary in types of products that children must use, but we do not use the differences between children to assign specific products to specific groups.

In sum, the STIP-approach gives teachers the opportunity to differentiate within the social context of the class, that is to address each child at a level matching its cognitive needs while all children work together on the same project or theme. It incorporates all hallmarks of effective differentiation as discussed by Tomlinson et al. (2003): it is a proactive, knowledge- and learner-centred approach in which children are grouped in different group compositions and receive instructions matching their specific instructional needs. The aim of the present study was to investigate whether the STIP-approach supports teachers in their differentiation activities and what the effect of the approach is on teachers' self-efficacy in differentiating instruction. In addition, the effect of the STIP-approach on the learning outcomes of the children is investigated, as well as the way in which they value the STIP-approach.

In order to do so, two conditions were compared to each other: (a) the STIP-condition, in which teachers were supported in differentiating within science lessons using the STIP-approach that focusses on differentiation in task, content, and process, and (b) the control condition, in which teachers used their regular programme for science lessons. As the STIP-approach gives immediate support to differentiate in content, task, and process, we expect higher levels of differentiated instructional practices in all behavioural categories as well as higher levels of self-efficacy towards differentiating instruction for teachers using the STIP-approach compared to teachers in the control condition. In addition, we expect that if teachers implement the STIP-approach in the right way, children learn as much as or even more than control children and we expect the children in the STIP-condition to value the lessons more highly than those in the control condition.

2. Method

2.1. Participants

In total, 16 fourth grade teachers (6 male, 10 female) from 11 regular primary schools located in (the vicinity of) a medium-sized city in the Netherlands participated in the study. Due to illness, one teacher dropped out halfway through the experiment, so data of this teacher and the children in her class were excluded from the data file. The remaining 15 teachers (6 male, 9 female) had a mean age of 40.46 years ($SD = 12.63$). As success of the intervention was related to the receptiveness of the teachers, teachers were assigned

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