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# THE RELEVANCE OF MATHEMATICS TEXTBOOK TASKS TO INDIGENOUS CULTURAL CONTEXT

## *A RELEVÂNCIA DAS TAREFAS DOS LIVROS DIDÁTICOS DE MATEMÁTICA PARA O CONTEXTO CULTURAL INDÍGENA*

## *LA RELEVANCIA DE LAS TAREAS DE LOS LIBROS DE TEXTO DE MATEMÁTICAS PARA EL CONTEXTO CULTURAL INDÍGENA*

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RESUMO

Este artigo relata um estudo que examina os livros didáticos usados pelas escolas na área Sámi, na Noruega. Os Sámi são povos indígenas da Noruega e de países vizinhos (Finlândia, Rússia e Suécia). O artesanato e a criação de renas são atividades predominantes na cultura Sámi. Baseando-se na teoria da fenomenologia didática, o estudo examina a relevância das tarefas dos livros didáticos para a formação cultural das crianças indígenas. A análise documental foi utilizada para extrair e analisar os dados dos livros didáticos antigos e novos. Os resultados indicam que as tarefas do antigo livro didático são pouco relevantes para a cultura Sámi. Embora o antigo livro didático tivesse tarefas que poderiam ser adotadas, o tópico contendo tais tarefas não está mais disponível no novo livro didático. A adopção de tais tarefas poderia ter ajudado a alcançar o objectivo estabelecido no novo currículo sobre o ensino da história e da cultura Sámi a todas as crianças norueguesas. Também poderia ter ajudado a alcançar outro objetivo, que é o da interdisciplinaridade, porque as tarefas tratam da linha do tempo na história norueguesa. O estudo tem implicações. Além de utilizar as tarefas dos estudos já disponíveis sobre os Sámi, precisamos de mais estudos sobre a concepção de tarefas que utilizem o contexto cultural Sámi. Além disso, a adoção de tarefas que utilizem contextos indígenas semelhantes ao contexto Sámi também deve ser considerada, em vez de uma mera tradução do livro obrigatório para a língua indígena. Outra opção é, de acordo com estudos anteriores, elaborar um livro didático separado para as crianças indígenas com base na sua cultura.

Palavras-chave: currículo de matemática. cultura indígena. medição. livro didático.

ABSTRACT

This paper reports about a study, which examines the mathematics textbooks used by the schools in the Sámi area of Norway. The Sámi are Indigenous people of Norway and neighboring countries (Finland, Russia and Sweden). Handcraft and reindeer herding are prevalent activities in Sámi culture. Drawing on the theory of didactical phenomenology, the study examines the relevance of textbook tasks to the cultural background of Indigenous children. Document analysis was used to extract and analyze the data from the old and new textbooks. The results indicate that the tasks in the old textbook are hardly relevant to Sámi

culture. Though the old textbook had tasks, which could be adopted, the topic containing such tasks is no longer available in the new textbook. The adoption of such tasks could have helped to achieve the goal set in the new curriculum about teaching Sámi history and culture to all Norwegian children. It could also have helped to achieve another goal, which is about interdisciplinarity, because the tasks are about timeline in Norwegian history. The study has implications. In addition to using the tasks in the already available studies about the Sámi, we need more studies about designing tasks which utilize the Sámi cultural context. Additionally, adopting tasks, which use Indigenous contexts similar to the Sámi context, should also be considered instead of a mere translation of the mandated textbook into the Indigenous language. Another option is, consistent with earlier studies, designing a separate textbook for the Indigenous children based on their culture.

Keywords: mathematics curriculum. Indigenous culture. measuring. textbook.

RESUMEM

Este artículo informa sobre un estudio que examina los libros de texto utilizados en las escuelas de la zona sámi de Noruega. Los sami son un pueblo indígena de Noruega y países vecinos (Finlandia, Rusia y Suecia). La artesanía y el pastoreo de renos son actividades predominantes en la cultura sámi. Basándose en la teoría de la fenomenología didáctica, el estudio examina la relevancia de las tareas de los libros de texto para el trasfondo cultural de los niños indígenas. Se utilizó el análisis de documentos para extraer y analizar los datos de los libros de texto nuevos y antiguos. Los resultados indican que las tareas del antiguo libro de texto apenas son relevantes para la cultura sámi. Aunque el antiguo libro de texto tenía tareas que podían adoptarse, el tema que contenía dichas tareas ya no está disponible en el nuevo libro de texto. La adopción de tales tareas podría haber ayudado a lograr el objetivo fijado en el nuevo plan de estudios de enseñar la historia y la cultura sámi a todos los niños noruegos. También podría haber ayudado a lograr otro objetivo, que es el de la interdisciplinariedad, porque las tareas tratan sobre la cronología de la historia de Noruega. El estudio tiene implicaciones. Además de utilizar las tareas de los estudios ya disponibles sobre los sámi, necesitamos más estudios sobre el diseño de tareas que utilicen el contexto cultural sámi. Además, también se debe considerar la adopción de tareas que utilicen contextos indígenas similares al contexto sámi en lugar de una mera traducción del libro de texto obligatorio al idioma indígena. Otra opción es, de acuerdo con estudios anteriores, diseñar un libro de texto separado para los niños indígenas basado en su cultura.

Palabras clave: cultura indígena. currículo de matemáticas. medición. libro de texto. medición.

## Introduction

The mathematics textbook is described as an important resource for mathematics learning and teaching (e.g., Fan et al., 2013, Schubring & Fan, 2018, Rezat, Fan, Pepin, 2021). Examining, among others, its content and structure is crucial (e.g., Fan et al., 2013). Measurement is a cross-disciplinary theme (e.g., Lipka et al., 2019). Earlier studies suggest that, in mathematics, measurement is often considered to be difficult (e.g., Gravemeijer, Figueiredo, van Galen, Keijzer, Munk, 2016). Some studies are critical of the teaching of measurement, where they expose that it is not well learned by children (e.g., Gómezescobar, Fernández-Cézar & Guerrero, 2018; Kamii, 2006; Sarama, Clements, Barret, Craig, Aaron & Vanegas, 2020; Smith, van den Heuvel-Panhuizen & Teppo, 2011). The problems of learning measurement can have ramifications on the child's future, which includes other topics of mathematics, other school subjects as well as career (Smith et al., 2011).

A special issue of ZDM in 2011 was dedicated to the topic of measurement (Smith, van den Heuvel-Panhuizen and Teppo, 2011). In their introduction to the special issue, Smith et al. (2011) make distinction between measurements of spatial and non-spatial quantities, where length, area and volume are spatial quantities whereas money, time and weight are non-spatial quantities. They set out that measurements of both spatial and non-spatial quantities had got attention in the special issue. However, it appears that measurement in cultural practices in general and in Indigenous cultures in particular, received hardly any attention in this special issue.

The current study focuses on the Sámi. The Sámi are Indigenous people of Norway and the neighboring countries (Finland, Russia and Sweden). Handcraft and reindeer herding are prevalent activities in Sámi culture. In the Sámi area of Norway, diverse traditional measurements are available and have been used in those activities (e.g., Fyhn et al., 2022). There have been suggestions of developing materials for the teaching of Sámi children based on the local culture including about measurement (e.g., Fyhn et al., 2011). Fyhn and colleagues (2011) also suggested a Sámi textbook and syllabus.

The current paper reports about a study, which examines the tasks of the topic measurement in the sixth-grade textbook used in Sámi schools of Norway. The choice of the topic is based on its central role in mathematics (e.g., Smith et al., 2011) as well as its importance in the Sámi culture (e.g., Fyhn et al., 2022). The results presented in the current paper are different in many ways, among others, a much more detailed articulation of the issue is presented here than what could be reported in a short poster presentation and in a conference proceeding.

In Norway, a new edition of mathematics textbook, Multi, was introduced following the introduction of a new curriculum. The core curriculum of the new Norwegian curriculum states the following about Sámi children and Sámi culture:

> The Norwegian Constitution lays down the principle that the central authorities must make it possible for the Sami to protect and develop the Sami languages, culture and societal life, a principle that is addressed in the Education Act. The core curriculum also applies to the Sami school. The designation "the Sami school" is used about education and training which follows a parallel and equal Sami curriculum. (Directorate for education and Training, n.d).

Perhaps mathematics education could be one means of protecting and developing the Sàmi language and culture. Indigenous mathematics education is often considered as a means of promoting this agenda of revitalizing the Indigenous culture and language (e.g., Trinick, Meaney and Fairhall, 2016). Another issue, which the core curriculum of the new Norwegian curriculum states, is about Norwegian children and Sámi culture and history. It states the following:

> Through the teaching and training the pupils shall gain insight into the indigenous Sami people's history, culture, societal life and rights. The pupils shall learn about diversity and variation in Sami culture and societal life. (Directorate for education and Training, n.d).

Mathematics, particularly, measurement can be one way to attain this goal (e.g., Fyhn et al., 2022). The new curriculum is for both Sámi and non-Sámi children of Norway (Directorate for education and Training, n.d.), and the Sámi mathematics textbook is often a direct translation of the Norwegian one (e.g., Fyhn et al., 2022). There was no Sámi version of a new sixth-grade textbook when this study was underway. The research question, which this study attempts to answer, is how relevant are the tasks about measurement in the mathematics textbook used in Sámi schools to Sámi context and what opportunities are available to improve it?

Tasks are central to mathematics teaching and learning (e.g., Clarke & Roche, 2018; Sullivan et al., 2015, Gravemeijer et al., 2016). Clarke and Roche (2018) consider choice and use of tasks by the teacher as being the determining factors for the quality as well as nature of learning. Mathematics textbooks are often considered as crucial sources of mathematics tasks. According to earlier studies, textbooks significantly influence the mathematics classroom and mathematics teachers rely on them for preparing their lessons (e.g., Rezat, Fan, Pepin, 2021).

In this paper, Watson and Thompson's (2015) description of a task is adopted. They describe a task as:

> written presentation of a planned mathematical experience for a learner, which could be one action or a sequence of actions that form an overall experience. … could consist of anything from a single problem, or a textbook exercise, to a complex interdisciplinary exploration. (p. 143).

Studies about tasks stress the importance of contextualized tasks in improving learning (e.g., Clarke & Roche, 2018; Gravemeijer et al., 2016; Van den Heuvel-Panhuizen, 2003). Clarke and Roche (2018) and Gravemijer et al. (2016) documented a positive influence of experiencing real-life problems on students' motivation to engage.

There are studies which examine Indigenous cultures as contexts for mathematics learning. In such studies, we find an exposition of tasks in diverse Indigenous contexts (e.g., Fyhn & Hansen, 2019; Lipka & Adams, 2004; Lipka et al., 2019; Siri & Hermansen, 2018; Trinick, Meaney and Fairhall, 2016). Lipka and Adams (2004) provide an example of a task from Alaska, USA, about building Fish Rack as a cultural activity. In their study about Yup'ik students' learning of mathematics, Lipka and Adams (2004) used a task, which they designed based on Yup'ik culture. The task is about a mathematical and cultural theme of building Fish Rack, where students explore rectangles, their properties and relationships with other quadrilaterals. According to Lipka and Adams (2004), building a Fish Rack, which is a structure "used for drying salmon", is a common activity in Yup'ik culture. The task included concepts such as shape, perimeter and area. The task also included proofs. For example, "how to determine they have a rectangular base—related to building a structure" (Lipka & Adams, 2004, p. 9). They suggest that the use of contextualized tasks in Indigenous culture has a positive influence on students' performance.

Similar to Lipka and Adams (2004), there is an example from a study about teaching of mathematics for Sámi children (Siri & Hermansen, 2018). Instead of the fish rack, Siri and Hermansen (2018) use Luovvi as a Sámi context, a structure used for hanging things. Luovvi has a rectangular top (Siri & Hermansen, 2018). Students can explore about area and perimeter, for example, they can explore how to get a maximum area on the top of the Luovvi (ibid). Students also get additional context to explore the relation between the area and the perimeter of a rectangle. That is, four children standing at four corners form a rectangular shape by stretching a rope, whose ends are tied, around them. Siri and Hermansen (2018) stress that such tasks are important in revitalizing the Sámi language and culture.

The adoption of a national textbook for Indigenous population is criticized for not fitting to the needs and situations of Indigenous populations (e.g., Fyhn et al., 2011; Silva, 2019). The adoption of the textbook includes adoption of its tasks. Sullivan et al. (2015) describes adoption of tasks as being complex as it involves language and culture. Both Fyhn and colleagues (2011) and Silva (2019) suggest producing a separate textbook for Indigenous population. In her report about their designing of mathematics textbooks for Indigenous students of Brazil, Silva stresses the importance of using the Indigenous culture as a starting point for the teaching of mathematics in order to address the needs and situation of Indigenous people and enhance better learning of children of Indigenous people. Silva (2019) states that in the textbook they used the cultural artifacts, nature, and activities of the Indigenous population. Such use of Indigenous resources is consistent with didactical phenomenology.

## Theoretical perspective

This study draws on Freudenthal's idea of didactical phenomenology. The issue of using concrete phenomena as a starting point for the teaching of mathematics has been advocated for many decades (e.g., Doorman, Van den Heuvel-Panhuizen, & Goddijn, 2020, Freudenthal, 1983; Treffers, 1987, van den Heuvel-Panhuizen, van den Brink, Janssen, Hachstenbach, Menne, Moor, & Nelissen, 2008). Freudenthal provides examples where historically the mathematics concepts originally came from concrete phenomena and stresses that children's mathematical experiences should follow the same order: concrete phenomena followed by mathematics concepts.

Freudenthal is critical of mathematics, where he states that, “Mathematics is characterized by a tendency … cutting the bonds with reality. … Attempts at instilling it lead to false concretisations” (Freudenthal, 1983, p.81). Freudenthal (1983) stresses that using materials, which are familiar to children and can concretize mathematics concepts, where they are used as starting points, enhances better learning. Similarly, Treffers (1987) suggests that in learning a new mathematics concept, using tasks situated in students’ real-life as starting points can ensure better understanding of the new concept. Other studies relating to realistic mathematics education also endorse this suggestion (e.g., Gravemeijer et al., 2016, Van den Heuvel-Panhuizen, 2003). In the current study, the tasks in the textbooks are examined to expose if concrete phenomena, which could be familiar to Sámi children, are used in the tasks. Then, the tasks are further examined to see if the concrete phenomena are used as starting points for developing the concepts in the topics of measurement.

## Method

In this study, the textbooks of grade 6 are examined, with a particular focus on the tasks in the topics of measurement. The study mainly examines the old textbook because it is available in North Sámi language. As mentioned in the introduction of this paper, when this study was undertaken, the new sixth-grade mathematics textbook was not yet available in the North Sámi language. Moreover, the new curriculum is for both Sámi and non-Sámi children of Norway (Directorate for education and Training, n.d.), and the Sámi mathematics textbook is often a direct translation of the norwegian one (e.g., Fyhn et al., 2022). Thus, it was found worthwhile to examine the content of the new textbook, which is available in Norwegian language, to expose the difference from the old one in the light of the new curriculum. That is, the content of the new textbook is examined with respect to the new Norwegian curriculum. The content of the new textbook is also examined to expose the difference from the old textbook.

The author’s acquaintance with Sámi culture is while working in the Northern Sámi area of Norway. He had a teaching and research position at the Sámi University of applied sciences for three and a half years, which ended in May 2023. The author has a good command of the Norwegian language. Though he has learnt the Sámi language, translating from Sámi into English language was not always easy. At times, he depended on the translation tools Gielatekno and the Sámi online dictionary Neahttadigisánit. These tools translate the Sámi text and words into Norwegian. Thus, some of the English translation presented here are from Norwegian.

The method employed in the current study was document analysis, where the three steps suggested by Bowen (2009) were implemented in this order: skimming, thoroughly examining and interpreting. Data from the textbook were extracted and analyzed using these stages. The measurement chapter was meticulously examined. Then, the pertinent data were mined, and were translated from Sámi language into English. The data is labeled by numbers in square brackets, as in [1]. These numbers are used when referring to these data in the following sections.

Tasks were further examined using the theoretical perspective. Then, the tasks with a focus on real-life context were identified. This was followed by examining the tasks to see if they used Sámi context. Tasks which are about real-life are coded as relevant. At a later stage such tasks are recoded as either “relevant to Sámi” or “may not be relevant to Sámi”. Finally, the tasks were examined to see if they are used as a starting point for the teaching of a concept.

## Data presentation and analysis

In this section, the focus is on the data extracted from the textbook and the analysis of these data. Though the primary focus of the study is about the tasks of the old sixth-grade textbook, some data about general features of this textbook and the pertaining chapter are also extracted. As stated in the previous section,

some data from the new textbook about its content is also included to expose the differences from the old one in the light of the new curriculum.

The old sixth-grade textbook has two volumes: Multi 6a and Multi 6b. Each volume has four chapters. The chapter about measurement is the fifth chapter of the sixth-grade textbook and is the first in the second volume (Multi 6b). As set out in the methods section, the data is labeled by numbers in square brackets, and these numbers are used when referring to these data later.

[1] The chapter about measurement starts with stating the objective of the chapter as follows: "In this chapter you will learn: About Weight and use measuring units such as g, hg, kg, and ton; About Volume and use measuring units such as ml, cl, dl and l; Calculating time" (Alseth et al., 2011, p. 4).

The chapter about measurement has topics of measurement of spatial quantity namely volume as well as non-spatial quantities, particularly, weight and time. The chapter contains 21 tasks about weight, 27 tasks about volume, and 8 tasks about time measurement. In addition to the tasks in the specific sections, there are tasks about each of the topics presented under the titles - Practice exercises I, II and III – consisting of 3, 8 and 5 tasks, respectively. Most of the tasks contain more than one question, ranging up to 5 questions.

In addition to the tasks in each section of the student textbook, there are four sets of tasks, under the titles: Test, Practice exercises I, II and III and "can you do these?" Moreover, there are tasks in a separate "workbook" called "bargogirji". In this workbook, there are tasks for each of the chapters. For each section of the chapter about measurement several tasks are included. The chapter consists of a total of 83 tasks, some of which containing up to 6 questions.

In this section, exemplar tasks are provided for every topic of the chapter about measurement. As explained in the methods section, they are author translations from the original language. The chapter has tasks with real-life context such as the following:

[2] "Haugesund's bakery bakes 5,000 loaves and 1,000 buns every day. Here, you see the basic information about loaves and buns. [Quantities in g and kg are provided.] How much flour does the bakery use for bread every day?" (Alseth et al., 2011, p. 5).

[3] Write ml, dl, or l after the numbers so that you explained the correct volume. In a few drops the volume is 1. The volume of a bucket is 10. The volume in a soda bottle is 5. The volume of an aquarium is 600 (Alseth et al., 2011, p. 14).

[4] Haugesund's bakery sells pretzels. These are packed neatly as shown in the picture. [a picture with a shape of prism whose dimensions are in dm is provided.] Approximately how much shell paper goes into a box? (Alseth et al., 2011, p. 17).

[5] Another example of real-life context is the following: "The train leaves Trondheim at 07.40. How long does it take to arrive at Værnes." (Alseth et al., 2011, p. 16).

[6] The chapter also has tasks with real-life context, which are interdisciplinary, such as the following: "Make such a timeline. Mark the following events on the number line: Babylonians write the numbers (ca. 2000 AD.) ... Archimedes is born (287 AD.) ... Vikiŋg period begins (ca. 800 AD.) ... Norway becomes independent (1905)" (Alseth et al., 2011, p. 25).

Though sections of the chapter have numerous such tasks with real-life context such as bakery [2] and train [5], there are barely any tasks which employ the Sámi culture and way of life as context. In rare occasions, some of the real-life contexts are used as starting points for the teaching of specific measurement concepts. For example, the context of specific time of historical events is used as a starting point for the teaching of the concept "year" [6]. As will be set out shortly, the section about time is no longer available in the new sixth-grade textbook.

The new curriculum declares that Norwegian students will learn about the Sámi culture and history (Directorate for education and Training, n.d.). As one of the school subjects which all Norwegian students will attend to, mathematics would be one way to let Norwegian students learn about Sámi culture and history.

[7] The new sixth-grade textbook is available in Norwegian language. The Sámi translation of the new sixth-grade textbook had not come yet when this study was underway. As in the old one, the new textbook has 8 chapters presented in two volumes, four chapters in each volume. The chapters in the first volume are numbers and arithmetic, decimal numbers, two- and three-dimensional figures, and perimeter, area, and volume (Nordberg, Arnås, Alseth, & Røsseland, 2020).

[8] In the Norwegian new sixth-grade textbook, there is no chapter called measurement. However, there is a chapter for measurement of the spatial quantities with a title: “perimeter, area and volume” (Nordberg et al., 2020). The topics are presented in four sections – length and perimeter, area, surface area, and volume.

[9] There are other differences between the new and the old sixth-grade grade textbooks in terms of content. The new textbook does not contain the topics of measurement of the non-spatial quantities – money, weight and time (Nordberg et al., 2020) – which were available in the old textbook (Alseth et al., 2011).

## Results and Discussion

As stated in the previous section [1], the chapter about measurement focuses on standardized measurements, and not on traditional measuring or using body parts [2] [3] [4] [5] and [6]. The chapter focuses mostly on exact calculations of measurement, except with few examples of non-exact measurement [3]. The child does not seem to learn about what one could do in the absence of standardized measuring tools. It does not contain traditional measuring or text about measuring using body parts (cf. Fyhn et al., 2022). The textbook does not seem to give room for such a type of measurement. The literature in mathematics education suggests the importance of using body parts in the teaching of measuring (e.g., Fyhn et al., 2022).

As set out earlier, measuring by using body parts is an important tradition in Sámi culture (Fyhn et al., 2022). Given that there are several Sámi traditional ways of measuring (e.g., Fyhn et al., 2022), it would have been an advantage for Sámi children to learn about them. Moreover, as mentioned in the Introduction section, the core curriculum also states about the Norwegian government's commitment to develop the Sámi culture and languages. On the other hand, the literature in Indigenous mathematics education suggests that one reason for the need to include Indigenous context for mathematics teaching is revitalization of Indigenous culture and language (Trinick et al., 2016). Consistent with the new curriculum (Directorate for education and Training, n.d.), it would have also served as a way of introducing Sámi culture to non-Sámi children (see Introduction).

Several phenomena are used in the tasks. However, phenomena which are pertaining to the Sámi culture are not used in the tasks. The textbook has numerous tasks with a focus on real-life context, [2], [3] and [4]. However, there are hardly any tasks with Sámi context. Task [5] may not be relevant to most North Sámi children as train services are rare in the area inhibited by North Sámi people. Task [6] is interdisciplinary, and it uses real-life as a starting point for teaching measurement concepts. However, such tasks are very rare. Moreover, such tasks as well as the topic (i.e., measurement of time) are no longer available in the new six-grade textbook [9].

The Introduction section of this paper exposes that, in mathematics we talk of the measurement of spatial quantities – length, area and volume – and non-spatial quantities – weight, time and money. As set out in the data presentation and analysis section, consistent with the available literature (e.g., Smith et al., 2011), the old textbook presents both spatial and non-spatial measurements. The Introduction section

also presented that the new sixth-grade textbook is yet in Norwegian language [7]. Though there is no chapter called measurement in the new sixth-grade textbook, there is a chapter presenting the topics of measurement of the spatial quantities – length, area and volume [8]. However, measurement of the non-spatial quantities, including time, are no longer available in the new textbook.

As set out earlier, time measurement is included in the old textbook, where tasks showing the timeline of historical events in Norway and beyond were presented. It was stated in the data and analysis section that the chapter of the old sixth-grade textbook sometimes follows such an interdisciplinary approach [6]. Though it does not include Sámi history, the mathematics teacher who teaches Sámi children could replace this context with Sámi history as long as the topic about time measurement and the tasks are available in the textbook. On the other hand, the new curriculum states that Norwegian children will learn about Sámi culture and history (Directorate for education and Training, n.d.). This topic about time would have been an opportunity to achieve this goal. However, as mentioned above, the new textbook no longer has this topic about time measurement.

As set out earlier in the Introduction of this paper, the textbook used in the Sámi schools is translated directly from Norwegian language (e.g., Fyhn et al., 2022), and so are the tasks in the textbook (cf. Sullivan et al., 2015). Sullivan and colleagues are critical about direct translation of tasks from one cultural context to another mainly because of the complexity of differences in culture and language. According to Trinick et al. (2016), there are features, which distinguish the Indigenous culture from the national culture, which make it necessary to pay attention to issues relating to the culture and language when considering mathematics tasks for Indigenous children.

There are studies about tasks pertaining measurement involving the Sámi culture (e.g., Siri & Hermansen, 2018; Nordkild, Fyhn & Hætta, 2022). These tasks can be utilized in the textbooks. Ofcourse, there should be more studies focusing on the topic of measuring. The adoption of tasks from similar Indigenous contexts can also be considered. There are studies which use Indigenous contexts as a starting point for the teaching of Indigenous children in other areas of the world focusing on the topic of measuring (e.g., Lipka & Adams, 2004). For example, in the earlier studies presented in the Introduction section, there are similarities between the traditional activities in the Sámi culture (e.g., Siri & Hermansen, 2018) and the culture of the Indigenous people of Alaska in the US (e.g., Lipka and Adams, 2004). A task which used fish rack as a context in Alaska (Lipka and Adams, 2004) can be adopted to the Sámi area of Norway because the Sámi people use a similar structure called luovvi (e.g., Siri & Hermansen, 2018). The similar aspects of Indigenous cultures might allow adoption of tasks from one context to the other, instead of translating directly from Norwegian (cf. Sullivan et al., 2015). As set out above, Sullivan et al. (2015) is critical of direct translation of tasks from one language to the other partly because of the cultural differences.

On the other hand, the suggestion of a separate textbook for Indigenous children, was set out in the Introduction (e.g., Fyhn et al., 2011; Silva, 2019). Silva's (2019) suggestion of a separate textbook for Indigenous children is based on her experience of publishing a separate textbook for Brazilian Indigenous children. Silva (2019) reported that their textbook contained tasks, which they designed using the handcraft as context for the teaching of different mathematics topics including measurement. The adoption of tasks from Brazilian Indigenous context to the Sámi can also be considered. As set out in the Introduction, similar to the Brazilian Indigenous culture, handcraft is part of the Sámi culture.

## Conclusion

The study has shown important findings with respect to the research question which was guiding this study. The textbooks, both the old and new, have numerous tasks with a focus on real-life context. The results indicate that the tasks in the old textbooks appear to be not relevant to the cultural background of the Sámi children. On the other hand, the old textbook had tasks, which could be adopted to the Sámi context. However, such tasks and the topic containing these tasks are no longer available in the new sixth grade textbook. If they were still available the adoption of such tasks could have helped to achieve the goal set in the new curriculum about teaching Sámi history and culture to all Norwegian children. It

could also have helped to achieve another goal set in the new curriculum about interdisciplinarity because the tasks are about timeline in Norwegian and world history. Though the new curriculum states that the Sámi and non – Sàmi children will learn about the Sámi culture and history, the absence of measurement as a content in the new curriculum and the absence of measurement of the non – spatial quantities, particularly, the topic, time, in the new textbook, seems to hamper this goal of the new curriculum, and is a disadvantage to both the Sàmi and non-Sàmi children.

The study has implications for mathematics education in the Sámi area of Norway. In addition to using the tasks in the already available studies, we need more studies about designing tasks which utilize the Sámi context. On the other hand, there are studies which use Indigenous contexts as starting points for the teaching of Indigenous children. Some aspects of Indigenous cultures are similar, which might allow adoption of tasks from one context to the other. Adopting such tasks to the Sámi context should also be considered instead of a mere translation of the Norwegian textbook into Sámi language. Another option is, consistent with earlier studies, designing a separate textbook for the Sámi children based on their Indigenous culture and way of life. It appears that designing and adopting tasks, which are based on Indigenous culture require paying attention to the cultural and language issues associated with the tasks. The issue of culture and language pertains whether the aim is to incorporate in the mandated textbook or publishing a separate textbook for the Sámi children.

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