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Meaningful learning and summative assessment in geography education: an analysis in secondary education in the Netherlands

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ABSTRACT

Enhancing meaningful learning is an important aim in geography education. Also, assessment should reflect this aim. Both formative and summative assessments contribute to meaningful learning when more complex knowledge and cognitive processes are assessed. The internal school-based geography examinations of the final exam in pre-vocational secondary education in the Netherlands are an important test case to reveal the extent to which geography teachers construct examinations containing complex knowledge and cognitive processes. In this study, internal school-based examinations were analyzed based on a taxonomy table derived from a revision of Bloom's taxonomy and discussed with teachers and experts. The results of the content analysis showed that more than half of the test items in the internal school-based examinations are based on remembering knowledge, especially factual and conceptual geographical knowledge.

KEYWORDS

Geography education; meaningful learning; summative assessments; taxonomy table; internal school-based examinations

Introduction

Meaningful learning and geographical knowledge

An important aim in education is to enhance meaningful learning (Anderson & Krathwohl, 2001; James & Gipps, 1998). Meaningful learning can be defined as constructing knowledge based on new information and prior knowledge (Anderson & Krathwohl, 2001). Meaningful learning, sometimes defined as deep learning, can be distinguished from rote learning. Rote learning refers to remembering or recalling factual knowledge and can be defined as surface or shallow learning (James & Gipps, 1998).

In the past decades, emphasis has been on enhancing meaningful learning in geography education. In this respect, the work of David Leat, Margaret Roberts and others have made a significant contribution to the application of teaching and learning strategies (Leat, 1998; Leat, van der Schee, & Vankan, 2005; Roberts, 2013). Less emphasis has been

placed, however, on the contribution of different types of assessments on meaningful learning, in particular the contribution of summative assessments.

Most authors refer to meaningful learning as a combination of several cognitive processes: understanding, applying, evaluating or creating on the one hand and different types of knowledge on the other (Anderson & Krathwohl, 2001; James & Gipps, 1998; Leat & McGrane, 2000; Mayer, 2002; Weeden, 2013). This combination requires an active approach of pupils to learning. Active, in this sense, means pupils have to integrate their knowledge of facts, concepts and procedures with new facts, concepts or procedures in such a way that they construct their own new meaningful knowledge. By constructing this new meaningful knowledge, pupils make sense of the new information, whether this new information is provided to them by instruction or assessment.

The construction of new knowledge can offer an important contribution to meaningful learning when pupils are challenged to perform complex tasks. The complexity of the tasks increases when more complex knowledge and cognitive processes beyond remembering are demanded. Although there is no strict hierarchy in the cognitive dimension, evaluating and creating are generally seen as more complex cognitive processes than applying or understanding (Krathwohl, 2002). However, despite this sequence in the cognitive dimension tasks based on lower order processes can be more demanding for pupils than higher cognitive processes. It depends on the complexity of the knowledge as well.

Understanding is the most comprehensive cognitive process and is sometimes referred to as an overall category for intellectual activities that go beyond recalling knowledge (Bennetts, 2005), but it is more common seen as a synonym for comprehending (Krathwohl, 2002), one of the former dimensions in the original taxonomy of Bloom. In this sense, understanding comprises multiple subcategories as explaining, interpreting, classifying, summarizing, comparing, exemplifying and inferring (Anderson & Krathwohl, 2001). All of these subcategories are important cognitive processes with a huge potential to enhance meaningful learning in education and in particular for geography education.

Meaningful learning, however, becomes less valuable when the higher order cognitive processes are not accompanied in the curriculum by core knowledge. Lambert (2011) stresses the need for defining core knowledge and a knowledge framework for geography education as an important and integral part of the curriculum. Others also write about the importance of defining what kind of geographical knowledge and which concepts besides cognitive processes should prevail in geography education (Brooks, 2008, 2013; Firth, 2013; Haubrich, 1992; Taylor, 2013).

Although Lambert's appeal must be read in the context of the revised National Curriculum in England, the importance of defining geographical knowledge has been an important issue in the Netherlands as well. In the beginning of this century, van der Vaart (2001) already emphasized the need for a geographical framework. This framework consists of (1) core knowledge, (2) knowledge of important geographical issues on different scales and (3) geographical skills, techniques and methods.

More recently, research has been conducted in the Netherlands on thinking geographically and teaching strategies enhancing geographical reasoning as an important contribution to meaningful learning (Favier & van der Schee, 2014; Hooghuis, van der Schee, van der Velde, Imants, & Volman, 2014; Karkdijk, van der Schee, & Admiraal, 2013). These studies contribute to research on the integration of cognitive processes and geographical knowledge. In the past decade, this theme has been emphasized by the work of David

Leat but others contributed to this theme as well with publications in journals for geography teachers and books with strategy exemplars (Jackson, 2006; Leat, 1998; Leat & Nichols, 2000; van der Schee & Vankan, 2006; van der Schee, Vankan, & Leat, 2003; Vankan & van der Schee, 2004).

Meaningful learning and assessments

The question, how geographical knowledge and geographical reasoning can be enhanced in such a way that meaningful learning is achieved is not only a question of developing successful teaching strategies, but also a question of constructing powerful tools for assessment. As Bennett (2005) pointed out, assessments can be very important in developing understanding amongst pupils. To enhance meaningful learning, both formative and summative assessments are useful. Although formative assessments, also defined as assessments for learning (AFL), have the highest capability of contributing to meaningful learning, summative assessments can contribute to meaningful learning as well. It is important to focus not on just one type of assessment but to use a wide range of types of assessment to support meaningful learning (Harlen, 2005; James & Gipps, 1998).

Caution is needed, however, when emphasis is placed on summative assessments. Several authors have drawn attention to the fact that assessments, mainly summative assessments, can have some negative effects on learning and motivation when the results of the tests are used for purposes other than stimulating learning, such as for purposes of accountability (Bennetts, 2005; Butt, Weeden, Chubb, & Srokosz, 2006; Harlen, 2005). Accountability purposes can distract the goals of assessment from meaningful learning. The types of questions in the assessments and the methods and procedures that were used to construct the assessments can have a negative impact on learning as well. The test items in the assessments can stimulate rote learning instead of meaningful learning (Davies, 2002; Leat & McGrane, 2000) and teachers can adopt a tendency to “teach to the test” which can have a serious negative impact on learning when the tests mainly assess rote learning (Anderson & Krathwohl, 2001; Harlen, 2005).

Despite these possible negative implications of summative assessments on meaningful learning, summative assessments can contribute to meaningful learning when the negative threats can be overcome by instruments that support meaningful learning. Some authors have put emphasis in this perspective on developing test items assessing higher order skills (Ediger, 2001; James & Gipps, 1998), others on the role of the teachers’ judgment in summative assessments (Harlen, 2005). Airasian and Miranda (2002) emphasized the potential of the taxonomy table of the revised taxonomy of Bloom for developing and stimulating meaningful learning. The taxonomy table, a two-dimensional tool that combines the knowledge and cognitive process dimension, is suitable not only to align assessments with curricular objectives and teacher instruction but with more complex aspects of learning and thinking as well.

A promising assessment instrument in supporting meaningful learning in geography education is the so-called SOLO taxonomy. The original SOLO taxonomy, in which SOLO means structure of the observed learning outcomes, was developed by Biggs and Collis (1982) and meant to evaluate the levels of performance by pupils in five stages; pre-structural, uni-structural, multi-structural, relational and extended abstract. The first stage reflects a level whereby the pupil does not know how to fulfill the task. The second level

involves describing one relevant element, the third level multiple elements and on the fourth level the pupil is able to relate these elements. On the fifth and final level, the response of the pupil goes beyond induction on the basis of data that were offered in the task and the response includes an abstract principle based on deduction as well.

The SOLO taxonomy has been used by others for further development. Stimpson (1992) combined single test items on the different levels of the SOLO taxonomy to one superitem and tested the validity of this instrument. The results of this study supported the idea that the SOLO taxonomy in combination with these superitems is useful in constructing assessments. The SOLO taxonomy has also been used to test the quality of essays by students (Munowenyu, 2007).

In summary, summative assessments can be powerful in enhancing meaningful learning when the test items demand meaningful learning and evaluation instruments will be used that support these test items. Negative influences as “teaching to the test” and accountability purposes have to be avoided.

Geography education in the Netherlands

This research is conducted in the theoretical program of pre-vocational education in the Netherlands (see [Appendix 1](#) for an explanation of the Dutch educational system). In pre-vocational education, geography as a subject is compulsory in the first two years, as a separate subject or as a part of social studies. After two years, pupils can choose geography as one out of six or sometimes seven subjects for their final exam. In 2013, a renewed examination program for geography was implemented in pre-vocational education ([Examenblad.nl, 2015](#)).

The content of the examination program of the final exam consists of two parts; the first part is assessed with internal school-based examinations and the second part is assessed with an external end-of-school (exit) examination. The internal school-based examinations program contains three main areas of geography from the syllabus; (1) sources of energy, (2) poverty and wealth and (3) boundaries and identity. The examination program for the external end-of-school (exit) examination contains three additional areas of geography; (4) weather and climate, (5) water and (6) population and place. The external examination pertains to about one-third of the objectives of the examination program and the school-based examinations to about two-thirds. Both parts, however, contribute 50% to the overall result for geography.

The objectives of the examination program for internal school-based examinations are elucidated and exemplified in a syllabus for teachers (SLO, 2012). The syllabus contains the specifications for the three main areas of the internal school-based examinations. The specifications are prescriptive for the content of the program, yet they do not serve as detailed assessment objectives. Teachers can decide which objectives will be assessed and how. The school is responsible for the choices being made by the teachers.

The syllabus emphasizes the importance of learning, the pupils to think and reason geographically. Not only does the syllabus contain a separate area with specifications for geographical skills and methods, the objectives in the three main geography areas also refer to these geographical skills and methods. Pupils are, for instance, expected to compare features and regions within different spatial contexts and draw across physical and

human characteristics to compare geographical features. Furthermore, pupils should conduct a small research in their own neighborhood.

Since half of the result of the final exam for geography in pre-vocational education is based on the internal school-based examinations, it is very important to understand how the objectives for this part of the geography examination program are aligned with the assessments. Alignment of the objectives with assessments (and other features of a curriculum) is of great importance to achieve the curricular goals (Anderson, 2002; van den Akker, Kuiper, & Hameyer, 2004).

However, there have been no studies in the Netherlands for geography as a subject in secondary education that examined how geographical knowledge and cognitive processes are assessed in internal school-based examinations. In 2008, the National Institute for Educational Measurement (Cito) conducted research into two pre-vocational education subjects, namely mathematics and Dutch language, and two subjects in general education, biology and English language, to assess the validity and quality of internal school-based examinations (Cito, 2008). As yet no research has been conducted for geography in the Netherlands.

There is a need to know how the geography objectives are aligned with the internal school-based examinations and what kind of geographical knowledge in combination with cognitive processes is assessed in internal school-based examinations. Both are needed to gain more insight in the contribution of these summative assessments in geography education in the Netherlands to meaningful learning. It is also important to know how teachers perceive their school-based examinations with respect to the objectives of the examination program.

This study explores the content of internal school-based examinations in pre-vocational secondary geography education. The results of this study are meant to give more insight in what kind of knowledge and cognitive processes are assessed and how teachers perceive their internal school-based examinations in relation to the objectives. These insights help to define to what extent the internal school-based examinations contribute to meaningful learning.

The research questions are as follows:

- (1) What kind of geographical knowledge and which cognitive processes are prevalent in test items in school-based geography examinations in pre-vocational secondary education in the Netherlands?
- (2) What kind of beliefs, attitudes and conceptions do geography teachers in pre-vocational secondary education in the Netherlands have upon the school-based geography examinations?

Methodology

Overview

For this study, two instruments were used to gather data. The first instrument was a taxonomy table derived from the original revised taxonomy table (Anderson & Krathwohl, 2001). This instrument was used for a content analysis of internal school-based examinations to answer the first research question. The results of the analysis were discussed in

two panel interviews. This second instrument was meant to give more insight in the beliefs, attitudes and conceptions teachers have upon internal school-based examinations.

Instruments and data collection

The first instrument, a taxonomy table, is based on the original revised taxonomy developed by Anderson and Krathwohl (2001) and the objectives for internal school-based examinations in the examination program of the final geography exam for pre-vocational education (SLO, 2012). Both the revised taxonomy and the objectives for internal school-based examinations in the examination program are based on two dimensions: a knowledge dimension and a cognitive process dimension. These two dimensions were brought in line with each other in a taxonomy table (see Appendix 2).

The first dimension of the taxonomy table, the knowledge dimension, consists of four categories and nine subcategories. The first category is factual knowledge, which can be subdivided into (1) knowledge of specific details and elements and (2) knowledge of simple concepts and terminology. The second category is conceptual knowledge, which can be subdivided into (3) knowledge of classifications and categories, (4) knowledge of geographical principles or relationships between concepts and (5) knowledge of geographical models and theories. The third category, procedural knowledge, is subdivided into (6) geographical skills, (7) geographical methods and (8) knowledge of criteria concerning geographical skills and methods. Finally, the fourth category consists of metacognitive knowledge, i.e. (9) knowledge of (learning) strategies.

The second dimension of the taxonomy table consists of five cognitive processes: remember, understand, apply, evaluate and produce. Unlike the original taxonomy table analyzing is not a separate category. The choice to reduce the cognitive processes in the geography taxonomy table to five instead of six processes is defensible, as Anderson and Krathwohl already suggested, because analyzing can be divided into three subcategories that can be allocated to other categories. As they have put it: “Although learning to analyze may be viewed as an end in itself, it is probably more defensible educationally to consider analysis as an extension of *understanding* or as a prelude to *evaluating* or *creating*” (Anderson & Krathwohl, 2001, p. 79).

In March 2014, the taxonomy table was validated in two workshops with geography teachers using the theoretical program of pre-vocational secondary education (vmbo-tl). In these workshops, teachers were asked to score a number of test items in the table. In both workshops, there was consensus about the way the items could be scored in the table.

In view of the content analysis, a request for internal school-based examinations in the theoretical program of study for pre-vocational secondary education (vmbo-tl) was sent to teachers by the different networks of teacher training institutions for secondary education in the Netherlands. The internal school-based examinations were collected during the spring and summer of 2014. A total of 49 internal school-based examinations were sent in by geography teachers from 13 schools across different parts of the Netherlands. The internal school-based examinations were all conducted in the school year 2013–2014 in grade Secondary 3 and part of the renewed examination program for geography in the theoretical program of pre-vocational secondary education (vmbo-tl).

Next, each test was checked in Ephorus on duplications. After removal of the duplications, a total number of 1108 unique test items remained to be analyzed and were classified in the taxonomy table.

For the purpose of this content analysis, the objectives for the internal school-based examinations have been scored in the taxonomy table as well. This gave the opportunity to compare the outcomes of the analysis of the internal school-based examinations with the intended objectives in the examination program, and provided more insight in the alignment of objectives and summative assessments in the internal school-based examination program.

The results of the content analysis were discussed in two separate panel interviews. The participants of the two panel interviews were selected and invited based on their experience as secondary teachers or their expertise in pre-service teacher education or curriculum development and assessments. Nine participants were secondary teachers in pre-vocational education and eight of them had constructed internal school-based examinations in 2013–2014, four participants were geography educators, one participant was from the Netherlands Institute for Curriculum Development (SLO) and one from Cito. Six participants attended the first interview and nine participants the second.

In both interviews, the participants were asked to respond to the most important outcomes of the content analysis. Both interviews were fully open interviews based on three introductory questions: (1) “What do you think of the outcome of the content analysis?” (2) “What could be an ideal distribution of test items in the taxonomy table?” and (3) “Is it possible to achieve this ideal distribution of test items in internal school-based examinations?”

Results

This section provides the main findings of the content analysis of internal school-based examinations as well as the main outcomes of the panel interviews. The content analysis gives an answer to the first research question of this study and the panel interviews contribute to answer the second research question.

Content analysis of internal school-based examinations

Table 1 shows that a majority of the test items were classified as assessing conceptual knowledge, mainly knowledge of geographical principles or relationships between concepts. About 60% focused on this subcategory of geographical knowledge (see Appendix 3 for examples of test items from the analyzed internal school-based examinations).

The second most important subcategory is knowledge of simple concepts and terminology. Almost 23% of the test items dealt with this type of knowledge. The other subcategories were less prevalent in the internal school-based examinations. Procedural knowledge, especially geographical skills, accounted for 9% and factual knowledge of specific details and elements for about 6%. The remaining subcategories, knowledge of geographical models and theories, knowledge of criteria concerning geographical skills and methods and knowledge of (learning) strategies were hardly assessed at all.

In terms of cognitive processes, the emphasis is on remembering. About 62% of the test items were based on this cognitive process. The second category of this dimension that prevailed in the tests was understanding, which accounted for 28%. Applying accounted for another 9%, with only 1% left that appealed to evaluating or creating.

Table 1. Percentage (number) of test items of analyzed internal school-based examinations and number of objectives for internal school-based examinations, scored for each cell in the taxonomy table.

Knowledge dimension		Cognitive process dimension					Total
		Remember	Understand	Apply	Evaluate	Create	
Factual Knowledge	(1) Knowledge of specific details and elements	5 (60) <u>34</u>	0 (2) <u>11</u>				6 (62) <u>45</u>
	(2) Knowledge of simple concepts and terminology	16 (180) <u>12</u>	6 (71) <u>9</u>				23 (251) <u>21</u>
Conceptual Knowledge	(3) Knowledge of classifications and categories	2 (21) <u>17</u>	1 (8) <u>10</u>				3 (29) <u>27</u>
	(4) Knowledge of geographical principles or relationships between concepts	39 (430) <u>25</u>	20 (227) <u>24</u>		1 (9) <u>10</u>	0 (2) <u>2</u>	60 (668) <u>61</u>
	(5) Knowledge of geographical models and theories				<u>1</u>		<u>1</u>
Procedural Knowledge	(6) Geographical skills		<u>2</u>	9 (97) <u>8</u>	<u>4</u>	<u>6</u>	9 (97) <u>20</u>
	(7) Geographical methods		<u>8</u>	0 (1) <u>1</u>	<u>3</u>	<u>3</u>	0 (1) <u>15</u>
	(8) Knowledge of criteria concerning geographical skills and methods				<u>1</u>	<u>1</u>	<u>2</u>
Metacognitive Knowledge	(9) Knowledge of (learning) strategies			<u>1</u>	<u>1</u>	<u>1</u>	<u>3</u>
Total		62 (691) <u>88</u>	28 (308) <u>64</u>	9 (98) <u>10</u>	1 (9) <u>20</u>	0 (2) <u>13</u>	100 (1108) <u>195</u>

The combination of the two dimensions shows that test items classified as remembering knowledge of geographical principles or relationships between concepts accounted for almost 39% of the test items. Two other prevailing cells in the taxonomy table are understanding knowledge of geographical principles or relationships between concepts and remembering knowledge of simple concepts and terminology, containing 20% and 16% of the test items. The other cells in the taxonomy table are less prevalent. Only applying geographical skills (9%), understanding knowledge of simple concepts and terminology (6%) and remembering knowledge of specific details and elements (5%) could to some extent be classified in the tests. The other combinations of geographical knowledge and cognitive processes were merely absent in the tests.

The objectives for internal school-based examinations were also scored in the taxonomy table (Table 1). Some of the objectives contain different categories of knowledge and different categories in the cognitive dimension and were scored in more than one cell. Pupils are, for example, supposed to describe and explain certain features and the associated objective was scored in more than one cell. The total number of objectives in the taxonomy table, therefore, outlines the total number of objectives in the examination program.

A comparison of the pattern of objectives in the taxonomy table with the pattern of the analyzed test items showed to some extent the misalignment of objectives and test items. The dominance of remembering as cognitive process in the test items compared to the objectives is obvious. Second, higher order cognitive processes like evaluate and create are more prevalent in the objectives than in the test items.

The classification of test items in the taxonomy table compared for the three main areas of geography in the internal school-based examinations program displayed no significant difference (Figure 1). For each subject, the pattern was more or less the same. Most test

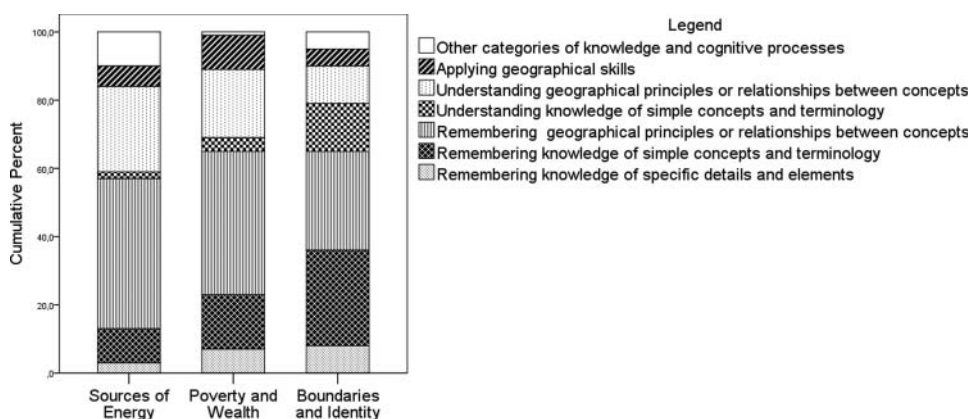


Figure 1. Score of test items for three main areas of geography in internal school-based examinations (percentages).

items could be classified as remembering knowledge of geographical principles and relationships between concepts and understanding knowledge of geographical principles and relationships between concepts or remembering knowledge of simple concepts and terminology, the latter especially in tests on boundaries and identity.

Panel interviews

Most participants on the panel interviews recognized the overall pattern of scored test items in the taxonomy table on internal school-based examinations. As one of the participants mentioned: *“Emphasis is on recalling knowledge, but I’m not surprised”*. The other participants confirmed that remembering is an important cognitive process in assessments in pre-vocational secondary education and particularly factual and conceptual knowledge is being assessed.

Some of the participants included a kind of judgment in their first reaction. In the first panel interview, one of the teachers started with the comment *“we prepare our pupils for the future but obviously this is not a purpose of the internal school-based examinations”*. This reaction immediately provoked an interpretation and evaluation from the others on the pattern in the taxonomy table. In both panel interviews, participants interpreted the scores in the taxonomy table as distinct from a more ideal pattern with more test items on complex knowledge and especially on higher order cognitive processes. Although all the participants agreed on the desirability to assess more complex cognitive processes, not all of them were convinced that these higher order processes should be examined in summative assessments, like the internal school-based examinations. Some of the teachers raised the question whether it is desirable and possible to examine higher order cognitive processes in summative assessments in pre-vocational education. Others suggested that these processes could be better examined in formative assessments even when the objectives for the internal school-based examinations request the assessment of more complex knowledge and cognitive processes in these internal school-based examinations.

In both panel interviews, there was consensus about the idea that the formats used in the external end-of-school (exit) examination are more than just a guideline for teachers

to use the same formats in their internal school-based examinations. By using the same formats, teachers feel they do a much better job in preparing their pupils for the external end-of-school (exit) examination. As one of the participants said: “*The internal school-based examinations are not meant to prepare pupils for the end-of-school (exit) examination, but when you don’t you might have a problem*”. It is almost a must for teachers to use the same formats, although most of them agreed on the importance to assess higher order cognitive processes in order to achieve the “*real*” goals with geography education. As one of the teachers admitted, “*preparation for the end-of-school (exit) examination is leading, that’s my frustration*”. All of the participants agreed that a change in formats in the external end-of-school (exit) examination would contribute to the application of other formats in the internal school-based examinations.

The formats in the external end-of-school (exit) examination were not the only felt restriction on assessing more complex knowledge in combination with higher order cognitive processes in internal school-based examinations. Other restrictions mentioned by the participants were a lack of time to practice these other assessment formats with pupils and a lack of confidence in scoring these other assessment formats. The participants admitted that “*good practices of new assessment formats*” as well as “*instruments to score the performance of the pupils in these formats*” would be of great help, especially to overcome problems of reliability. Again, harmonization with formats in the external end-of-school (exit) examination is required according to the participants, as long as accountability remains an important issue in secondary education.

Conclusion and discussion

The purpose of this study was to investigate what categories of geographical knowledge and cognitive processes prevail in internal school-based examinations in the theoretical program of pre-vocational education in the Netherlands. Second, this study was conducted to examine what kind of beliefs, attitudes and conceptions geography teachers have upon the school-based examinations.

This study has uncovered that a majority of test items deal with the lower categories in the cognitive process dimension, mainly remembering and to a somewhat less extent understanding. About two-thirds of all the test items are based on rote learning. The more complex cognitive processes like evaluating and creating are hardly assessed at all. From this point of view, the contribution of the internal school-based examinations to meaningful learning is problematic.

In the knowledge dimension, emphasis is being laid on facts, concepts and geographical principles and relations between concepts. Procedural knowledge of geographical skills and methods is less prevalent. Remarkably, in none of the test items knowledge of geographical models or theories was assessed.

Both dimensions combined reveal that Dutch geography teachers in pre-vocational education tend to focus on testing geographical concepts, geographical principles and geographical relations between concepts in such a way that emphasis is being laid on rote learning and not on different kinds of meaningful learning. In the panel discussions, teachers confirmed that remembering is an important dimension in their internal school-based examinations.

The way teachers implement these dimensions of knowledge and cognitive processes in the internal school-based examinations tends to fit in with a broader discussion about geographical knowledge and generic skills. Like in other countries (Lambert, 2011), there seems to be a tendency in the Netherlands in recent years to focus on assessing basic geographical knowledge in the final examinations instead of generic skills (Hooghuis et al., 2014). An important outcome of this tendency could be that teachers put more emphasis on test items in internal school-based examinations that appeal for remembering geographical knowledge instead of test items appealing for more complex knowledge and cognitive processes, although we have to be careful with these statements because we do not really know how internal school-based examinations were constructed in earlier years.

The tendency to put more focus on remembering geographical knowledge does not only raise the question to what extent the internal school-based examinations contribute to the aim of a school geography enhancing meaningful learning but also to what extent these examinations match with the purpose of the examination program. The syllabus for the internal school-based examinations prescribes that pupils should be taught to think geographically and being able to apply several geographical skills and methods. Based on these prescriptions and the analysis of the objectives for the internal school-based examinations in the taxonomy table you might expect that more different types of knowledge and cognitive processes would be assessed. Almost none of the analyzed internal school-based examinations, however, contained more complex test items appealing to higher cognitive processes. Most analyzed test items were constructed in formats to assess recalling, like matching, true-false or multiple choice, or in assessment formats testing understanding, like constructed response (i.e. supply an answer) or selected response (i.e. choose an answer). To achieve the aim of assessing higher cognitive processes other kinds of test items than those in the analyzed internal school-based examinations seem to be necessary (Anderson & Krathwohl, 2001; James & Gipps, 1998; Lee & Shemilt, 2003; Weeden, 2013; Wood, 2013).

The examination program is more demanding towards assessing higher cognitive processes than the analyzed internal school-based examinations reflect. One of the main objectives of the examination program for internal school-based examinations is that pupils have to carry out a simple enquiry-based exercise in their own neighborhood. None of the internal school-based examinations that were analyzed contained a kind of assessment as meant in the objectives. This does not justify the conclusion that these assessments are not presented to pupils at all, rather that the internal school-based examinations obviously have another purpose for geography teachers. An important argument for teachers why more complex test items seem to be less prevalent in their internal school-based examinations is that complex knowledge and skills can be just as well, or perhaps even better, assessed formative instead of summative. Assessment for learning can fill the gap (Wood, 2013) that appears to be in internal school-based examinations concerning meaningful or deep learning. Some teachers confirmed in the panel interviews that these kinds of assessments are part of their program, not in summative assessments of learning but as part of AFL in their classrooms. As they put it: *“Enquiry-based assessments are part of the curriculum, but not a part of the internal school-based examinations”*.

These outcomes reveal that the perception of the geography teachers towards the purpose of the internal school-based examinations is aberrant from the standards of the examination program. Teachers confirmed in the panel interviews that an important

purpose of the internal school-based examinations is to prepare the pupils for the external final examinations by using the same assessment formats for test items in the internal school-based examinations as in the external final examinations. In their words: “*We have to prepare our pupils in the same way as they will be assessed in the external final examinations and therefore construct our internal school-based examinations likewise*”. In this sense, there is a strong tendency of “teaching to the test” (Anderson & Krathwohl, 2001; Weeden, 2013). Perhaps this tendency can even be better described as “testing to the test”.

Finally, the results raise a question about the competence and confidence of teachers towards assessing complex knowledge and cognitive processes in internal school-based examinations. A reason why teachers might hesitate to use more complex test items in the internal school-based examinations could be the lack of appropriate instruments to construct more complex test items and instruments to score the performance of the pupils.

Another reason why teachers hesitate to use more complex test items in the internal school-based examinations might be accountability. The results of the internal school-based examinations have to be in line with the results of the external final examinations. Schools have to justify the results towards the Dutch Inspectorate of Education. Weeden (2013) already raises the question whether the tendency to put more emphasis on accountability purposes has led to a loss in teachers’ confidence to judge the performance of pupils. Reliable instruments that have been designed and tested can possibly help teachers to overcome this lack of confidence assuming that accountability will continue to play an important role in secondary education in the Netherlands.

If enhancing meaningful learning is an important aim in school geography in secondary education, the assessments should reflect this aim. From this study, it seems that other kinds of assessment formats are needed to contribute to the aim of enhancing meaningful learning by summative assessments, not only in internal school-based examinations but also in the external final exam. Teachers nowadays tend to focus on assessing rote learning and they seem to have a tendency not only of “teaching to the test” but also of “testing to the test”.

Caution is demanded, however, drawing firm conclusions from both the content analysis and the panel interviews. First of all, 2013–2014 was the first year of the new geography examination program for the theoretical program of pre-vocational secondary education in the Netherlands. The three main areas of geography belonging to the examination program that were assessed in the internal school-based examinations were assessed for the first time. Teachers could have avoided risks by conducting test items that mainly assessed remembering and understanding facts, concepts and geographical principles and relations between concepts in assessment formats as described above. In the forthcoming years, teachers might include test items assessing more complex geographical knowledge and cognitive processes.

Second, as stated above, teachers might have assessed the objectives in the examination program containing more complex geographical knowledge and cognitive processes but not as a part of the summative assessments. Assessments like enquiry-based exercises in their own neighborhood could have been part of formative assessments in the classroom. In fact, according to some authors meaningful learning can be achieved just as well or perhaps even better by these kinds of assessment, because these AFL are more effective than summative assessments (Weeden, 2013).

Some comments have to be made on the number of analyzed internal school-based examinations. Although a substantial number of internal school-based examinations and test items were analyzed, still only 13 schoolteachers sent in their internal school-based examinations. To draw more firm conclusions on the assessment of geographical knowledge and cognitive processes, an analysis of tests items from more different internal school-based examinations and schools is needed.

Caution is also needed on drawing conclusions concerning the beliefs, attitudes and conceptions of the geography teachers towards the internal school-based examinations. The panel interviews cannot be seen as representative for the geography teachers in pre-vocational education in the Netherlands due to the small numbers. Further research is needed to reveal what geography teachers will strive to construct internal school-based examinations with more complex test items.

The results of this study point to a need to conduct additional research providing insight what teachers need to assess more complex geographical knowledge and cognitive processes in internal school-based examinations in pre-vocational secondary education in the Netherlands and how this can be accomplished. Which other formats for test items assessing more complex geographical knowledge and cognitive processes can be developed and implemented in internal school-based examinations? And also, what kind of instruments do teachers need to construct more complex test items and score reliably the responses on these test items to give more attention to meaningful learning?

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Appendices

Appendix 1. The educational system in the Netherlands

The Dutch education system

In the Netherlands, pupils start with primary education at the age of 4 years and attend secondary education at the age of 12 years. Secondary education in the Netherlands comprises three different types of education; a four year pre-vocational education track (VMBO), a five year general education track (HAVO) and a six year pre-university education track (VWO). The choice between these types of education after primary education is based on a judgment by the primary school and an external exam.

Roughly 53% of all pupils in secondary education attend pre-vocational education, which is subdivided in four learning pathways: the basic vocational program (bl), the middle-management vocational program (kl), the combined program (gl) and the theoretical program (tl). These pathways are geared to subsequent pathways in vocational education.

After pre-vocational secondary education, at an average age of 16, pupils can attend a college for vocational education. Pupils having completed the general education track (HAVO) can attend a university of applied sciences which leads to a Bachelor degree. Pupils that have completed the pre-university track (VWO) can attend academic higher education that leads to a three year Bachelor's degree program and subsequently an one or two year voluntary Master's degree program (Ministry of Education, 2013, p. 8).

This research is conducted in the theoretical program (tl) of pre-vocational education. The examination program in pre-vocational education differs from the examination program in the general education track and the pre-university education track. In pre-vocational education, the examination program contains six areas of geography; (1) sources of energy, (2) poverty and wealth and (3) boundaries and identity are the three areas for the internal school-based examinations and (4) weather and climate, (5) water and (6) population and place for the external end-of-school (exit) examination. Besides these three areas, a separate area with specifications for geographical skills and methods is included in the examination program.

The examination program for the general education track and the pre-university education track roughly comprises four different areas of geography besides the area with specifications for geographical skills and methods; (1) a human geographical area about global patterns and processes, (2) a physical geographical area about (geomorphic) processes and change, (3) an area with patterns, processes and interaction between people and environment in a specific realm or developing country and (4) geographical issues on a national or regional scale.

Besides these differences in content, the examination programs also differ in the complexity of the knowledge and the cognitive processes. The objectives in the pre-university track are more demanding than those in the general education track and these are more demanding than those in the pre-vocational education track. Even within pre-vocational education distinction is being made between the diverse pathways. In the combined and theoretical pathway (gl and tl) pupils, for instance, have to study a case about the Amazon within the area sources of energy, whilst the pupils in the other pathways do not have to

study this case. Furthermore, pupils in the combined and theoretical pathway are frequently asked to describe and explain certain patterns or processes, where the pupils in the other pathways only have to describe these. In this way, the examination program in pre-vocational education distinguishes both in the knowledge dimension as in the cognitive dimension between the several pathways.

Appendix 2. Taxonomy table, based on the original taxonomy table of the revised taxonomy (Anderson & Krathwohl, 2001)

Knowledge dimension	Cognitive process dimension				
	Remember	Understand	Apply	Evaluate	Create
	Recognizing Recalling	Interpreting Exemplifying	Executing Problem solving	Attributing Critiquing	Predicting Organizing
		Summarizing Inferring Comparing Classifying Explaining Differentiating			
Factual knowledge					
(1)		Knowledge of specific details and elements			
(2)		Knowledge of simple concepts and terminology			
Conceptual knowledge					
(3)		Knowledge of classifications and categories			
(4)		Knowledge of geographical principles or relationships between concepts			
(5)		Knowledge of geographical models and theories			
Procedural knowledge					
(6)		Geographical skills			
(7)		Geographical methods			
(8)		Knowledge of criteria concerning geographical skills and methods			
Metacognitive knowledge					
(9)		Strategic knowledge			

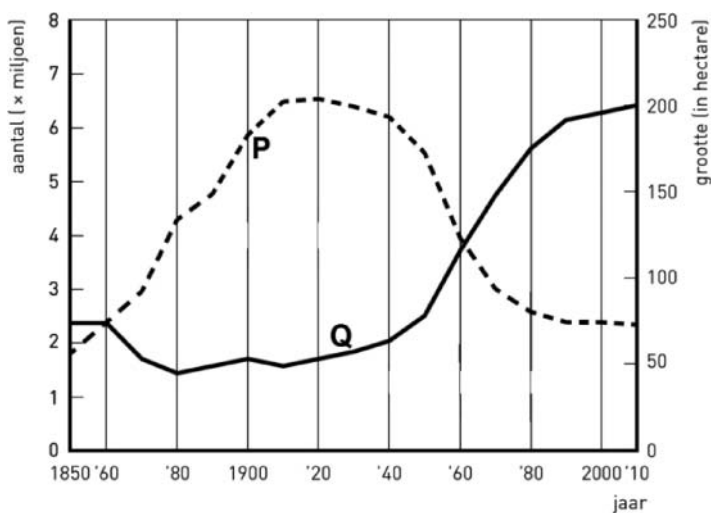
Appendix 3. Examples of test items from analyzed internal school-based examinations

- (1) Example of test item assessing remembering factual knowledge.
 - In welk jaar werd Nigeria onafhankelijk?
 - (*In which year Nigeria became independent?*)
- (2) Example of test item assessing remembering conceptual knowledge.
 - Behalve saneren wil de gemeente ook iets doen aan de sociale cohesie in de wijk. Wat wordt er bedoeld met sociale cohesie?
 - (*Except by remediation, the municipality wants to improve the social cohesion in the local district/neighborhood. What is meant by “social cohesion”?*)

- (3) Example of test item assessing understanding conceptual knowledge of geographical principles or relationships between concepts.

Bron 6 Aantal boerderijen en hun gemiddelde omvang, in de VS (1850–2010).

(Figure 6. Number of farms and their average size in the US (1850--2010)).



Gebruik bron 6.

(Use figure 6).

- a Neem de letters P en Q uit bron 7 over en schrijf erachter wat de lijn bij de letter weergeeft.
 - (a Write the letters P and Q on your paper en write behind it what the line for each letter indicates).
 - b Geef de verklaring voor de ontwikkeling van lijn P na 1910.
 - (b Explain the evolution of line P after 1910.)
- (4) Example of test item assessing procedural knowledge.
- Gebruik kaartblad GB 181. Noem drie steden in het zuiden die het dichtstbevolkt zijn.
 - (Use atlas map GB 181. Mention three cities in the South with the highest population density.)
- (5) Example of test item assessing evaluating.

Lees onderstaande nieuwsbericht:

Nederland trekt knip tegen sociale uitsluiting (21/11/13)

Nederland geeft relatief veel geld uit aan de bestrijding van sociale uitsluiting. Van alle Eu landen geeft alleen Cyprus een groter deel van haar budget hier aan uit. Nederland geeft wel veel geld aan de bestrijding van sociale uitsluiting. Hierbij wordt dan bijvoorbeeld geprobeerd om discriminatie terug te dringen.

- Vind jij dat Nederland minder geld moet uitgeven aan bestrijding van sociale uitsluiting? Leg uit waarom je dat vindt. Gebruik hierbij het begrip: sociale samenhang.

Read the news item below:

The Netherlands invest against social exclusion (21/11/13)

The Netherlands spend a lot of money on the combat against social exclusion compared to other countries. Of all EU countries, only Cyprus spends a larger share of its budget on this combat. The Netherlands spend a lot of money to combat social exclusion. This is, for example, to reduce discrimination.

- *(Do you think the Netherlands should spend less money on the combat against social exclusion? Explain your answer. Use the concept of “social cohesion” in your answer.)*

(6) Example of test item assessing creating.

De regering is druk bezig om de achterstandsbuurten in de grote steden leefbaarder te maken. Het moeten weer krachtwijken worden. Ze hebben ook geld hiervoor vrijgemaakt. Jij mag een dag hierbij advies geven.

- Noem 3 verbeteringen/veranderingen die jij voorstelt en leg ze ook uit.

Gebruik 100 woorden voor je antwoord. (tellen en het aantal woorden erbij zetten).

The government is working hard to make the poor neighborhoods more livable in the big cities. These neighborhoods should be revitalized. The government made money available for this revitalization. You’re allowed to advice the government for one day.

- *Mention three improvements / changes you would propose and explain them.*

Use 100 words for your answer. (Count and put the number of words on your paper).