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Building Indigenous Futures with Minecraft: A Sámi Educational Perspective

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Abstract

Throughout the 21st century, digital gaming environments have been widely used in Nordic education to engage students, deepen learning across subjects, foster social skills, and promote 21st-century digital literacy. In Sámi education, however, the use of digital games is primarily constrained by the limited availability of games in the Sámi languages, Sámi-specific content in existing games, and the usability of these games in Sámi language education. Teachers also require training in the use of digital learning games in Sámi education. In Sámi education, teachers not only need technical proficiency but also the ability to utilise technology to pass on traditional knowledge and language, embedded in Sámi culture, to future generations. This article discusses experiences with the use of Minecraft in Sámi education and the teaching of Sámi content within Norwegian education. The authors have taught the use of Minecraft in both Sámi and Norwegian teacher education and have developed content specifically for this purpose based on Sámi educational values. The first author has translated Minecraft into Northern Sámi. The article takes a narrative approach, discussing how Minecraft is suited for teaching Sámi content and language, and which pedagogical approaches can be considered when using Minecraft in education.

Keywords: Sámi education; Sámi language; Sámi pedagogy; digital games; teacher digital competence; Minecraft

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Introduction

The available research indicates that Sámi education operates in a liminal space, wherein multiple factors complicate or inhibit its effective implementation (Keskitalo, 2017). One critical challenge is the insufficient number of trained personnel with expertise in Sámi languages, which has a profound impact on both early childhood education and formal education in Sámi. This shortage of qualified educators affects not only the type of education that can be provided, but also its quality and overall effectiveness. (Arola, 2020.) In addition to staffing issues, teaching and learning resources (TLR) in Sámi education are markedly limited. The Sámi region spans a vast geographical area that includes Norway, Sweden, Finland, and Russia, collectively referred to as Sápmi. This region is home to ten Sámi languages, and there are several distinct dialects within the largest language group, North Sámi. For instance, in the Finnish part of Sápmi, two separate dialects of North Sámi are recognised, which necessitates the production of distinct second-language learning materials for the eastern and western dialects. According to the 'Report on the Current Situation and Future Needs in Sámi Learning Materials' (Korpela, 2020), systematic efforts have been undertaken in Finland to develop Sámi-language learning materials, including digital formats. The report notes that the availability of learning materials for Sámi, both as a mother tongue and as a second language, is generally regarded as satisfactory. However, a primary challenge remains in the outdated nature of many existing materials. Although learning resources have been produced, their updating to align with current curricula lags behind.

Sámi educational materials are produced and published through different models across the Nordic countries, reflecting distinct national policies and institutional frameworks. In Norway, the Sámi Parliament holds responsibility for developing and overseeing Sámi-language teaching materials for grades 1–13, including special education. According to the Sámi Parliament in Norway, Sámi-language educational materials should reflect the entirety of the Sámi region, recognising the Sámi as a unified people across national borders (Sámediggi, 2024). In Finland, the Sámi Parliament is responsible for producing educational materials in all three Sámi languages spoken within the country. The Education and Learning Materials Committee approves the production plans and principles, while the Education and Learning Materials Office oversees the planning, implementation, distribution, communication, financial administration, and Nordic cooperation related to educational resource development. A central focus in the most recent educational materials production plan is the development of mother tongue and literature resources. In addition, a few years ago the Sámi Parliament hired an educational material designer to focus specifically on digital educational material development (Saamelaiskäräjät, 2025). Although the number of educational materials has steadily increased in recent years, significant gaps remain, particularly for Skolt Sámi and Inari Sámi.

In Sweden, the Sámi School Board identifies needs, commissions content production, procures learning materials, and manages their distribution. It also oversees the budget and coordinates dissemination efforts. According to the Sámi School Board, a vital part of

education is traditional Sámi knowledge, and the aim of instruction is to develop the ability to speak, listen, read, and write in Sámi. The Board produces educational materials for all grade levels in collaboration with textbook producers within the Sámi region (Sameskolstyrelsen, 2021). These nationally distinct systems underscore the central role of Sámi institutions in preserving and promoting Indigenous languages in education. At the same time, they reveal disparities in infrastructure, funding mechanisms, and state involvement across borders. Education relies heavily on resources to be successfully implemented, and this is especially true for Sámi education, which faces unique challenges in terms of available teaching and learning resources (TLRs) and distinct national systems. Digital gaming platforms have the potential to address these challenges. They can provide interactive and culturally relevant learning environments that transcend national and linguistic borders. Platforms like Minecraft can be adapted to reflect Sámi languages, traditions, and ways of learning, offering a flexible medium for education. These platforms not only support language acquisition and cultural knowledge but also foster digital literacy and create inclusive educational practices that reflect Indigenous values and perspectives.

In this article, we explore the integration of Sámi culture and knowledge into education using digital game-based platforms, with a particular focus on Minecraft. We discuss Minecraft, the digital play and interaction space launched by the Swedish company Mojang in 2011, as a resource and environment for learning and teaching in the context of Sámi culture and knowledge. Our insights are based on the joint research and development project 'Minecraft as a Teaching Tool' at the Sámi University of Applied Sciences (Sápmi/Norway) and the University of Agder (Norway) between 2021–2023. The project was partly financed by the Norwegian Directorate for Higher Education and Skills. The project had two main aims. The first was to develop a Sámi Minecraft game that could be utilised in Sámi and Norwegian schools, available in the Sámi languages, Norwegian, and English. The game was expected to be aligned with the latest Sámi and Norwegian curricula, thematising Sámi culture and topics (Ministry of Education and Research, 2020a; 2020b).

In Sámi education, the game was intended to serve as a new environment for learning and language development. The game developed takes its starting point from the Sámi Parliament on the Norwegian side of Sápmi, while also taking the player to a variety of places through activities that have significance for Sámi culture, history, and society. Examples of the activities included are salmon fishing, reindeer herding, exploring the first Sámi national meeting in 1917, and engaging in historical and contemporary conflicts about land rights and natural resources. Both the tasks themselves and the places where they occur are significant in the game, aligning with the importance of place in Sámi culture and teacher education by offering new opportunities for interacting with and accessing these places. The second main aim was directed towards Sámi education. In this part of the project, both pre- and in-service teachers created their own Minecraft worlds and used Minecraft as part of their student teaching practicum to answer the need for updated digital teaching and learning resources in Sámi education (Føreland & Äärelä-Vihriälä, 2024).

The purpose of the article is to highlight the potential of digital interaction platforms (such as Minecraft) to support and advance Indigenous education from within its own foundations. Based on the activities of our project, we argue that these platforms are well-suited for teaching Indigenous languages and traditional knowledge, while simultaneously fostering the digital competencies required by 21st-century learners. Importantly, we underline that digital interaction environments can support Indigenous peoples' rights to self-determined education by respecting culturally grounded pedagogies and enabling the autonomous selection of teaching methods and learning materials.

Next, we will first situate Sámi perspectives within the curriculum and then review previous research on games and environments as teaching and learning resources. We continue by examining the broader context of Sámi education and teacher education, including collaborative pedagogical practices such as playing together. Ethical considerations of the study are also discussed. The results of the study are presented in three thematic sections. The first section explores how various resources are used to enhance learning within Sámi education and to support the teaching of Sámi-specific content. The second section examines the varying levels of digital skills and pedagogical approaches among teacher educators working in Sámi contexts. The third and final section focuses on how game-based learning can be used to reinforce Sámi pedagogical methods and cultural content in meaningful ways.

Previous studies: Digital interaction platforms as resources of learning

There are a large variety of games and game genres, targeted towards different audiences such as age groups or player types. As such, it is difficult to describe which games and gaming environments constitute learning environments (Plass et al., 2020). Using games with the goal of learning can still be described as game-based learning, despite using different types of games for different purposes. This includes both games developed for educational purposes as well as games not specifically aimed at learning. For example, a game can be used to learn about different narratives or thematise topics that are relevant for education, such as games inspired by cultural heritage or games requiring scientific knowledge in order to solve puzzles. Minecraft, which this article focuses on, was originally a game created for entertainment purposes. Later, a game platform specifically targeted towards education was created. Games are defined as “rule-based systems with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable” (Juul, 2005, p. 36). As such, Minecraft does not necessarily fulfil the criteria of a game, but rather, it is an environment where games are enabled (as well as any other forms of interaction), as it offers numerous educational opportunities. To understand how Minecraft can be used as a TLR, it is worth discussing what kind of game Minecraft actually is, and whether it is better to describe the game as a gaming platform or learning environment.

Minecraft has been described as a sandbox game, meaning that the player can use, interact with, and utilize the environment in numerous ways. The game can be played in different modes, mainly 'creative' and 'survival' modes. In 'survival' mode, there are limited resources available, and the player needs to strategically plan, gather, and process them in order to fend off hostile creatures and advance. The game has the potential for a story in this mode, whereby the player can fight against the final boss and thereby 'win' the game. However, the player can also choose to simply ignore the story and create their own goals. Playing often involves building, and if the player does not want building restrictions or to fight hostile creatures, they can turn on the 'creative' mode to have unlimited resources to create from. Minecraft thus opens limitless creative building opportunities where players can create everything from working machines to endless forms of buildings, whether replicas of existing ones, fictional ones, or simply using their own imagination. This has led teachers and researchers to explore the potential of using Minecraft for several educational purposes, such as computational thinking (Kutay & Oner, 2022), science education (Nkadameng & Ankiewicz, 2022), literacy learning (Marcon & Faulkner, 2020) and enhancing Sámi language and culture (Førelund & Äärelä-Vihriälä, 2024). Research shows how Minecraft in particular can encourage student collaboration, support creativity, provide active learning opportunities, be an inclusive educational tool, and support curricular content as long as issues such as enough devices and internet connection were solved (Slattery et al., 2024).

Previous studies have shown that the use of digital gaming platforms in education can support children's learning. Wang and colleagues (2022) propose three areas for development in research on digital game platforms. According to their study, research should focus on enhancing game design, examining the impact of learning skills on students' interest in digital games, and advancing the sustainable development of digital games for educational use. The integration of various digital spaces in language learning has been seen as supporting student creativity and active engagement (Lee & Roger, 2023). Following these recommendations, the current article explores how educational game development can enhance Sámi culture and language.

Through digital interaction platforms, and particularly through their narrative features, it is possible to address current events affecting Indigenous peoples that often evoke strong emotions. For example, the ban on salmon fishing, which has deeply affected the Sámi people of the Teno River and led to a cultural void and grief known as *luossamoraš* ('salmon grief'), has been explored on a digital gaming platform (Laiti & Virtanen 2024). LaPensée and colleagues (2022) have studied the potential of digital games to function as sovereign spaces for Indigenous expression and to support Indigenous self-determination. Research has also explored how technology can be linked to cultural aspects, connecting science, technology, engineering, and mathematics (STEM) to Indigenous material and intangible cultural heritage, using Minecraft as one of several examples (Boz et al., 2024). In one example, the students coded a powwow (a gathering held by many First Nations and Native Americans), thus making the students see the reflection of their cultures (and themselves) in the digital sphere.

The implementation of Sámi education and Sámi pedagogical practices have been particularly studied since the early 2000s. Balto (1997, 2008) and Keskitalo (2010) have studied the Sámi approach to education from the perspective of teachers. According to their research, the core of Sámi education is to foster an individual who grows up to be independent and capable. This independence is called *birgejupmi* in Northern Sámi. Aikio (2010) has explored the social framework and communal dimensions of Sámi education. His research investigates whether education can foster individuals who can manage life, integrate into society, and avoid marginalisation. Research highlights the significance of social integration and community in Sámi education, emphasising the role of communal support in fostering individual capability and self-sufficiency. Such resilience and self-sufficiency are especially needed in this new era, where adaptation to the impacts and uncertainties of climate change has become essential.

In Sámi education, there has been a described lack of teaching material as well as material relevant for culture-based teaching. Due to this lack, there is a need to create freely available digital teaching and learning tools providing multimodal teaching and learning resources (Keskitalo et al., 2019). Game-playing can provide a unique opportunity to enhance understanding of Sámi perspectives in educational settings by fostering the development of innovative storytelling methods (Laiti, 2021; LaPensée, 2018). Influenced by traditional storytelling, games can employ narrative design strategies to shape settings, characters, interactivity, and aesthetics that challenge linear storytelling conventions. According to Nijdam (2023), video games have the potential to showcase Sámi storytelling traditions as modern, interactive, and ever evolving, by incorporating both traditional themes and current issues. Moreover, when created in partnership with the Sámi community, digital games can highlight Indigenous matters relevant for contemporary Sámi societies. Technology, therefore, can serve various purposes in the learning, teaching, preservation, documentation, archiving, revitalisation, promotion, maintenance, and perpetuation of Indigenous languages. One example is how digital games can reconnect Indigenous place names, language, and culture to the land (Kelly, 2020), functioning as locative technology that provides a connection between digital and physical spaces. As such, the digital game (or app) presents a continuation of the physical space, giving the possibility to strengthen the connection to place as well as reclaiming physical and digital places (Cresswell, 2014; Kelly, 2020). As underlined by Shah and colleagues (2024), Minecraft has reached a wide popularity in Indigenous communities worldwide, functioning as an Indigenous metaverse where one can play and create. Games such as Minecraft can therefore help fill the need for TLR in Sámi education that also enhances cultural competence and language use (Føreland & Äärelä-Vihriälä, 2024). In accordance with Galla (2016), we suggest that integrating digital games such as Minecraft with Indigenous teaching methods may open new opportunities for language use, thereby extending its application into different areas.

In sum, this section illustrates the richness of existing research on digital games and Indigenous education while also identifying a clear gap: the lack of systematic exploration into how existing mainstream platforms like Minecraft can be adapted into Sámi-specific

pedagogical practices. This article aims to fill that gap by offering both theoretical reflection and practical insight into how Minecraft can be transformed into a culturally grounded teaching and learning resource.

From tradition to innovation: The evolution of Sámi educational practices

The Sámi are a unified people living across the territories of four countries. Traditionally, the Sámi have led a nomadic lifestyle, following reindeer (*Rangifer tarandus*) herds over long distances between summer and winter grazing areas, or living alongside the coast, lakes, and rivers where the Sámi engaged in fishing and other maritime activities. However, the establishment of modern state borders between Norway, Sweden, Finland, and Russia ultimately divided the Sámi, confining them within these countries. From the late 1800s to the 1950s, the Sámi faced strong assimilation pressures, particularly through the efforts of education systems and the church. The goal was to integrate the Sámi into the majority populations of these nations. In education, this assimilation policy involved suppressing the Sámi language, culture, rituals, and customs. Children from Sámi communities, often living in remote areas, would stay in school dormitories for extended periods, becoming accustomed to the dominant culture (see Kortekangas, 2021).

The era of assimilation shifted across the Nordic countries by the 1970s, with the initiation of Sámi-language education and instruction about Sámi culture. This change was largely driven by strong Sámi activism and advocacy for Indigenous rights. In response to this movement, education policies began to recognise and incorporate Sámi language and cultural studies, fostering a revival of Sámi identity and heritage within the educational systems in Norway, Sweden, and Finland. This period marked a transition towards respecting and preserving the linguistic and cultural rights of the Sámi people, setting the stage for further advancements in Sámi self-determination and cultural preservation (see Olsen, 2019).

The colonial history of Sámi education and the relatively short period during which Sámi instruction has been available have both significantly impacted the availability of teaching materials. Additionally, the vastness of the Sámi region, spanning four different countries and encompassing ten different Sámi languages, creates a highly diverse educational context. There is a shortage of learning materials in all Sámi languages, including Northern Sámi, the most widely spoken. The number of children entering Sámi education has been growing steadily, particularly due to the language nest initiatives launched in the early 2000s (Äärelä, 2016.) In these language nests, Sámi children learn the Sámi language through immersion methods, which gives them the opportunity to join immersion classes when they begin school. Today, Sámi education encompasses various forms of instruction, including Sámi-medium education for native Sámi speakers, language immersion, Sámi language teaching at all levels, as well as Sámi language and culture education.

Keskitalo, Määttä, and Uusiautti (2011) describe Sámi education as education that takes place in Sámi and that deals with Sámi language and culture. They further describe Sámi pedagogy as a pedagogy that recognises the historical and cultural background of being a Sámi,

and which has certain features from Sámi culture ingrained in both teaching and classroom arrangements. Sámi education is further deeply rooted in traditional knowledge, *árbediehtu*, which is characteristically tacit and is often not documented in written form. According to Porsanger and Guttorm (2011), *árbediehtu* represents the collective wisdom and skills of the Sámi people, cultivated and used over centuries to develop Sámi livelihoods. Sámi pedagogy is a teaching approach or methodological orientation that is based on the cultural and historical characteristics of the Indigenous Sámi people, often conducted in Sámi or through the Sámi language (Keskitalo et al., 2011).

Research questions

In this article, we explore the integration of Sámi culture and knowledge into education using Minecraft. To gain a deeper understanding of how games can be utilised for this purpose, we pose the following questions:

- 1) How can Minecraft be utilised as a teaching and learning resource to support and enhance Sámi educational contexts?
- 2) How do our understandings and reflections contribute to or challenge the development of Sámi TLR game content?
- 3) What are the possibilities for leveraging digital games like Minecraft to enhance digital knowledge and strengthen Sámi pedagogical methods and experiential learning practices in the future?

Research design

Positionality of the authors

Conducting research in an Indigenous context requires careful ethical considerations (as described in the next sub-section) as well as methodological ones. Using Western research methodological approaches to explore Indigenous perspectives is not necessarily appropriate or adequate to gain a deeper understanding of the topic researched (Smith, 1999; Datta, 2017). Although Indigenous research methodologies vary from context to context, certain research values are deemed particularly relevant, such as ethical frameworks, holistic approaches, positionality, and the need to take the entire research process into account. In a Sámi research context, the use of local Sámi concepts, involving all actors in the research, community, and land-based approaches, has been highlighted (Virtanen et al., 2021). One methodological approach that has been explored is the use of narrative and storytelling (Virtanen et al., 2021; Datta, 2017). Through stories, individuals construct their understanding of the surrounding community, and these narratives reflect the realities of Indigenous peoples (Fitznor, 2012). The number of published stories by Sámi teachers and teacher educators remains limited. Teacher educators Äärelä-Vihriälä, Jannok Nutti and Rahko-Ravanti (2024) therefore suggest that Sámi teachers should share their own stories to help shape the understanding of Sámi pedagogy and education. Giving space to the researcher's reflections and stories follows

perspectives from methodological approaches to Indigenous research. In this article, that entails that we give space not only to the project results, but also to our positionality as researchers, to Sámi concepts and community, and to ethical approaches to the research and development process.

The three individuals participating in the present study have each been involved in a Minecraft project aimed specifically at Sámi education. They are as follows:

- *Lemet Máhtte Eira Sara*. I contributed as a key developer of Sámi language and culture content for the Minecraft project. In parallel with my studies in primary teacher education, I was able to pilot the features I developed during my teaching practicum. My role in this project was shaped by my identity as a Sámi pre-service and lead author, motivated by a desire to highlight both the opportunities and challenges involved in developing and locating culturally relevant teaching and learning resources as an Indigenous Sámi educator. I also translated Minecraft into Northern Sámi in response to the scarcity of digital language resources in the language. A friend of mine had expressed interest in learning Northern Sámi through digital tools yet struggled to find accessible and culturally contextualised resources. I emphasise the potential of digital media to create immersive learning experiences, which I see as aligning closely with Indigenous ways of learning. I hope educators will recognise the effectiveness of such immersive methods and also become aware of the challenges inherent in producing culturally sensitive educational materials for digital platforms. Together with Rauni Äärelä-Vihriälä, who is also Sámi, we brought a strong grounding in Sámi perspectives to the project.
- *Rauni Äärelä-Vihriälä*. I am a teacher educator and served as the institutional coordinator for the Minecraft project at the Sámi University of Applied Sciences. I became involved after being recommended as the faculty contact person and was immediately enthusiastic about participating, knowing that Minecraft had previously demonstrated educational potential. Within the project, I acted as faculty representative and one of the trainers of student teachers. I was particularly involved in the practicum components, where students explored the pedagogical applications of Minecraft. I familiarised myself with the game and taught it to pre-service throughout their studies, helping them build their digital competence. I also supervised students' practicum tasks related to the platform. My goal was to examine the potential of Minecraft as a digital learning environment for Sámi education and to introduce both pre-service teachers and their future pupils to the pedagogical possibilities of game-based learning. Simultaneously, I sought to expand my own understanding of the game's structure and its practical applications in Indigenous education. My work focused particularly on sustainable education, emphasizing the acquisition, proficiency, and use of the Indigenous language in new environments. Implementing sustainable and equitable education is also crucial in the era of climate change and biodiversity loss, which shapes the living conditions and futures of Sámi youth. At the moment, I am

continuing this work in my research on the significance of the relationship with nature in intergenerational dialogue and in understanding the green transition. This ongoing research is called ‘Reconceptualizing Boundaries Together Towards Resilient and Just Arctic Future(s)’ – REBOUND project (2023–2026), which investigates the justice of the green transition. The project is funded by the Strategic Research Council (SRC) established within the Research Council of Finland.

- *Line Reichelt Føreland.* I am a teacher educator who initiated the Minecraft project and brought together the project team. I have substantial experience using digital environments, educational games, and learning tools in teacher education in Norway. I was responsible for coordinating the project, with a particular focus on its development phase. My students frequently have limited prior knowledge of Sámi topics and perspectives, even though they are expected to integrate this knowledge into their own teaching. Many may go on to teach children who themselves lack familiarity with Sámi content. The ‘2023 Truth and Reconciliation Report’ in Norway revealed that a large proportion of respondents reported learning little or nothing about Sámi culture during their schooling, and that Sámi issues are often inadequately addressed in teacher education programmes. Supporting students with minimal background knowledge poses a challenge: it requires fostering their confidence and competence in integrating Indigenous knowledge sustainably and respectfully. My hope in initiating this project was that students would not only gain knowledge but also discover pedagogical strategies that support Sámi perspectives. Equally important was the goal of contributing to the development of teaching materials relevant for Sámi schools—specifically, producing outcomes such as games and educational content in Sámi languages.

The three of us used our discussions as material to evaluate teaching and learning resources (TLR) in Sámi education, as well as teachers’ digital knowledge and the integration of digital games into the Sámi pedagogical approach. The discussion material was gathered in autumn 2024, after the conclusion of the Minecraft project. Discussion topics were decided beforehand and were reflected in the discussions we had throughout the entire project. We discussed various themes together and individually in different contexts. From these topics, we decided to create a more in-depth review and developed an online survey based on the themes that had emerged in our discussions, which we then shared among ourselves. Afterward, we summarised these responses and held discussion meetings to further deepen our understanding of each other’s experiences and observations.

Time	Participants	Topic
Spring 2022	Rauni Äärelä-Vihriälä, Line Foreland Reichelt	Discussions about using Minecraft in Sámi education after workshops with students
Spring 2022 – Autumn 2023	Lemet Máhtte Eira Sara, Line Foreland Reichelt	Discussion in the context of building the Minecraft world and its tasks.
Spring 2022 – Autumn 2023	Line Foreland Reichelt, Rauni Äärelä-Vihriälä, Lemet Máhtte Eira Sara	Discussion during the project in the context of student workshops and teaching practicums
Spring 2022 – Autumn 2023	Line Foreland Reichelt, Rauni Äärelä-Vihriälä, Lemet Máhtte Eira Sara, colleagues at the Sámi University of Applied Sciences and the University of Agder	Discussion during the project in the context of student workshops and teaching practicums on the use of Minecraft in Sámi education and Sámi educational content
Spring 2024 - Autumn 2024	Line Foreland Reichelt, Rauni Äärelä-Vihriälä, Lemet Máhtte Eira Sara	A collaboratively prepared electronic survey for the article using the authors' stories
Autumn 2024	Line Foreland Reichelt, Rauni Äärelä-Vihriälä, Lemet Máhtte Eira Sara	Analysis of stories from the electronic survey, round 1
Autumn 2024	Line Foreland Reichelt, Rauni Äärelä-Vihriälä, Lemet Máhtte Eira Sara	Analysis of stories from the electronic survey, round 2

Table 1. Data collection process

We discussed the following topics, organised according to the research questions and the thematic structure described in the introduction to this article:

(1) Teaching and Learning Resources in Sámi Education: Supporting Sámi Educational Contexts and Teaching Sámi Topics	• How are TLRs used in Sámi education? • Are TLRs available in Sámi education and in Sámi language? • What are our thoughts when we teach about Sámi topics?
(2) The Diverse Digital Pedagogical Competence of Teacher Educators	• How do you see the development of digital teaching material in your work or studies? • What were our positions in the project? • Why were we involved in this project? what were our aims or expectations? • What did we bring to the project from our own Minecraft gaming or knowledge? • What are our gamer backgrounds? • Do we use digital resources and games in our lives? • How do these affect our willingness to use digital games, our aims in the project, and in our work or studies?
(3) Strengthening Sámi Pedagogical Approaches Through Digital Games	• What did we learn from playing Minecraft? • How are the games used in education? • What do we think about playing together? • What does the context of playing together mean for education? • What are our future thoughts for using digital games in Sámi education?

Ethics of the study

In this study, ethical perspectives are grounded primarily in the ethical guidelines established for Sámi research. Central to Sámi research is a community-centred approach that emphasises the importance and impact of research on the community. Good research practices aim to foster a safe and trusting environment for both individuals and the collective, a space that is described in Northern Sámi as *oadjebas*. The overarching goal of these practices and ethical guidelines is to cultivate an ethically sustainable dialogue between the scientific community and the Sámi people (Heikkilä et al., 2024.)

Reciprocal communication and engagement, known as *gulahallan* in Northern Sámi, have been central to the Minecraft project, as these are based on the active engagement of participants and the strengthening of their own skills in their own society. The project placed particular emphasis on producing Sámi-language content grounded in Sámi cultural and linguistic contexts, providing opportunities for reciprocal communication and engagement with the Sámi education community. Another key objective was to train student teachers in Sámi teacher education programmes to use this digital gaming platform, enabling them to incorporate these materials into their teaching.

Assessment of the benefits and risks of the research and the positionality of the researcher and their research, *guorahallan ja vihkkedallan*, is an important ethical perspective that emphasises the role of traditional knowledge within the Sámi community and sharing it with others (Heikkilä et al., 2024.) When building game worlds in Minecraft, it is important to be highly aware of Sámi cultural customs, language usage, and traditional knowledge, applying this information to support the community and enhance learning. Minecraft offers vast creative possibilities, with nearly limitless potential for adapting knowledge. In this context, the ability to discern what information is appropriate to share is crucial. For example, it is not appropriate to model or build locations that represent sacred sites of families or clans without consent from those involved. The Sámi Parliament world created for the project was developed in close collaboration with this article's first author, Lemet Máhtte, and with Sámi teacher education and teacher professional development programmes. Lemet Máhtte played a central role in creating all Sámi content, while Sámi teacher education programmes applied these materials in practice.

Appreciation of and respect for Sámi society and knowledge, *gudnejahttin ja árvvusatnin*, are particularly evident from the perspective of the Sámi language in the project. The project has primarily focused on placing the Sámi language and culture at the centre, ensuring the Sámi community's full participation in their own language. Overall, one of the most important principles of the project has been to promote the status of the Sámi language in gaming and thus expand its use in new contexts.

The obligation to return and share information, *geatnegasvuohta dieđu máhcaheapmái ja juohkimii*, stands for the researcher's responsibility and the obligation to share the project material and results with the Sámi community that participated in the project (Heikkilä

et al., 2024). From the beginning, it was clear that all Minecraft materials produced in the project would be made publicly accessible for everyone to view and use. Additionally, the Sámi Parliament world created within the project was continuously tested among Sámi teachers and schools. The Minecraft projects developed as part of the teacher professional development and were presented at a final seminar for participants, where everyone in the training programme had the opportunity to view it and provide feedback.

Results

Enhancing Sámi learning and instruction

During the project, we had extensive discussions about the role and contextualisation of digital learning materials in Sámi education. These discussions were part of the project's goal to develop educational materials within Minecraft. When discussing TLRs in Sámi and Sámi education, and TLR availability in Sámi language, Rauni considered TLRs to be part of language-aware teaching. She underlined that the language and culture being taught must be visible and accessible in the learning environment. Materials need to be present to support the linguistic landscape of the learning environment. According to research on the Sámi linguistic landscape, the presence of the Sámi language in schools is associated with hierarchical positioning relative to the dominant language. The Sámi language may hold strong value in interpersonal interactions, yet it can simultaneously remain invisible in the school environment (e.g., Linkola, 2014). In a Norwegian context, 86 per cent of children and young people play digital games, with Minecraft being in the top three most popular regardless of gender (The Norwegian Media Authority, 2024). Developing Sámi language games in Minecraft could create such digital linguistic landscapes, as well as support the Sámi language in a game environment that many children and young people already have experience with.

Lemet Máhtte saw that, while using Minecraft during this project, Northern Sámi linguistic landscapes contributed to altering the students' preferred language of communication. The students asked for directions, landmarks, or certain blocks and items in Northern Sámi as a way of communicating. The students also used words such as *geađgi*, *muorra*, *eana* (rock, tree, dirt) when referring to common items. However, English was used for more complex items such as a crafting bench, furnace, lamp, or zombie, as well as Norwegian for words such as *sverd* (sword). As the students played, the Northern Sámi words became more popular. These language choices indicate that as the students read the words and contextualised them, they added the words to their vocabulary. It is also worth noting that if they had not read the item's name, the students often constructed their own Northern Sámi word based upon their own dialect; for an example, *uvdna* or *omman* (furnace) or *dáktealmmái* (skeleton). The students also seemed to pick up words that their peers used, such as *giisá* (jewellery chest) instead of the translated word *bumbá* (large chest), since in this case the word *giisá* is more well-known. Lemet Máhtte saw that Minecraft and other types of games made students able to improve their grammar, literature skills, collaboration skills, storytelling skills, and so on. It also helped build a sense of community,

belonging, meaning, and fulfilment of goals. This is also supported by research on games, and on Minecraft in particular (Slattery et al., 2024).

The visibility of the Sámi language in learning environments is highly significant due to its minority status, as well as the assimilation history associated with the language. The presence of the Sámi language in schools is part of decolonisation and Indigenisation efforts, creating space for the language in environments where it was previously prohibited. We also find it important to examine the content of learning materials about Indigenous peoples from the perspective of their goals: learning from an internal or external perspective. All these aspects are connected to the liminal context of Sámi education, as previously mentioned (e.g., Keskitalo 2010.)

Lemet Máhtte raised the question of deeper knowledge in teaching materials, both in the materials used in Sámi education and in those used to teach accurate and up-to-date information about the Sámi people. He saw that TLR teaching about Sámi is still quite stereotypical. Berg-Nordlie (2024, p. 16) argues that Sámi history has been written from the perspective of suppression rather than Sámi people being the active agent in shaping their own history. Some resources seem to be improving, but remain focused on big topics such as Norwegianization, the Fovsen wind turbine case, the Sámi parliament, learning simple Sámi words, and how Sámi experience discrimination. There are few TLRs for topics such as culinary traditions, storytelling, health, wisdom, nature and holistic views of nature, on deeper discussions about who Sámi are, or in-depth knowledge of active Sámi involvement in national history. Even within the Minecraft project, not all of these examples have been adequately focused on. Since the game is directed to both Norwegian and Sámi schools, to a certain degree the game still focuses on the bigger issues. However, the game does gather several of these topics in the same game and thus presents some form of diversity. If students use the game, it should therefore be supplemented with other teaching and learning resources.

When examining Sámi learning materials more closely, Lemet Máhtte highlighted the acute shortage of learning materials. He has experienced that Sámi schools choose to buy Norwegian books rather than newer Sámi publications. He saw that firstly that there is a lack of content in Sámi languages, but also content about Sámi in general. There is also a lack of content that is culturally adapted for Sámi education. While training on how to teach snow-themed subjects, which are important to Sámi, he experienced not being able to find TLRs that covered snow-related words in a desired fashion that was adapted for the age of the students. He ended up creating a Minecraft world where he used the available types of snow and ice to build a snowy landscape. The pupils were instructed to take pictures of what they found and had to write about what they believed to be the correct term from a list of snow-related words that had descriptions. Here, Minecraft was used in addition to reading a short text about winter activities that was available as well as a subsequent field trip outside. This example demonstrates the many possibilities that can arise when using Minecraft as a TLR in Sámi education, particularly when relevant resources are lacking or there is a need for TLR supplements.

Rauni added to this discussion, explaining how the significant lack of materials resulted in teachers spending considerable amounts of time creating materials themselves, leading to a sense of a heavy workload. In other words, there is a great shortage of people who produce Sámi educational materials. According to Korpela (2020), although there are few professional educational material producers, there are potential contributors and creators among both students and teachers. Without content creators, this leads to the translation of materials, which often results in cultural context being inadequately represented, forcing teachers to adapt the content of textbooks to their teaching. TLRs in Sámi education are also fundamentally affected by the requirements of the four national education systems, which additionally influence teaching and content. As a result, materials are often not interchangeable between countries, and Sámi education organisers and teachers end up using materials produced within their own country. This issue is further influenced by language considerations.

Line highlighted the Norwegian context, where digitalisation has led to a larger number of resources available. According to Kure et al. (2025), Norway and other Nordic nations have long been leaders in integrating digital technology and enhancing skills and competence within education. They have also provided the schools with the technological equipment that is deemed necessary (Kure et al., 2025). Although the availability of technological resources may vary, there do seem to be resources available. In the Norwegian context, the demand has focused on developing teachers' and future teachers' digital competence (Kure et al., 2025). In a Sámi context, however, having digital units might not, in itself, meet the demand in schools as there are not enough digital content and resources available in Sámi languages. To mitigate the lack or scarcity of educational resources, Outakoski et al. (2018) emphasise the need to develop and strengthen collaborations and initiatives both within and outside educational institutions. In a Sámi context, there is both a need to develop more teaching and learning resources in Sámi languages, as well as a need to develop digital competencies that is in line with Sámi pedagogical practices. The project therefore strove to provide students with game content that could support this lack of teaching material, adding Sámi content in the game such as traditional boats, reindeer, working snow mobiles, *lavvu* (a portable traditional Sámi dwelling made of wood and fabric), and waving Sámi flags. In addition, a large number of workshops and classes were directly targeted towards Sámi education.

Line argued that teaching and learning resources that include Sámi topics (and are used to teach about or enhance Sámi knowledge) should be prioritised in making the material available in the Sámi language, as has been the Minecraft project's goal from the beginning. The development of material especially tailored to Sámi context should also be prioritised. Line highlighted that the Norwegian state has a responsibility to contribute to developing Sámi TLRs, considering the long process of the Norwegianization of Sámi people (which also took place across Sápmi). In the newly released 'Truth and Reconciliation Report' that investigates the Norwegianization Policy and Injustice against the Sámi and Kvens/Norwegian Finns, one of the suggested measures is precisely to create a Nordic initiative to strengthen cooperation on language, language education, the production of teaching material, and

language revitalisation (Sannhets- og forsoningskommisjonen, 2023). Sámi teachers and future teachers must also have time to develop Sámi digital competencies, with projects that particularly focus on how the digital tools could be utilised in Sámi classrooms. The Minecraft project therefore had a branch that was directed only towards Sámi teacher education. In the project, Sámi pre-service teachers developed their own Minecraft games that they tested in their practicums, in line with demands made by Sámi teacher training and schools (Føreland & Äärelä-Vihriälä, 2024).

The diverse digital pedagogical competence of teacher educators

We bring with us a variety of experiences with digital games. These experiences influence how we perceive the possibilities for TLRs in Sámi education, as well as which digital pedagogical competences we consider necessary. We argue that in a project like the Minecraft project, participants' own backgrounds will affect the project results and possibilities. Considering participant backgrounds, including experiences using games, could therefore be an important contribution to this kind of research that is also in line with the ethical guidelines established for Sámi research.

Lemet Máhtte has played videogames since he was a child. It all started with *Mario Kart* and Nintendo games, then first-person shooter games like *Call of Duty*. However, this abruptly changed after his classmate introduced Minecraft to him. The classmate told him about all the possibilities in that sandbox game, as well as all the entertainment video material that was produced through it online. He started playing, creating, and solving problems – and most importantly communicating and collaborating with people online. They made villages with professions, roles, jobs, and careers. They communicated in English, which was not the first language for any of them. The oldest young person in the group gave English lessons for them inside Minecraft because they all wrote so badly. Lemet Máhtte went on to be interested in English subjects in school. Later, he produced gaming entertainment videos online by himself. He learned how to make engaging content, and how to be precise about who the recipient of the 'text' was. He also went on to write fanfiction. After some time, he decided to translate Minecraft into Northern Sámi, which took him eight months to translate over 14,000 words. To this day, it continues to need new translation and upkeep. He ended up being awarded the Sami Language Promotion Award for his effort (Sámediggi, 2021). This demonstrates the potential of language learning by using digital games (Baek et al., 2020; Garshol & Føreland, 2024). When creating TLRs for the Sámi classroom, it is also important that the content is available in Sámi languages. Previous research has demonstrated the potential of including Sámi content in gaming environments where students have prior knowledge (Føreland & Äärelä-Vihriälä, 2024), something Lemet Máhtte's own background and teaching experience confirms.

Rauni has played basic-level games on various digital platforms and gaming consoles since 1990. However, she is quite familiar with the use of games in education and has used games in her own teaching as a primary school teacher. She does not consider herself a

gamer but hopes to inspire students to engage with gaming and to develop or use gaming skills. She sees the value and importance of gaming in learning. Rauni underlines games, play, and gamification are important aspects of teaching, especially in Sámi education, where new everyday skills have traditionally been learned through play (see Äärelä, 2016). Playing has always been an important part of childhood in the Sámi community. Even the oldest studies conducted in Sámi communities show that the Sámi valued playing with children and giving space for children to play with each other (see Bruhn 1935; Demant-Hatt 1913). Sámi parents traditionally crafted toys that reflected their cultural life, thus integrating play into the learning of skills necessary for adulthood. In contemporary times, the realm of play and games has expanded into the digital world, including participation in various forms of small metaverses. Incorporating modern play environments into the play activities of Sámi children supports their development within contemporary societies while maintaining the central role that play has had in Sámi culture. Through such play, children can acquire experiences and knowledge important for understanding how to navigate similar situations later in life. For instance, engaging in games that simulate reindeer herding or fishing, whether in physical or digital realms, equips children with practical insights for real-life activities like salmon fishing or managing reindeer at a fence. Play also involves adults who can celebrate successes and offer support during challenges. As such, play can foster connections between children and parents at an early stage (see Balto 1997; 2008) and strengthen bonds within the community.

The use of games such as Minecraft continues to express culture and strengthen cultural and language identity today (Føreland & Äärelä-Vihriälä, 2024; Laiti, 2021). Since the Minecraft project began, Rauni has played Minecraft with her children. They have been building their shared world together. Her son often asks her to visit his house in the game, where he shows her different things as she follows him around. Through this, she has come to understand the joy of shared activities and the pleasure of experiencing things together. While working with student teachers on Minecraft, she gained valuable insights into how the game can be used in a versatile way to teach the Sámi language, including the exploration of traditional knowledge, all the while fostering a connection between students and teachers or children and parents (Føreland & Äärelä-Vihriälä, 2024). The intergenerational approach to playing enables the exploration of many contemporary issues, where knowledge passed down from one generation to another plays a central role. For example, the significance of intergenerational relationships with nature and place-based knowledge is crucial in the land use practices of the green transition.

Line uses games a lot and has always done so, from playing on her much-used handheld Nintendo Game Boy in childhood to having multiple gaming consols and a gaming PC. Perhaps that is a reason why she believes in the potential of games as an interactive, engaging, and fun way to learn and socialise in schools and teacher education. Line has experimented with Minecraft and saw the potential of using a sandbox game to develop learning materials as it is quite easy to use and build one's own games and content, as well as because of the popularity of the game. Before the project began, she was also present at a presentation of

another Indigenous Minecraft world, NGĀ MOTU, where players could explore a Māori world and learn the Te Reo Māori language (Paitai, 2022). Seeing how Indigenous perspectives could be integrated in a game many students know made her interested in how Minecraft could be used to further Sámi perspectives in education.

Discussing our diverse background knowledge about games led to a fruitful discussion about the different digital pedagogical knowledge that would be required from students, student teachers, and teachers when using games in education. Rauni understands digital competence as one of the future skills that future teachers should learn, at least to the extent that they can use it to create digital materials for their own teaching. This is part of a sustainable future and an opportunity to strengthen Indigenous education and promote equitable education. More broadly, she views digital skills as important civic skills needed to thrive in changing environments. To ensure the Sámi student teachers developed necessary digital skills in line with Sámi pedagogy, we used both the Pedagogical, Ethical, Attitudinal, and Technical dimensions (PEAT) model (McDonagh et al., 2021) and the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006).

In the PEAT model, the strong ethical understanding of the teacher regarding digital learning environments stood out, differentiating it from the TPACK model. In addition to these models, we have utilised the Digital Competence of Future Teachers (DCFT) model (Korte et al., 2023). The DCFT model is based on the PEAT and TPACK models, but offers a new perspective on teachers' digital competence, framing it as cultural competence. It highlights that teachers' expertise is not only about combining various knowledge and skills, but rather about engaging with a broader digital culture. We decided to use these models to provide a constructive and diverse perspective on how a teacher's digital expertise can be understood and developed within Sámi education. In that way, we not only included perspectives on how to use games within Sámi teacher training and further education but also reflections on how the games could be implemented in line with Sámi pedagogical practice and culture.

Discussion

When presenting the use of games within Sámi education, we discussed how games were implemented and what function games could have. Lemet Máhtte argued that a lot of teachers may see games as no more than a reward for students. However, this might be due to lack of competence in how to use the games didactically and the possible positive outcomes. The uncertainty of the teacher can be exploited by students, and therefore teachers might choose not to use them. If they had proper knowledge on how to integrate games in their teaching, they could see that immersion and experiences through games as a part of a holistic learning approach that would strengthen the pupils' grasp or understanding of a topic. As such, it could be a useful supplement to good teaching where students and teachers could play together. In a Sámi understanding, the students play with the teacher, even though the teacher may not know the game completely (Føreland & Äärelä-Vihriälä, 2024). This can be seen as part of *searvelatnja* learning, which is a Sámi pedagogical method in where the teacher and

pupil work together on problem solving, where the student might be able to teach the teacher something and the teacher guides the pupil into learning within the topic (see Sara, 2004.)

Rauni highlighted that the educational use of the games we discussed is primarily comprised of social interaction with others, although individual games can also enhance students' learning. There are many such games where you can progress independently from one learning event to another. In Sámi education, she sees cultural and language goals as so central that games should be used, especially in interaction with others. Language is learned and strengthened only through use. In Sámi education, she believes that learning together strengthens children's cultural and language identity, as well as their sense of belonging to their community. These are among the core values of Sámi education.

The participation of adults or teachers in such gameplay is particularly important. When an adult and child play together, they meet as equals, without roles, which can give the child a sense of being seen and heard. Line argued that these games are used in many different ways. In Norwegian schools, Line added, many use the Minecraft game as part of a larger project around the Sámi national day. Several teachers reported that the entire school or several classes play the game. The students may play alone or together. If they do not play together, the hope is that they at least socialise and discuss their play experiences. However, her experience has been that it is mostly students that play together, without teachers being part of the play experience. Lemet Máhtte and Rauni shared Line's observation that Sámi teachers seem to play with the pupils, not just give them work to do. We agreed that this thinking is rooted in the *searvelatnja* perspective. We think that playing and learning together is valuable, both in line with Sámi pedagogy and in line with previous feedback about using games and the positive impact that playing can have on the connection between pupils and teachers (Føreland & Äärelä-Vihriälä, 2024).

We had several discussions on how to present Sámi content through a game, not least with regard to ethical aspects. The difference between presenting content in games and books was one of the topics. Line said that digital material has an advantage in that it can be flexible in ways that non-digital material cannot be. There are, of course, many advantages with non-digital written material as well, but one pitfall is that it might end up presenting Sámi topics as static and – depending on the content – as less dynamic and modern. Loban (2024) argues that if textbooks are the only source of information, it might give the impression that cultures are fixed and static, perhaps even trapped in the past. In the Minecraft project, the ability to change the game content has been important. It has been an advantage to be able to change game content during testing, seeing the needs of the pupils and how the game is used by pupils with varying levels of knowledge. But, not least, the pupils' ability to change and interact with the content has shown many possibilities on how the game is experienced and has given pupils the experience of "having been there" (Føreland et al., 2024). Schools should therefore have both digital and non-digital material available.

Conclusion

Our joint Minecraft project has emphasised the importance of Sámi representation and active participation in the development of educational practices by making use of existing digital environments. In addition to creating games and game materials, the focus has been on how platforms like Minecraft can be adapted to support Indigenous education within Sámi cultural and linguistic frameworks. This demonstrates how a lack of institutional resources can be addressed by developing culturally relevant pedagogical practices that utilise tools from a majority society in support of minority and Indigenous perspectives. Indeed, a core argument in this article has been to show that the lack of Sámi-specific resources can be compensated for by creating pedagogical practices or adapting tools and materials from the majority society to fit Indigenous educational goals.

First and foremost, it is crucial to share knowledge and experiences within the context of Indigenous education and to highlight lessons learned through various development projects. In the Sámi context, development projects offer tangible support to the educational field but are typically time-limited and thus excluded from more long-term institutional initiatives. Therefore, the insights and experiences gained through these projects must be brought into broader public discussion, not only as a way of disseminating information but also to inform evaluation processes and guide future research and educational development.

The project has contributed to increasing awareness of the potential of digital games in Sámi education and has helped strengthen the digital pedagogical competence of Sámi teachers and future teachers. The results of the project are being further utilized in our new research initiatives. For example, Minecraft is used as a research tool in the REBOUND project. In its sub-project on educational sciences, Rauni and colleagues explore intergenerational experiences of justice in the green transition in Northern Finland and the Sámi region. Based on the research findings, they are developing educational materials addressing climate education, relationships with nature, and the justice of climate actions.

Importantly, Minecraft has proven to be a suitable and engaging platform for integrating Sámi content into teaching. Its flexibility allows educators to apply Sámi pedagogical principles (such as contextual, experiential, and communal learning) in digital environments. This highlights the importance of training teachers in both the technical use of the platform and its pedagogical applications in a Sámi educational context. However, further efforts are needed to expand this work – by involving more contributors, developing content in additional Sámi languages, and creating ready-to-use lesson plans and terminology resources.

Challenges remain, including the burden placed on teachers to produce their own materials and the limited capacity of Sámi publishers to meet demands across all educational levels. There is a clear need for collaborative digital platforms that provide an overview of Sámi teaching and learning resources and facilitate sharing among educators. At the same time, this work underscores the dual role of digital tools: addressing current gaps in Sámi education while also tapping into the immersive and experiential learning opportunities that games provide.

These approaches are in line with Sámi pedagogical principles, such as learning through socialisation and the concept of *searvelatnja* – learning that is contextual, shared, and lived.

In conclusion, while Sámi education – like that of many national minorities – lacks a comprehensive set of institutionally produced (top-down) TLRs such as textbooks and exercise books, teachers can use existing resources in digital spaces like Minecraft to create pedagogical practices that respond to curricular goals. In this context, the development of practices becomes more relevant than the production of new materials. This shift challenges the conventional notion of TLRs by positioning pedagogical practice itself as a critical resource, especially in Indigenous education.

Moreover, through this work we wish to highlight the urgent need to further develop and promote a broader Sámi educational materials discourse. We see it as vital to strengthen the connection between Sámi pedagogical approaches, teaching methods, and the development of learning materials. It is crucial that Sámi teachers have access to teaching and learning resources that are compatible with Sámi ways of teaching and learning, and that these materials are available in the languages and cultural frameworks that best serve their communities.

The experiences from the project demonstrate how Indigenous digital learning materials can be specifically designed to address the cultural and linguistic needs of Sámi and other Indigenous peoples in educational contexts. While educational materials may vary significantly across different Indigenous groups, they all share a common goal: to strengthen and sustain Indigenous traditions, languages, and values, while simultaneously fostering learning and teaching within the framework of contemporary digital technology. It is important that these materials are culturally sensitive and collaboratively developed with Indigenous communities to ensure that they authentically reflect Indigenous needs, values, and worldviews. Furthermore, digital learning materials present significant opportunities for creating innovative and inclusive educational environments that contribute to the preservation and development of Indigenous cultures and languages. By integrating digital tools, such as interactive games or immersive platforms, these resources can enhance the learning experience, making education more engaging and accessible, while respecting the cultural integrity of Indigenous peoples.

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