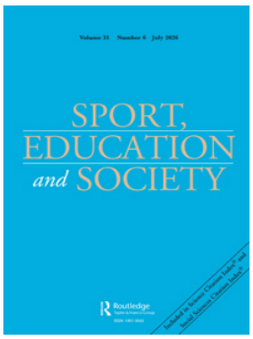

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'The kids are pumped!': Teachers' perceptions of the '*Pau te Hau*' high-intensity interval training programme

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ABSTRACT

This article examines generalist teachers' perceptions of *Pau te Hau*, a classroom-based high-intensity interval training (HIIT) programme implemented in primary schools in Aotearoa New Zealand. In response to critiques of school-based HIIT as health-centric and instrumental, the study foregrounds teacher sense-making to explore how movement practices are understood, enacted and valued within everyday classroom contexts. Drawing on an interpretivist, sociocultural and culturally responsive theoretical framework, *Pau te Hau* is conceptualised not as a fitness intervention but as a learning ecology in which movement, digital technologies and Mātauranga Māori operate as mediating resources shaping participation, engagement and wellbeing. The programme comprised 10–15 min HIIT sessions delivered two to three times per week over nine weeks during class time (N = 401 students; mean age 10.6 ± 1.1 years; 17 classes; six schools), facilitated by generalist teachers (N = 17) and supported by a purpose-built app, heart-rate monitors and Indigenous narratives (*pūrākau*). Semi-structured interviews were conducted with teachers, and thematic analysis revealed that the programme was widely perceived as a catalyst for building student capabilities and confidence. Teachers did not experience *Pau te Hau* as merely a time-efficient strategy for improving fitness. Rather, they interpreted it as a pedagogically meaningful practice that supported student agency, self-regulation, leadership and readiness to learn. Mātauranga Māori functioned as both a pedagogical and epistemic resource, providing cultural grounding and relational meaning for movement, although teachers' varying levels of cultural confidence shaped enactment. Digital technologies acted as sociocultural mediators, enhancing motivation and collective engagement while also introducing familiar pedagogical tensions. This study contributes to discourse about physical activity interventions by reconceptualising classroom-based HIIT as a culturally grounded, socio-culturally mediated pedagogical practice and contributes to wider debates on physical activity, Indigenous knowledge integration and technology-supported movement in schooling.

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Introduction

School-based physical activity interventions are often promoted as efficient means to support children's fitness (Alfrey & Gard, 2019; Kelso et al., 2020; Salmon et al., 2005), yet they have been widely critiqued for privileging measurable health outcomes over culturally meaningful and educationally rich experiences (Cale, 2021, 2023; Dyson et al., 2018; Harris & Cale, 2018; Hartwig et al., 2021; Kirk & Tinning, 1990; Petrie, 2012; Petrie et al., 2014; Powell, 2015). This raises questions about how movement-based interventions can be designed to align with broader educational aims, rather than functioning as short, fitness-focused add-ons. In Aotearoa New Zealand, such questions intersect with bicultural curriculum commitments and sociocultural interpretations of learning (Cliff, 2012). Movement is therefore conceptualised not simply as a vehicle for physical fitness but as a context for identity formation, sense-making, social connectedness and culturally grounded learning (Arnold, 1979; Culpan, 2004; Kaukau et al., 2025; Sallis et al., 2012). These commitments are further shaped by educational obligations under *Te Tiriti o Waitangi*[1] and by growing calls to embed *Mātauranga Māori*[2] and indigenous pedagogies within everyday classroom practice (Karaka-Clarke et al., 2022; Macfarlane, 2004).

Schools have long been positioned as key sites for promoting physical activity and fitness, with a substantial body of research demonstrating the potential health and educational benefits of school-based interventions (Burns et al., 2017; Dobbins et al., 2013; Duncan et al., 2011; Garcia-Hermoso, 2024; Hollis et al., 2016; Li et al., 2022; Morgan et al., 2016; Muntaner-Mas et al., 2024; Powell, 2015; Sallis et al., 2012). Arguably, many initiatives remain narrowly focused on physical outcomes, often overlooking the broader sociocultural, relational and pedagogical dimensions of movement in school contexts (Duncombe et al., 2022). Specifically, our intervention *Pau te Hau* was conceptualised not as a fitness intervention but as a learning ecology in which movement, digital technologies and Mātauranga Māori operate as mediating resources shaping participation, engagement and well-being. High-intensity interval training (HIIT) has gained traction internationally as a time-efficient strategy for improving health-related fitness, benefits for cardiometabolic health, engagement and, in some cases, psychosocial outcomes (Bauer et al., 2022; Chen et al., 2021., Eather et al., 2023; Harris et al., 2021; Logan et al., 2014; Lubans et al., 2022; Poon et al., 2024). However, HIIT interventions in education have been criticised for foregrounding intensity and measurement in ways that risk marginalising student enjoyment, cultural relevance and holistic wellbeing (Kelso et al., 2020; Leahy et al., 2024). Therefore, the design of school-based movement programmes that are both effective and educationally meaningful provides an opportunity to consider ecologies of practice (Kemmis et al., 2014). The challenge for such interventions is being able to create interdependence among the practices situated within a curriculum (Alfrey et al., 2021). The New Zealand Curriculum (Ministry of Education, 2007) during the intervention period (2021-2023) emphasises holistic, sociocultural and culturally responsive interpretations of wellbeing, as articulated through *Hauora*[3] and contemporary Māori health models such as *Te Whare Tapa Whā*,[4] and embedded in Health and Physical Education (HPE). Understanding movement as a culturally mediated and relational activity aligns with sociocultural theories of learning and practice, which conceptualise learning as shaped by interactions among people, tools and cultural practices (Kemmis et al., 2014; Lave & Wenger, 1991; Schön, 1987; Vygotsky, 1978). These commitments are deepened by New Zealand's bicultural foundations and educational obligations under Te Tiriti o Waitangi, which position Mātauranga Māori, *pūrākau* (Indigenous narratives) and Māori ways of knowing as integral to teaching and learning (Bishop, 2010; Harris et al., 2022; Macfarlane & Macfarlane, 2016; Tsuruda & Shepherd, 2016). Recent scholarship in HPE and education more broadly argues that embedding indigenous knowledge within curriculum not only affirms cultural identity but also supports relational, meaningful and inclusive pedagogical practices (Kaukau et al., 2025).

Technological tools also play an increasingly important role in shaping learning experiences in physical education (Casey & Jones, 2011; Jastrow et al., 2022; Krause et al., 2020). Digital technologies such as heart rate monitors and real-time visual feedback function as mediating artefacts that can enhance student agency, promote self-regulation and support interactive learning environments

when used thoughtfully. Yet they may also introduce tensions related to surveillance, motivation and equitable engagement (Leahy et al., 2020; Leahy et al., 2024). Understanding how teachers interpret and navigate these tensions is crucial for designing pedagogically responsive interventions that align with sociocultural perspectives on learning (Smith, 2007).

The purpose of the current research was therefore to examine students and generalist teachers' perceptions of *Pau te Hau*, a programme deliberately designed to position learning – not fitness alone – at the centre of students' experiences. A significant amount of rich data was gathered from both teachers and students. Fifty-five student focus groups of either 5–6 boys or 5–6 girls (N = 330) and 17 teacher interviews were held at the end of the nine-week intervention. However, for this article, only the teachers' data will be discussed. Drawing on an interpretivist, sociocultural and culturally responsive theoretical framework, this study explores how teachers made sense of the programme, how they enacted its cultural and technological components and how they understood its impact on classroom learning, engagement and wellbeing. By foregrounding teacher sense-making, school-based fitness interventions that seek to align with the sociocultural, bicultural and holistic aims of the New Zealand Curriculum (Ministry of Education, 2007) might better inform programme design.

Study design

The *Pau te Hau* study was a cluster-randomised controlled trial consisting of thirteen schools within which seven undertook an intervention programme known as *Pau te Hau*. The study consisted of generalist teachers (N = 17), each with over 10 years teaching experience, delivering a 10–15 min HIIT session 2–3 times per week to students (10.7 ± 1.1 years, N = 401) over one school 'term' (nine weeks). Following from our feasibility study (Harris et al., 2021), aspects of Mātauranga Māori in the form of pūrakau were integral within the programme. *Pau te Hau* was intended for generalist teachers to use their own classroom space exclusively, given space constraints in the school setting. Teachers used a purpose-built app featuring brief exercise videos and elements of Mātauranga Māori in the form of a pūrakau or stories/legends that were related to the accompanying exercise. Students wore heart rate monitors with a numbered transmitter which connected to an iPad™ projecting results in real time onto a screen or monitor in the classroom. For all participants, their heart rate was also colour coded as their heart rate reached certain zones, firstly green, then orange and red, finally designating 90% of the maximum heart rate. At the commencement of each exercise phase, there were animated indigenous narratives in the form of videos of pūrakau that aligned with the forthcoming exercise. These narratives provided an innovative opportunity to connect aspects of culturally relevant stories that also related to Mātauranga Māori in the school curriculum, including the use of Māori language (te reo), to physical activity (te ao kori) objectives aligned to the HPE curriculum (Ministry of Education, 1999). Following this, each exercise was demonstrated in a video specifically performed by young people (peers), as they are the relatable role models. This meant that the teacher was not required to undertake any demonstrations and was then able to facilitate the session, motivating as required.

Full ethical approval was sought and approved through the University's institutional ethics review committee (20/429) and the New Zealand Health and Disabilities Ethics Committee (20/NTB/280). Invitations were sent to a range of schools from across Auckland. All participants (both teachers and students), along with parents/guardians, received information sheets. Teachers and parents signed a consent form, and students signed an assent form agreeing to participate.

Generalist teachers are responsible for the delivery of eight learning areas within the New Zealand Curriculum (Ministry of Education, 2007) and do not typically have specialist knowledge in physical education; therefore, the intervention teachers were invited to attend a one-day professional learning session undertaken by the research team. All 17 teachers had previously taught fitness components within their HPE curriculum and were confident in being able to integrate *Pau te Hau* into their classroom programme after attending the one-day professional development day. The

sessions on the day covered the benefits of HIIT, how to facilitate the sessions, using the supplied technology (heart rate monitors and an iPad™) and the links to curriculum. During this development day, the teachers undertook a brief practical HIIT session with discussion focusing on how they could then facilitate positive participation from students. They were also provided with a written resource that included information on curriculum links, lesson plans, assessment ideas, and further background on HIIT. Whilst the intention of the *Pau te Hau* sessions was ideally to be conducted within the HPE curriculum time, it was reiterated to the intervention teachers that twice weekly sessions could be taught anywhere within the usual classroom programme.

Theoretical framework

The theoretical framework for this study is grounded in an interpretivist epistemology, which positions knowledge as constructed through individuals' experiences and interactions (Berg, 2007; Bryman, 2008). This orientation is well suited to research seeking to understand how teachers made sense of, responded to, and enacted the *Pau te Hau* programme in their classrooms (Jones et al., 2013). Qualitative methods therefore enabled the collection of rich, experience--based accounts that illuminate teachers' interpretations of both the programme's cultural intentions and their (the teachers') response to its pedagogical aims.

To capture the situated nature of teachers' experiences, the study employed a case study methodology (Crotty, 1998). The learning experience situated within each of the teachers' classrooms enabled them to consider how student learning was conceptualised within the *Pau te Hau* programme. It was both a social and ecological process materialised through reflection on participation (Lave & Wenger, 1991; Schön, 1987). The case study method allowed the researchers to explore how an intervention unfolds within the complexities of real-world contexts, including school structures, routines and teacher–student relationships, all of which contribute to an ecology of practice. This design foregrounded the specificities of each classroom environment and supported a nuanced exploration of how teachers implemented the HIIT sessions and how these aligned with the intended outcomes of the programme..

The analysis was informed by a sociocultural theoretical lens, drawing particularly on culturally responsive and relational pedagogies (Atkins, 2015; Cale et al., 2020 ;Meier & Culpan, 2020; Tsuruda & Shepherd, 2016). Sociocultural theory emphasises the ways learning is shaped by social interaction, cultural norms and institutional expectations. This perspective provided a productive way to examine how teachers experienced *Pau te Hau* while navigating the complexity of their school contexts, classroom practices, and curriculum demands (Atkins et al., 2025; Gordon et al., 2013; Harris et al., 2025)

Central to this framework are the principles of culturally responsive pedagogy **(**Bishop & Glynn, 1999; Kaukau et al., 2025; Salter, 2000a; Salter 2000b), which highlight the importance of affirming Māori identity, language and cultural values within educational settings. By incorporating *pūrākau*, te reo Māori, and culturally grounded forms of movement, the *Pau te Hau* programme intentionally positioned Indigenous knowledge as integral to students' learning experiences. This aligns with wider educational commitments in Aotearoa New Zealand, such as to honour Te Tiriti o Waitangi and to embed Mātauranga Māori authentically within the curriculum (Bishop, 2010; Macfarlane & Macfarlane, 2016; Ministry of Education 2025).

Together, interpretivism, case study methodology, ecological practices and socio-culturally responsive theories provided a coherent foundation for understanding how teachers interpreted and enacted the *Pau te Hau* intervention through their facilitation of the programme and through observing their students' responses within their classroom environment. This framework guided the analysis toward recognising not only what teachers experienced, but how their sense-making aligned with the pedagogical, cultural and relational dimensions of the programme (Leahy & Simovska, 2017) -It is well suited to examine the integration of Mātauranga Māori within a school-based physical activity programme and to make sense of the pedagogical decisions that contribute to holistic outcomes for children.

Data collection

The qualitative focus of this study centred on gathering rich accounts of teachers' perspectives regarding their experiences of the *Pau te Hau* intervention and its perceived impact on learning, participation, and approaches to fitness. Semi-structured interviews were conducted with 17 teachers at the conclusion of the intervention, using open-ended questions designed to elicit reflections on how the programme influenced both their own practice and student engagement.- -Intended questions were prepared; however, as Roulston (2010) notes, open-ended questioning supports deeper exploration through follow-up prompts or probing for clarification.

Interviews were conducted online via Zoom and were approximately 45 min in duration. All interviews were audio-recorded and transcribed using software. Transcripts were subsequently edited for accuracy, particularly to ensure correct use of Māori words and concepts. The verified transcripts were then imported into NVivo for data management and preparation for analysis.

Data analysis

A reflexive thematic analysis was undertaken to interpret the data (Braun & Clarke, 2021). This approach followed a six-phase, iterative process, with each stage building upon the previous one to support a coherent and comprehensive interpretation of the dataset. The recursive nature of reflexive thematic analysis enabled repeated engagement with the data, allowing meanings to be refined and deepened over time (Roulston, 2010). An inductive orientation guided the analysis, ensuring that themes were generated from the data itself rather than from pre-existing theoretical categories.

Theme development began with repeated reading of all transcripts to support familiarisation, followed by systematic coding within NVivo. Codes and sub-codes were generated as recurring ideas, concepts, and phrases emerged across the dataset. These coded segments were then collated into broader patterns of meaning from which potential themes and subthemes were constructed.

Subsequent phases involved analysing the full dataset and relevant literature to assess coherence and analytic robustness. Through adopting a sociocultural lens on the data, the researchers identified several prominent themes that highlighted the ways in which social relationships, institutional structures and cultural contexts shaped the teachers' experiences of the *Pau te Hau* programme. Given the case study design of the research, particular attention was paid to how these themes reflected the unique contexts of the participating schools and teachers. This ensured that each theme represented not only a conceptual pattern but also the situated realities of programme implementation. The final stage involved refining the scope and focus of each theme, articulating the narrative each conveyed, and identifying the overarching story of the dataset that informed the findings and discussion.

Findings

The findings of this study reflect teachers' interpretive accounts of how the *Pau te Hau* intervention operated within their classroom contexts. Two overarching themes were identified – **Learning is Central** and **Mātauranga Māori** – each supported by several subthemes (Figure 1). These themes demonstrate how teachers understood the programme as both a pedagogical and cultural experience, rather than solely a fitness initiative.

Learning is central – an overarching focus

This theme foregrounds learning as the central organising concept through which teachers understood the *Pau te Hau* intervention. Rather than viewing it as a discrete fitness add-on, teachers framed the programme as a meaningful learning experience that supported students' capability building, confidence, self-regulation, along with a fitness focus. The overarching theme highlights

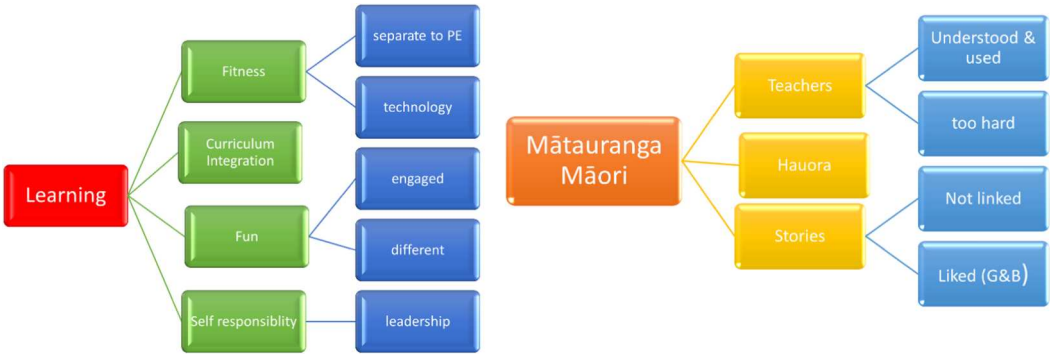

Figure 1. Themes and sub-themes contributing to the overarching focus.

how the programme functioned pedagogically within everyday classroom practice, reinforcing its alignment with broader curriculum aims.

All teachers embraced the concept that learning was at the centre of their experiences in the *Pau te Hau* intervention. Teachers consistently framed the *Pau te Hau* programme as a 'learning experience', not just a fitness initiative. One teacher described it as:

> It's about building capabilities and confidence. The kids weren't just getting fitter – they were learning about themselves and what they could achieve.

This sentiment was echoed across interviews, with teachers noting that the programme supported holistic development beyond physical health. Teachers observed that students not only engaged physically but also developed leadership and self-responsibility, often taking ownership of the technology setup and facilitation of sessions.

> … and they just ran the whole thing. It was very easy. They picked up the iPad, they put it, connected to the TV, they had the exercises going and everyone was sitting like it was just, it was perfect. So, that was cool. That they were like, I'd never taught them how to do it, either. It was obviously just watching and then trying and helping and whatnot. So yeah, it was really good.

Engagement and enjoyment

The integration of heart rate monitors and the *Pau te Hau* app was widely praised for enhancing motivation through real-time feedback. Teachers reported that students were 'pumped', actively monitoring their exertion levels and responding to the visibility of their heart rate data on the classroom screen. This immediacy of feedback contributed to heightened engagement and enjoyment, with teachers highlighting the value of fun, challenge and social interaction during sessions. Certain movements with kapa haka[5] links were particularly well received, reinforcing cultural relevance as a motivating factor.

> The kids were pumped! Seeing their heart rates on the screen made it real for them – they wanted to push themselves and see the numbers go up.

Students themselves recognised the challenge and fun involved, with teachers reporting:

> Most of my students enjoyed the sessions. They liked the challenge, and it was something different from the usual PE.

Teachers commented about student engagement and having fun whilst exercising:

> Yeah, you know, even, you know, that was probably the laughing at each other. You know, they might not always take it as serious, but it was, you know, they're enjoying themselves. And that was a good thing about it.

> Watching the children improve in their fitness was really good. Yeah, just and just, you know, getting to see the kids have fun with it as well. Was really good.

> Some of the actions that they enjoyed the most were the actions that had Kapa haka links like the haka and that sort of thing.

Curriculum integration

Teachers described varied approaches to integrating the intervention into their classroom programmes. While some embedded it within mathematics through the collection and analysis of heart rate data, others positioned it as a replacement for existing fitness routines. Several teachers later recognised missed opportunities to integrate pūrākau into literacy and other areas, noting that greater familiarity with the programme might have encouraged more cross-curricular use in future.

For some, this alignment made the programme easier to embed into their teaching practice.

> Yeah, so we, every lesson, my class jotted down their heart rates and their percentages, and we're currently doing statistics with them. Okay, so that was really cool way to engage and make it real life with them.

However, the majority of teachers embedded the programme into their classroom day and did not specifically include it in the health and physical education time. Some felt it was a 'lost opportunity' not to integrate it into literacy.

> We enjoyed it. It was nice to have that narrative (pūrakau) to weave and put it all together. And you know, when I think about it now, and I remember thinking of this near the end, it was a lost opportunity to integrate it to literacy and other aspects …

> It replaced my fitness that I would normally do.

> I did it in the morning. If I did miss, something was on and we couldn't do it in the morning, then I would move it to another time spot. But I'm the same like my class was settled and ready to go to work afterwards. And mine also replaced the fitness, but we still did both classes still did, do our Friday PE. And I think we both did it 3 times a week, yeah.

Others thought it was a lost opportunity not to integrate it into other subject areas. For example:

> I mean maybe if I was to approach this again, I think I would be able to tie it in and better knowing what was coming through and experiencing those. And just yeah, looking at a way that we could integrate it a little bit more into our programme as a more key part of maybe moving away from fitness, but more into the to the health aspect of things and tying those stories and ideas together into a larger unit.

Observable outcomes beyond fitness

Teachers consistently reported improvements in classroom focus, confidence, social cohesion, and overall readiness to learn. Many described students as more settled, energised, and able to engage with challenging academic content following the sessions. Teachers also noted increased peer support and encouragement during activities, reflecting positive shifts in social dynamics within classes.

> After Pau te Hau, the class was more settled and ready to learn. I noticed a real difference in their focus after the sessions.

> It brought the class together. The boys loved the physicality, saying they felt 'fitter', while the girls talked about how nice it was to do something together.

> I like the Te Reo element of it, like the stories and incorporating the 'why'. So at the start, it wasn't all about the exercises, but by the end, they had a story, a story each week, about what the exercises were and why. And that was really good. And the kids enjoyed that.

> I noticed the levels of engagement afterwards were a lot better because I'd got their energy out of the way and that. I never did it in the afternoon because we never did, it's like we did all the hard, harder subjects in the morning. So we always do our math and things in the morning. So they, that's when I felt they needed it. And it was beneficial. You could always tell as soon as we'd done it, that they were more switched on and ready to learn because they're done the exercise.

> … a bit of complaining about being sweaty and things like that, but yeah, I think it did have an impact on their ability to just sit back in and focus on their work.

> Mine were some of them are more sort of supportive towards other people. I can think about the one that was, he was, like, got to the red straight away and people were sort of encouraging, encouraging of him and yeah, so they were. It was the whole way. So yeah, they sort of, they celebrated each other, but they supported each other like at no point were their put downs.

Incorportating Mātauranga Māori – an overarching focus

This theme captures the role of Mātauranga Māori as a key conceptual concept in teachers' interpretations of the programme. While some teachers described strong connections between the pūrākau, te reo Māori and movement sequences, others noted missed opportunities or challenges in fully integrating the cultural narratives. The overarching focus of this theme emphasises how cultural responsiveness – and teachers' confidence in working with it – shaped their engagement with and delivery of the intervention.

The integration of Mātauranga Māori within *Pau te Hau* was interpreted in varied ways across the case study schools. Some teachers embraced the inclusion of pūrākau and te reo Māori, describing these elements as enriching and supportive of bicultural classroom practice. Others, however, identified challenges related to the brevity or delivery of the narratives, noting that longer or more visually engaging pūrākau could enhance student connection and understanding.

Teachers had mixed responses when considering the place of Mātauranga Māori in the programme, despite Te Tiriti o Waitangi being one of the eight principles in the New Zealand Curriculum (Ministry of Education, 2007, p. 9). The use of Māori language is encouraged in all Aotearoa New Zealand schools and some teachers in the *Pau te Hau* programme embraced the opportunity to apply aspects of Mātauranga Māori where they could. Teachers said:

> The intention was good but the story got lost.

> I also loved the the use of Te Reo, that, that the Pau te Hau program included this year.

> Having the pūrākau and the tech made it easier to fit into our planning. It wasn't just exercise – it was part of our learning.

> It was all really, well, user friendly as far as I'm concerned. And it was, yeah engaging for the children and how it set the scene as well. Set the scene with the story, but with the Māori myths and legends set the scene for the weeks' sessions as well.

Some teacher responses regarding the narrative stories (pūrakau) came with solutions as well. For example, teachers provided some feedback for improvements to the videos.

> So I think half the time the kids are not really like as engaged with the stories because it's a lot shorter or it's like bits of the story. So yeah, I think the whole, the thing around It is really cool with the movements and stuff, but I think maybe just a little more extension or a little bit like longer snippets of it and maybe I know that on some of them they have the pictures, but there's not really any like visual for them to like, follow along or for them to be engaged in it for a period of time.

Hauroa is an underlying concept in the Health and Physical Education curriculum (Ministry of Education, 1999). Teachers recognised this four-dimensional concept of wellbeing. One teacher commented:

> I thought it was really good because the videos were each week. And it was like okay, we're doing these movements and this relates to this to do with Māori, which was really cool. So, towards the end, they definitely improved and I thought it was great.

Challenges

Despite strong engagement from the teachers, teachers noted challenges including competing time demands, occasional technical issues with heart rate monitors and student self-consciousness during some movement activities. However, all teachers expressed willingness to use elements of the programme again, particularly given the observed benefits for participation, motivation, and classroom climate.

Time constraints, varying levels of student enthusiasm and the connection with Mātauranga Māori were noted as barriers:

> It was hard to fit it in some weeks, especially with everything else going on. Some kids were less keen, and I needed more support with the tech.

> The students did not settle to watch the story – they wanted to move so this could be improved.

> Just at times, they (the HR monitors) would work one day, the next day, they wouldn't work, or they come on halfway through the activity. And I think just for the kids the lack of motivation that you're oh not again. But once they get it going, yeah, I'm back in! It'd be like that.

> I think even though it is that it's, I think our curriculum is so full on and we've got so many different things that we have to fit in during the day. So it's I think like finding the time and making sure that we can, yeah, do it.

Despite these challenges, all teachers expressed a desire to continue using elements of the programme in future:

> I'd definitely use parts of Pau te Hau again. The kids responded well, and it fits with what we're trying to do in the curriculum.

> The kids had to learn how to do it over and over again, which made them really tired, which was quite nice. And so they kind of had to learn to kind of persevere. So there were different, kind of values, but also just I think they kind of learn something about themselves, some of them who try to keep up and some couldn't. But they kind of had to do it over time. But it does take time to kind of get used to the programme.

> I felt like for me it was a really good way to do fitness. I loved how it brought in, like the myths and legends and it was good for my own learnings, learning a little bit about some Māori myths and legends that maybe I could bring more into the classroom. So I thought that was really cool and just a cool experience to have a go at from way of kind of teaching fitness and yeah, getting the kids excited about that because they loved it.

Discussion

This research examined how generalist teachers interpreted and enacted the *Pau te Hau* programme within school classrooms in Aotearoa New Zealand. The findings shift attention away from intervention 'effects' and towards teachers making sense of the experience along with the pedagogical purposes attributed to classroom-based physical activity. Teachers did not frame *Pau te Hau* as a time-efficient strategy for improving fitness or managing student behaviour.- Rather, they revealed their experiences of the learning environment, which the research team interpreted as practices within a learning ecology. Their experience of *Pau te Hau* demonstrated that a socially and culturally mediated assemblage in which movement, digital technologies, and Indigenous narratives could work together could shape participation, identity, and engagement. This reframing directly challenges dominant health-centric and instrumental discourses surrounding HIIT in schools, which often prioritise physiological outcomes over educational meaning.- -In earlier studies of HIIT intervention programmes undertaken in the United Kingdom (Boddy et al., 2010; Buchan et al., 2012) and through earlier systematic reviews undertaken globally (Costigan et al., 2015; Janssen & LeBlanc,

2010; Metcalf et al., 2012), there is support as well as criticisms for HIIT as an effective health promotion strategy (Kelso et al., 2020; Leahy et al., 2024; Liu et al., 2024; Lubans et al., 2022). One of the core arguments against HIIT is that exercising at an intensity that can lead to feelings of displeasure and lower exercise adherence. However, in the *Pau te Hau* intervention, teachers found generally that the intervention could improve a student's motivation, especially if it had variety, thus fostering their students' enjoyment (Eather et al., 2026).

Drawing on sociocultural theory, learning was understood by teachers as emerging through shared activity, relational engagement and the use of technological tools,all of which contribute to pedagogical practice within a learning ecology. Heart-rate monitors, real-time data displays and app-based videos functioned as mediating artefacts that made effort visible, collective, and negotiable. These tools supported students' self-regulation, agency and leadership, while also reshaping classroom social relations.- Teachers' observations of improved focus and readiness to learn further position movement not as a break from learning but as an integral pedagogical practice that can foster classroom climate and engagement.

A key contribution of this study is showing how Mātauranga Māori functions as a way of knowing and teaching, rather than being treated as an added cultural layer to an otherwise conventional intervention. This was evident in how some of the teachers engaged meaningfully with the pūrākau. They did not skip showing the pūrākau videos to the students at the start of the HIIT session, and instead further emphasised the pūrākau's relationship to the exercises. This suggests that Indigenous narratives can provide purpose, relational depth, and cultural grounding for movement experiences. In these instances, Mātauranga Māori shaped not only what students did, but how they understood movement, wellbeing, and collective participation, all of which align with the pedagogical concepts of saying, doing and relating. However, at the same time, variability in teachers' cultural confidence revealed the persistent structural and professional challenges involved in realising bicultural curriculum commitments within generalist teaching contexts. Digital technologies played a central role in this learning environment. From a sociocultural perspective, they shaped interaction through immediate feedback and shared reference points. While teachers highlighted motivational and pedagogical affordances, they also identified familiar tensions associated with technology in movement practices (Casey et al., 2017), including technical reliability of both heart rate monitors and student self-consciousness during the activity. Most of these barriers were overcome with support from the research team, and all teachers finished the nine-week programme. This duality reinforces critical cautions around educational technology.

Despite the pressures of crowded curricula and implementation constraints, teachers expressed strong willingness to continue using elements of *Pau te Hau*. Their accounts suggest that when HIIT-based interventions are culturally grounded, pedagogically flexible, and theoretically coherent, generalist teachers are not passive implementers but active curriculum makers who adapt movement practices to align with local meanings, values and learning priorities.

Taken together, the teacher findings re-conceptualise classroom HIIT as a relational, culturally responsive pedagogical practice, rather than a fitness intervention. In doing so, the study contributes to debates about the purposes of physical activity in schooling, the role of Indigenous knowledge in curriculum, and the conditions under which movement practices can support holistic, socially situated learning.

Conclusion

This study examined generalist teachers' perceptions of the *Pau te Hau* high-intensity interval training programme within school classrooms in Aotearoa New Zealand. Consistent with the interpretivist, case-study approach underpinning the research, the findings highlight the pedagogical, cultural and relational meanings teachers attributed to the intervention, rather than focusing solely on fitness outcomes. Across the participating schools, teachers interpreted *Pau te Hau* as a meaningful learning experience that supported students' confidence, motivation, and readiness to learn. These interpretations reinforce growing evidence that school-based HIIT, when designed to be engaging and contextually relevant, can contribute positively to children's holistic wellbeing.

In addition, this intervention did more than simply demonstrate how different ecological modalities, including pūrākau, exercise and digital technologies, co-existed within a single site. The findings demonstrated that different practices can co-inhabit and co-exist in a site, demonstrating an interdependence evident in most educational systems (Kemmis et al., 2014). These created affordances that both enabled and constrained teacher pedagogical practice. However, it is important to note that other factors such as overcrowdedness in the curriculum, the complexity of students' needs, adequacy of resourcing, competing educational priorities and the pressure of time could also have influenced how teachers made their pedagogical decisions in the *Pau te Hau* intervention.

A key feature distinguishing *Pau te Hau* from comparable HIIT interventions was its integration of Mātauranga Māori through pūrākau, te reo Māori, and culturally grounded movement activities. Teachers' varied responses to these elements highlight both the potential and the challenges of embedding cultural narratives within short, structured activity sessions. For many, the cultural components enriched the learning experience and aligned naturally with curriculum goals, while others identified missed opportunities for deeper integration. Teacher findings from the *Pau te Hau* intervention echoed the current educational policy and scholarship of the time, emphasising the importance of bicultural and culturally responsive pedagogies across the curriculum. Therefore, this research contributes to a growing body of international Indigenous education literature that advocates for pedagogical approaches grounded in Indigenous knowledges, identities, cultural values, and community self-determination (Battiste, 2013; Bishop et al., 2009; Castagno & Brayboy, 2008; Smith, 2021).

Teachers also emphasised the value of the digital technologies embedded within the intervention. The real-time visualisation of heart rate data served as a powerful motivational tool and supported student agency and self-monitoring – features consistent with sociocultural perspectives that view learning as mediated by tools and shared activity. At the same time, teachers highlighted challenges related to time constraints, technological reliability, and student confidence in performing some movements. Such challenges reflect broader concerns about the sustainability of school-based interventions, particularly those reliant on specialist equipment or additional teacher expertise.

Despite these barriers, all teachers expressed willingness to adopt aspects of the programme again, underscoring its perceived relevance, adaptability and pedagogical value. Their enthusiasm suggests that culturally responsive, technology-supported HIIT programmes can be meaningfully embedded within everyday classroom practice when adequate support, professional learning, and curricular alignment are provided.

Overall, the *Pau te Hau* study contributes to ongoing discussions about how primary schools can foster physical activity, wellbeing and culturally responsive learning within crowded curriculum environments. The findings demonstrate that when interventions are grounded in culturally meaningful content, aligned with the New Zealand Curriculum (Ministry of Education, 2007), and supported through purposeful teacher development, they can enhance student engagement, social cohesion, and holistic learning. Future research should explore how programmes like *Pau te Hau* can be sustained, adapted and scaled across diverse school communities while maintaining cultural integrity and supporting teacher capability.

Contribution to the field

This article advances understanding of how school-based HIIT interventions can be conceptualised and enacted as culturally grounded, socio-culturally mediated learning ecologies, rather than fitness initiatives. It provides an empirical examination of a HIIT programme that integrates Mātauranga Māori, *pūrākau*, and digital technologies, showing how Indigenous knowledge functions not as cultural 'content' but as an epistemic and pedagogical resource that can shape identity, belonging, and holistic wellbeing. Indeed, movement is culturally mediated, and by analysing teacher sense-making (demonstrated by the interdependence of what they said, observed and experienced), the study demonstrates how digital tools and cultural narratives operate as mediating artefacts supporting agency, engagement, and self-regulation. The findings challenge dominant health-centric framings

of HIIT and offer a model for designing movement-based interventions that align with bicultural educational commitments and sociocultural theories of learning. The paper contributes conceptually, empirically, and methodologically to debates on decolonising HPE, technology-supported learning, and the purposes of physical activity in schooling. In addition, further analysis of the *Pau te Hau* student focus group data, presented in a future article, will provide insights into students' perspectives on the success, or otherwise, of HIIT interventions in schools.

Postscript

It is important to note that in New Zealand the current government appears to be undermining the importance of Mātauranga Māori within the revised New Zealand Curriculum. This developing situation speaks to the situatedness of pedagogical moves and how the learning ecology is informed by wider competing political discourses.

Notes

1. Te Tiriti o Waitangi (in English, the Treaty of Waitangi), New Zealand's founding document in 1840, was meant to be a partnership between Māori and the British Crown. *Te Ara Encyclopedia of New Zealand* https://teara.govt.nz.
2. Mātauranga Māori – the body of knowledge originating from Māori ancestors, including the Māori world view and perspectives, Māori creativity and cultural practices (Moorfield, J.C. (2011). *Te Aka Māori-English, English-Māori dictionary and index*. Pearson).
3. Hauora is a Māori philosophy of health unique to Aotearoa New Zealand.
4. Te Whare Tapu Wha is a Māori health model developed by Sir Mason Durie in 1984 based on the concepts of whānau (family/social health), Tinana (physical health), Hinengaro (mental and emotional health) and wairua (spiritual health). This holistic model compares health and wellbeing to a wharenui (meeting house) with four interconnected walls, each representing the dimensions above (Ministry of Education, 1999, p. 31).
5. Kapa haka is a term for Māori performing arts (the literal translation is group dance).

Author contributions

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