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Prep to be PRO – building talent without burning it

An educational programme for specialised
sports schools

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«If I have seen further, it is by standing on the shoulders of giants» - I. Newton

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List of Papers

This dissertation is based on the following original research papers, which are referred to in the text by their Roman numerals:

- I. Heiestad, H., Myklebust, G., Bahr, R., & Moseid, C. H. (2025). Making, not breaking the young, aspiring athlete: the development of Prep to be PRO (Nærmere Best)-a Norwegian school-based educational programme. *BMJ Open Sport & Exercise Medicine*, 11(2).
- II. Heiestad, H., Myklebust, G., Bahr, R., & Moseid, C. H. (2026). Implementing prep to be PRO-bridging the gap between design and delivery. *Journal of Science and Medicine in Sport*.
- III. Heiestad, H., Myklebust, G., Bahr, R., Moseid, C.H. Empowering Young Athletes: An early Evaluation of the Prep to be PRO programme in Norway-Uptake, Delivery and Perceived Value after 18 months. Manuscript submitted and under review.

Abbreviations

<i>IOC</i>	The International Olympic Committee.
<i>RE-AIM</i>	An implementation and evaluation framework encompassing five dimensions: Reach, Effectiveness, Adoption, Implementation, Maintenance.
<i>RE-AIM SSM</i>	RE-AIM Sports Setting Matrix. A context-specific adaptation of the RE-AIM framework for sport settings, designed to capture how interventions are implemented and experienced across relevant levels and actors within organised sport.
<i>REDs</i>	Relative Energy Deficiency in Sport
<i>TRIPP</i>	Translation Research into Injury Prevention Practice. A six-stage framework for sports injury prevention that extends earlier sequence-of-prevention models by emphasising the implementation of preventive measures in real-world contexts.

Summary

Introduction The starting point for this thesis was prior research indicating that young, ambitious athletes may be at increased risk of health- and load-related challenges, including injury, illness, and inadequate recovery. Against this background, Prep to be PRO was developed in close collaboration with Norwegian sports schools as an overall health supportive- and development-oriented programme aimed at strengthening students' capacity to safeguard their own health, make informed decisions, and develop as athletes over time.

Methods The programme was developed and evaluated through a four-year development process from 2019 to 2023. The studies employed a descriptive retrospective design, a mixed methods case study, and questionnaire data, grounded in the TRIPP, RE-AIM SSM, and implementation quality frameworks. The data material included contributions from sports schools, coaches, athletes, school leaders, and other stakeholders through workshops, focus groups, field observations, and survey evaluations.

Main Results The school leaders, coaches and other key stakeholders considered Prep to be PRO relevant, useful, and suitable for implementation in Norwegian sports schools. The programme comprised modules related to performance training, growth and maturation, critical periods, load management, total load, recovery, nutrition, and sport psychology. Key facilitators of implementation were perceived relevance, coach training, leadership anchoring, and feedback systems. Important barriers included limited time and resources, varying levels of coach preparedness, and tensions between standardisation and the need for local adaptations.

Conclusions Overall, the findings indicate that Prep to be PRO provides a relevant, practice-focused framework that supports overall health and athlete development over time in Norwegian sports schools. The programme appears to strengthen students' capacity to safeguard their own health, make informed decisions, and develop as athletes over time. At the same time, the results underscore the importance of sustained implementation support, clear leadership anchoring, involvement of parents and support personnel, and further research on implementation quality and the programme's long-term effects.

Sammendrag (summary in Norwegian)

Introduksjon Utgangspunktet for denne avhandlingen var tidligere forskning som viser at unge, ambisiøse idrettsutøvere kan være særlig utsatt for helse- og belastningsrelaterte utfordringer, inkludert skader, sykdom og utilstrekkelig restitusjon. På bakgrunn av dette ble Prep to be PRO utviklet i tett samarbeid med norske idrettsskoler, som et helsefremmende og utviklingsorientert program, med mål om å styrke elevenes forutsetninger for å ivareta egen helse, ta informerte valg og utvikle seg som utøvere over tid.

Metode Programmet ble utviklet og evaluert gjennom et fireårig utviklingsløp fra 2019 til 2023. Studiene benyttet et deskriptivt retrospektivt design, mixed methods case studie og spørreskjemadata, forankret i TRIPP, RE-AIM SSM og implementeringskvalitetsrammeverk. Datamaterialet omfattet bidrag fra idrettsskoler, trenere, utøvere, skoleledere og øvrige interessenter gjennom workshops, fokusgrupper, feltobservasjoner og spørreskjemaevalueringer.

Hovedresultat Skoleledelsen, trenerne og andre sentrale aktører ved skolen vurderte Prep to be PRO som relevant, nyttig og egnet for implementering i norske idrettsskoler. Programmet omfattet moduler knyttet til prestasjonstrening, vekst og modning, sårbare perioder, treningsplanlegging, totalbelastning, restitusjon, ernæring og idrettspsykologi. Sentrale fremmere for implementering var opplevd relevans, treneropplæring, ledelsesforankring og systemer for tilbakemelding. Viktige barrierer inkluderte begrenset tid og ressurser, varierende trenerberedskap og spenninger mellom standardisering og behovet for lokale tilpasninger.

Konklusjon Samlet indikerer funnene at Prep to be PRO representerer et relevant og praksisnært helsefremmende og utviklingsorientert rammeverk for norske idrettsskoler. Programmet synes å kunne styrke elevenes forutsetninger for å ivareta egen helse, ta informerte valg og utvikle seg som utøvere over tid. Samtidig understreker resultatene betydningen av vedvarende implementeringsstøtte, tydelig ledelsesforankring, involvering av foreldre og støtteapparat samt videre forskning på implementeringskvalitet og programmets langsiktige effekter.

Thesis at a glance

Questions	Methods	Results	Conclusion
How can we contribute to support the development and protect the overall health of young ambitious athletes?	A four-year development period (2019–2023) was examined using a descriptive, retrospective design guided by the TRIPP framework. The Prep to be PRO programme was conducted in close collaboration with schools and involved more than 40 stakeholders, over 100 collaborative meetings, 10 focus groups, and 20 workshops.	The Prep to be PRO programme: Four Sports Junior High School modules included Performance Training, Growth and Maturation, Eat Smart, and Be Aware. Six Sports Academy High School modules consisting of Performance Training+, Load Management, Total Load, Recovery, Nutrition, and Sports Psychology.	The programme appears to represent a notable step forward in the Norwegian sports school' approach, as it may strengthen the focus on overall health, introduce a more individualised approach, and foster long-term athlete development.
Is Prep to be PRO relevant, useful and suitable for national implementation at sports schools? What factors may facilitate or hinder future implementation and integration of Prep to be PRO at sports schools?	Participants included 174 coaches, 986 athletes, and 10 schools. Data were collected through a mixed-methods case study guided by the TRIPP and RE-AIM SSM frameworks and using Durlak & DuPre's eight dimensions of implementation quality as a complementary lens. Outcomes included school administrator and coach workshop evaluations, observational field notes generated through researcher participation, and athlete feedback following an instructional session.	A substantial majority of coaches rated the programme as highly relevant, and most athletes intended to apply the knowledge in daily training and reported increased autonomy and confidence in decision making. Key facilitators were perceived relevance of the content, robust training and support for coaches, engaged school leadership, and systems for feedback and follow-up. Main barriers included limited time and resources, variability in coach readiness, tensions between programme standardisation and local adaptation, and competing institutional priorities.	The programme was perceived by coaches and athletes as relevant, useful and suitable. However, it also highlighted the need for targeted support structures to sustain the programme over time.
How do coaches and athletes evaluate early uptake, delivery, and perceived value of the first 18 months of implementing Prep to be PRO?	Participants included 57 coaches, 1143 athletes, and 20 schools. Data were collected using self-reported questionnaires. Outcomes included programme uptake and delivery, coach perceptions and athlete ratings of the teaching sessions.	Leadership support was rated positively overall. Coaches reported high relevance and perceived that the programme helped athletes make better choices. Athletes also reported positive perceptions of usefulness, relevance, learning, and confidence in making choices. Prep to be PRO demonstrated promising early acceptability and perceived value following national rollout.	Future work and research should further strengthen leadership support, systematically assess implementation quality, recommend a core module dose, involve parents and the wider support system, and provide schools with practical implementation tools.

Introduction

The why – thesis rationale

Specialised sports schools operate within a field of tension between performance-oriented goals and a clear responsibility for the health, safety, and long-term development of children and adolescents. In contexts characterized by early sport specialization, high training loads, and strong expectations from the environment, athletes, and parents, the risk increases that demands may exceed the individual's physical and psychosocial capacities (Bahr, 2014; Visnes & Bahr, 2013; Visnes et al., 2013; von Rosen et al., 2018a). The consequences may range from overuse injuries and persistent pain to reduced motivation, dropout, and negative experiences that may shape one's relationship with sport into adulthood (Martinsen & Sundgot-Borgen, 2013; Moseid et al., 2018; Moseid et al., 2019; Perera et al., 2019; Wik, 2021). Against this backdrop, and informed by previous research, there was a clear need to develop a preventive educational programme that would better equip specialised sports schools to create environments in which young athletes can develop at their own pace, perform, and thrive over time. *Paper I* examines the development process of Prep to be PRO as its central theme.

A fundamental rationale for Prep to be PRO was that injury prevention in sport should be understood not only as individual knowledge, but as competence, culture, and systematic everyday practice (Sæther et al., 2022). Many sport environments demonstrate high professional quality in athletic training itself. However, there is often greater variation in knowledge and shared practice related to injury prevention, recovery, load management, nutrition, sleep, mental health, and safe sport (Sæther et al., 2022). Teacher and coach autonomy is highly valued in the Norwegian school system; however, when responsibility and follow-up become dependent on individuals, quality becomes vulnerable during staff turnover and periods of high workload. Prep to be PRO was therefore developed to embed preventive work through a shared framework and common knowledge base, ensuring that good routines and decisions become a standard part of practice rather than depending on individual staff members. Particularly important was the need for a programme that recognizes sports schools as complex arenas of learning and care, not merely training settings (Utdanningsdirektoratet, n.d.; Virke, 2023). Athletes are influenced by the interaction between training plans, academic demands, the social environment, bodily maturation, and life stressors outside sport (Sæther et al., 2022). In practice, this means that prevention must be both interdisciplinary and relational. Coaches' decisions regarding intensity and volume are closely connected to communication, expectation management, and the ability to detect early

signs of overload or distress. *Paper II* examines how these factors are framed, discussed and situated within the broader school situation.

Another central rationale was to strengthen athlete competence and participation. Prevention rarely succeeds if it is understood solely as “something the coach tells the athlete to do.” Young athletes need knowledge that enable them to interpret bodily signals, understand the relationship between load and recovery, and communicate safely about difficult experiences, pain, stress, and pressure (Bourdon et al., 2017; Jacobsson et al., 2021; Soligard et al., 2016b). In some performance environments, barriers to speak up remain strong: fear of losing one’s place on the team, disappointing the coach or support team, or appearing weak or insufficiently resilient (Chrisman et al., 2013; Cosh et al., 2024). Prep to be PRO was developed to reduce these barriers by normalizing dialogue about load, pain, and mental health, and by positioning athletes as active, knowledgeable participants in their own development. In this way, the programme may contribute to more sustainable performance environments, in which “toughness” or “resilience” is not understood as ignoring warning signs, but rather as the ability to regulate effort and make wise decisions over time.

Furthermore, it was essential to develop a programme that is both feasible and scalable within the everyday realities of specialised sports schools. Many preventive initiatives struggle to achieve sustained uptake and real-world impact because they are time- and resource-intensive, perceived as too generic, or insufficiently adapted to the specific culture, routines and constraints of the training environment (Bolling et al., 2018; Minnig et al., 2022). Prep to be PRO was therefore developed as an educational programme to be integrated into already existing structures: into the school’s annual plans adapted to each specific sport, into coaches’ follow-up of individual athletes and athlete groups, and into collaboration with parents. Such integration is crucial for achieving lasting change, because prevention then becomes part of “the way we do things here,” rather than a side project or yet another addition to an already crowded everyday schedule. Building on the perspective outlined above, *Paper III* evaluates early uptake and perceived value from both the coaches and the athletes.

The development of Prep to be PRO also provides a clear framework for evaluation and knowledge development (Hoffmann et al., 2014; Skivington et al., 2021). Preventive work is often discussed in normative terms as “we should do more”, but without systematic documentation of what changes practice and which mechanisms produce effects. When a programme is explicitly and clearly described, with defined learning objectives and anticipated processes of change, it becomes possible over time to investigate implementation, adherence, and outcomes in a

scientific manner (Hoffmann et al., 2014; Proctor et al., 2011; Skivington et al., 2021). This makes it possible to examine what participants learn, whether the programme influences training practices, injury risk, wellbeing, and whether it leads to changes in practice. It also becomes possible to investigate how contextual factors (such as sport, performance level, resources, and culture) influence how well the programme works (Bolling et al., 2018; Damschroder et al., 2009; Damschroder et al., 2022; Finch, 2011; Finch & Donaldson, 2010). This is particularly relevant in a project in which the aim is to connect practical developmental work with generalizable knowledge that may also prove useful in other contexts.

Together, this highlights the importance of developing Prep to be PRO to address specialised sports schools' need for a preventive, practice-oriented educational programme that builds competence, strengthens a safe sport culture, and empowers athletes to make informed, independent decisions. The topics covered reflect the everyday dilemmas and challenges commonly faced by this age group, as identified through research, clinical practice, and direct conversations. Prep to be PRO represents a structured effort to protect young athletes' health and motivation, not as a compromise with performance, but as a prerequisite for long-term development and, in practice, for becoming "Prep to be PRO."

The overall PhD project is structured around our three papers, each addressing a distinct phase of the intervention's development, implementation, and early evaluation. *Paper I* focus on the development of the intervention, including the rationale, theoretical foundation, and design process. *Paper II* examines the transition from idea to delivery, with particular attention to the factors that facilitated or hindered implementation and may influence future integration into practice. *Paper III* evaluates early uptake and perceived value during the first 18 months, exploring how the intervention was received, used, and experienced by relevant stakeholders.

Background

Are we burning our biggest talents

Youth elite athletes operate at the intersection of athletic development, performance demands, education, growth, maturation, and psychosocial development. This makes sustainable talent development a complex challenge. The question of whether we “are destroying our biggest talents” therefore concerns not only individual injuries, but also how the sport system, including schools, support or undermine long-term athlete health and development (Bahr, 2014).

In sports injury research, the first step is to define the magnitude of the problem in terms of incidence, prevalence, and severity (van Mechelen et al., 1992). For the present project, this foundation was established in Christine Holm Moseid’s PhD thesis, *Injury and illness in youth elite athletes* (Moseid, 2020). Her work showed that health problems are highly prevalent among young athletes in Norwegian elite sports schools: 43% reported a health problem on a weekly basis, and 25% reported a health problem with a substantial negative impact on training and performance (Moseid et al., 2018).

These findings demonstrate that injuries and illnesses are a recurring part of everyday life for youth elite athletes (Asker et al., 2022; Clarsen et al., 2014; Moseid, 2020; von Rosen et al., 2018b). Health problems may affect more than training availability alone; they can also influence performance (Clarsen et al., 2014; Moseid, 2020), learning, motivation, wellbeing, sleep, school functioning, and long-term participation in sport (Moseid et al., 2023; von Rosen et al., 2018b), highlighting the need to understand athlete health as a multidimensional issue shaped by physical, psychological, and social factors.

Moseid et al.’s work (2020) also showed that health problems in this population have complex causes. Although the burden of injury and illness was well documented, single risk factors were difficult to identify. Variables such as early specialisation, single-sport specialisation, performance level, or low physical fitness did not emerge as clear independent predictors (Moseid et al., 2019). This indicates that prevention in youth elite sport should not rely on isolated interventions, but address the broader context of total load, recovery, training culture, communication, expectations, growth and maturation, school demands, and athletes’ ability to recognise and respond to early signs of overload or illness (Sawczuk et al., 2018; Scantlebury et al., 2020; Tee et al., 2020; West et al., 2021; Wik et al., 2021). Although the specific contributing factors remain to be established, these considerations are broadly informed by clinical experience and the current

understanding of athlete health and development. Prep to be PRO was developed aiming to explore underlying mechanisms and contextual challenges in young athletes' daily lives and to provide tools that support a more holistic approach to athlete health through knowledge, reflection, communication, and early preventive action.

Prep to be PRO was developed in response to two key insights. First, it builds on a clearly documented health burden among youth elite athletes (Martinsen & Sundgot-Borgen, 2013; Moseid et al., 2018; von Rosen et al., 2018a). Second, it reflects the recognition that injury and illness prevention in this setting must be holistic, context-sensitive, and practically applicable (Bergeron et al., 2024). The aim was to provide athletes, coaches, and support staff with a shared language and better tools for understanding load, development and overall health.

In this way, Prep to be PRO was a response to the question of whether or not we are “destroying our biggest talents” (Bahr, 2014). The project is grounded in the idea that talent development is not simply about increasing training volume or accelerating performance but about creating conditions that allow young athletes to develop, learn, and perform over time. Overall health is therefore not separate from performance development; it is a fundamental prerequisite for it.

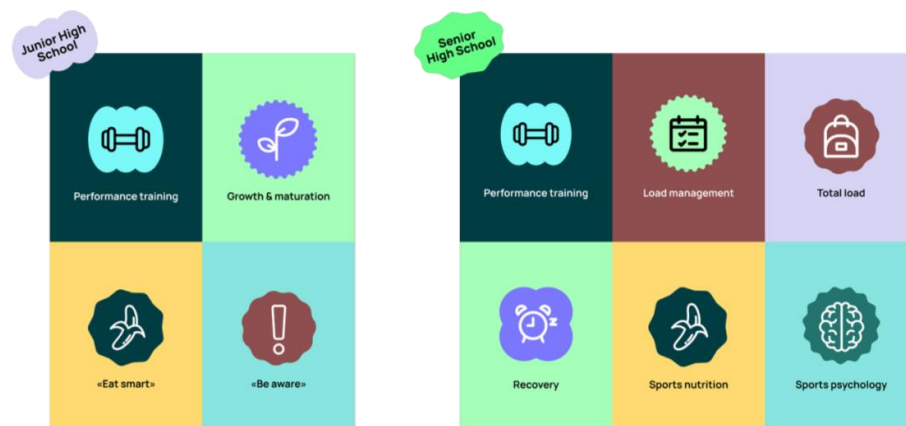
The Prep to be PRO-programme

Developed in collaboration with sports schools, Sunn Idrett, Olympiatoppen, and other relevant experts, the programme intended to promote overall health within youth sport development and performance environments. It consists of ten educational modules adapted to Sports Junior High School and Sports Academy High School athletes, addressing topics such as performance training, growth and maturation, critical periods, nutrition, training planning, total load management, recovery, and mental health (Figure 1). Across these modules, emphasis is placed on long-term athlete development, prevention of injury and illness, self-regulation, balanced training loads, adequate recovery, and informed decision-making. The programme also recognises the important role of parents and other support persons in fostering a positive sport environment, with particular attention to autonomy, enjoyment, effort, social support, and collaboration with coaches and schools.

Each of the modules is constructed on a consistent framework, comprising the module's agenda, the learning objectives addressed, the theoretical foundation, assignments, reflective tasks, video clips, narratives, and interactive elements. Additionally, every module includes group activities, project proposals, and concludes with an evaluation of the module.

Overall, Prep to be PRO aims to provide young athletes and their support networks with knowledge and practical strategies that may contribute to sustainable athletic development, health, and wellbeing during adolescence. The following section provides a brief overview of each module and outlines the theoretical foundation underpinning the development of the modules.

Figure 1. The prep to be PRO modules.



Module 1: Performance training and Module 5: Performance training+

The scientific foundation of the performance training modules is primarily grounded in contemporary models of youth athlete development, in which adolescent performance is understood as a long-term, individualised, and health promoting process. Rather than focusing narrowly on short-term outcomes, the module emphasises the development of physical competence, movement skills, strength, neuromuscular control, and sport-specific capacities in accordance with the athlete's biological maturation, training history, and psychosocial development. International consensus statements on youth athlete development and resistance training support the view that well-supervised and developmentally appropriate training can enhance performance while reducing injury risk (Bergeron et al., 2015; von Rosen & Heijne, 2018). Furthermore, research on integrative neuromuscular training suggests that multifaceted training approaches may improve physical performance and simultaneously contribute to injury prevention in young athletes (Cuthbert et al., 2019; Emery et al., 2015; Lauersen et al., 2014; Raysmith & Drew, 2016; Rössler et al., 2014; Soomro et al., 2016).

Module 2: Growth & maturation

The module focuses on growth and maturation in young athletes, with particular emphasis on how puberty, hormonal changes, the adolescent growth spurt, skeletal and muscular development, brain maturation, and social comparison may influence athletic performance, wellbeing, and injury risk. This aligns with the broader understanding of youth athletic development as a dynamic and non-linear process, in which biological maturation, growth tempo, neuromuscular development, training load, and psychosocial factors interact. A central message is that adolescents mature at different rates, and that coaches and athletes should approach this developmental period with patience, individualised training adaptations, process-oriented goals and adequate recovery, rather than with excessive emphasis on short-term results or comparisons with peers (Bergeron et al., 2015; Malina et al., 2015). The literature highlights that periods of rapid growth may increase vulnerability to certain musculoskeletal injuries, and that growth plates and immature skeletal structures require careful load management in youth sport (Caine et al., 2014). Furthermore, early biological maturation and relative age advantages may be mistaken for superior athletic talent in youth sport selection contexts, underlining the importance of interpreting performance differences with caution during adolescence (Malina et al., 2015).

Module 3: Be aware

The module addresses periods during which young athletes may be particularly vulnerable to illness or injury, especially when rapid changes in training or competition load occur. Such “be aware” periods may include return to sport after holidays, injury, or illness, transition into a new season, increased match or competition frequency, rapid increases in training volume, progression to a higher performance level, puberty, or periods of accelerated growth. These transition phases align with research indicating that injury and illness risk may increase when training loads changes rapidly and athletes have insufficient time for recovery and adaptation (Gabbett, 2016; Jones et al., 2017; Soligard et al., 2016b). The athletes are encouraged to identify their own “Be aware” periods within an annual training calendar, reflect on what makes sport enjoyable, and develop an understanding of why the body requires time to adapt to new or increased physical demands. This is particularly relevant in adolescent athletes, as biological maturation, puberty, and growth spurts may influence load tolerance, movement quality, and injury risk (Bergeron et al., 2015; Towlson et al., 2021). The main educational message is to be patient, plan, and involve coaches and parents. The module emphasizes gradual progression, short-term overview of training sessions, matches, and competition schedules, and the use of a simple training plan or training diary in collaboration with the coach. These strategies align with

recommendations for monitoring training load, supporting gradual return to sport, and avoiding excessive or rapid increases in load (Soligard et al., 2016b).

Module 4: Eat smart and Module 9: Sports nutrition

The overarching message of these modules is that optimal performance and health are founded on adequate energy intake, a varied, nutritious diet, regular meal patterns, and appropriate intake before, during, and after training (Sunn Idrett, n.d.) The modules emphasize that young athletes have higher energy requirements than nonathletes, particularly during periods of high training load, growth, and multiple daily training sessions, and they recommend the use of a “food bag” to support adequate intake throughout the day. The module also cautions against shortcuts such as energy drinks and unnecessary dietary supplements. Energy drinks are not recommended, primarily due to their caffeine content, potential negative effects on sleep, and tendency to mask the body’s physiological signals (Iversen et al., 2018). Dietary supplements are generally not recommended, except for cod liver oil or supplements prescribed following a documented deficiency and under the guidance of a qualified health professional (Helsedirektoratet, 2026).

Module 6: Load management

The central message in this module is that athletic development depends on gradual progression. Athletes must be exposed to sufficient training stimuli to promote adaptation, while avoiding excessive or rapid increases in training load without adequate recovery. The International Olympic Committee (IOC) consensus statement emphasizes that both training and competition load should be prescribed and monitored carefully to reduce the risk of injury and illness (Schwellnus et al., 2016b; Soligard et al., 2016b). Training load is determined by the interaction between intensity, duration, and frequency. The athletes learn that high training loads are not inherently problematic, but injury risk appears to increase particularly when training load is progressed too rapidly, when large fluctuations occur from week to week, or when recovery is insufficient. This is consistent with Gabbett’s “training–injury prevention paradox”, which suggests that appropriately developed chronic training capacity may be protective, whereas sudden spikes in workload are associated with increased injury risk (Gabbett, 2016).

The module further highlights that young athletes may be especially vulnerable during “be aware” periods. In such periods, training should be reintroduced and progressed gradually, with close attention to individual responses and recovery (Soligard et al., 2016b). A central practical tool in the module is the training diary, which can be used to monitor training exposure, provide an overview of weekly and monthly load, support planning and evaluation, and facilitate communication between athlete and coach. Athlete monitoring is widely recommended as a

multidisciplinary process that should include both external load, internal load, wellbeing, and signs of fatigue or injury. Athletes are also introduced to rating of perceived exertion (RPE) as a simple and accessible method for assessing perceived training intensity. The session-RPE method, originally developed as a practical approach to quantify internal training load, combines perceived exertion with session duration, and has been shown to be useful across different sports and training contexts (Wojtaszek, n.d.–a).

Module 7: Total load

The module emphasises that young athletes' health, wellbeing, development and performance are shaped by the cumulative demands of everyday life, including training and competition, schoolwork, sleep, nutrition, social relationships, family circumstances, psychological stress, mobile phone use and social media. The module encourages athletes to identify what drains and restores energy, monitor their weekly time use, make small and realistic adjustments, and communicate honestly with coaches when total load becomes excessive. This is in line with research showing that injury, illness and overtraining risk are influenced not only by training load, but also by recovery, psychological load, athlete wellbeing and broader life stress. Sustainable youth athlete development requires balanced load management, sufficient sleep, adequate recovery and attention to the whole person rather than the athlete alone (Bakken et al., 2018; Bergeron et al., 2015; Schwellnus et al., 2016b; Soligard et al., 2016b).

Module 8, Recovery

The module highlights that training imposes short-term physiological stress on the body, whereas recovery enables adaptation, rebuilding, and the long-term benefits of training. This module covers the physical dimension of recovery by focusing on what occurs between training sessions, particularly the balance between training load and subsequent adaptation. The module places particular emphasis on mental recovery, sleep, and nutrition. Athletes are encouraged to reflect on how they can maintain motivation, persevere through demanding periods, and restore mental energy within a busy school and training schedule. They also learn why sleep is performance-enhancing, how much sleep young athletes typically need, and which routines may contribute to improved sleep quality (Fullagar et al., 2023). Regular recovery practices are especially important for young athletes, as training, school demands, and daily life stressors may interact and influence both performance and wellbeing. Through practical embodied exercises, discussions, and an everyday-life practice assignment, athletes may develop recovery habits and create a personal list of strategies that help them regain energy and restore balance. The overall purpose of the module

is to increase students' awareness that effective training requires not only high-quality practice, but also high-quality recovery.

Module 10: Sports psychology

The module focuses on the psychological demands of combining school, sport, social life, and performance expectations. The module aims to strengthen athletes' self-awareness, resilience, and capacity for adaptive self-regulation, by addressing key topics such as pressure and stress, cognitive and emotional processes, fear of failure, learning from mistakes, social media, mental recovery, sleep, social support, and practical mental skills. Through reflection tasks, discussion, and applied exercises, athletes are encouraged to understand how thoughts, emotions, bodily reactions, and behaviour interact, and how these processes may influence wellbeing, health, injury risk, learning, and sport performance (Reardon et al., 2019). The module's use of After Action Review as a tool for learning from mistakes is supported by organisational learning literature (Mutch et al., 2023). This aligns well with the module's pedagogical aim of reframing mistakes as information for learning rather than as personal failure. The overall purpose is to help young athletes make informed choices, develop healthier coping strategies, and build sustainable routines that support both mental health and long-term performance (Wojtaszek, n.d.–b).

Specialised sports schools

Norwegian specialised sports schools operate within a dual-load context, where athletes simultaneously combine elite sports participation and academic education. These schools differ from regular school by specifically accommodating training, competitions, and academic demands through flexible schedules and close athlete support. Similar systems exist internationally, although they vary across countries. In some countries, such as the United States, youth elite sport is closely integrated into school and collegiate systems, whereas other European countries more commonly organize athlete development through sports academies and club structures. Norwegian research on school-based dual-career development environments shows that athletes' experiences are shaped by academic flexibility and coordination of training loads across school and club settings as well as coach roles and organisational support (Sæther et al., 2022).

Injury prevention in specialised sports schools

Several injury- and illness-prevention measures for young elite athletes are well documented (Bergeron et al., 2015; Emery et al., 2015; Lutz et al., 2024; Steffen et al., 2013). This is particularly the case for neuromuscular warm-up programmes (Lutz et al., 2024; Rössler et al.,

2014; Steffen et al., 2013), systematic load management (Bergeron et al., 2015; Murray, 2017; Sniffen et al., 2022), weekly health monitoring (Clarsen et al., 2014; Moseid et al., 2018), and coach education or coach led prevention strategies (Kempe et al., 2023; Minnig et al., 2022; Norcross et al., 2016; O'Brien & Finch, 2014). Previous research has also emphasised the need to consider young athletes' physical, psychosocial, developmental, and academic demands within a holistic framework (Bergeron et al., 2015; Stambulova & Wylleman, 2019; Thompson et al., 2022). However, to the best of our knowledge, we identified no other well-documented and implemented sports school programme that integrates physical load, psychosocial health, recovery, academic demands, and coach competence within a single coherent model.

This points to a clear gap between evidence and implementation. Although the effects of specific injury prevention measures are well established, these measures are often not applied consistently in practice (Donaldson & Finch, 2013; Finch, 2006; Minnig et al., 2022; O'Brien & Finch, 2014). Contributing factors include limited coach competence, time constraints in daily training environments, insufficient interdisciplinary support, and a tendency for performance outcomes to be prioritised over prevention (Kempe et al., 2023; Minnig et al., 2022; O'Brien & Finch, 2014). Thus, the main challenge is not necessarily to identify additional risk factors, but to develop more effective strategies for translating existing knowledge into sustained practice in school and training environments (Bergeron et al., 2015; Donaldson & Finch, 2013; Finch, 2006).

The literature also shows that injury and illness prevention cannot be understood as a purely physical issue (Tee et al., 2020). Psychosocial factors such as stress, academic pressure, sleep, recovery, wellbeing, and mental health are important for both health and performance (Visnes & Bahr, 2013; Walton et al., 2021). Nevertheless, these factors remain insufficiently integrated into intervention studies. This is particularly relevant in specialised sports schools where young athletes are exposed to a distinctive combination of athletic, academic, and social demands.

Taken together, the literature indicates a need for a more holistic and system-based approach (Thompson et al., 2022). Injury prevention should not be conceptualised as a set of isolated measures, but as an integrated component of long-term athlete development (Tee et al., 2020). Physical load, psychosocial health, recovery, academic demands, previous injury, wellbeing, and coach competence need to be considered in relation to one another. This is consistent with the specialised sports school's literature, long-term athlete development perspectives, and recent International Olympic Committee consensus statements, all of which emphasise safe, sustainable, and holistic development among young elite athletes (Bergeron et al., 2024; Bergeron et al., 2015; Söker et al., 2025).

There are currently few, if any, published intervention studies that directly examine injury prevention and overall health within the specialised sports school’ setting. Hagum et al. (2023) appears to be the most relevant intervention study conducted in this context, as it evaluated a progressive, individualised, and sport-specific training programme among football and handball students during the transition into a sport academy high school. The study reported a reduction in injury prevalence. However, it did not address broader aspects of health or the occurrence of illness.

The wider literature indicates that youth elite athletes enrolled in specialised sports schools experience a substantial overall health burden, including acute injuries, overuse injuries, illness, psychosocial strain, and mental health challenges. However, most existing studies are observational, qualitative, or theoretical in design, and primarily document health needs, risk factors, and conditions for implementation rather than the effects of comprehensive school based interventions. Although school based injury prevention randomised controlled trials, such as those by Foss et al. (2018) and Emery et al. (2020) provide important evidence. These studies were conducted in general school settings and mainly examined injury outcomes. Consequently, their findings cannot be directly applied to youth elite athletes in specialised sports school contexts, where both injury and illness prevention, as well as broader overall health remain under investigated.

Table 1 summarises key empirical studies documenting broader health promotion needs among young elite athletes, particularly in sports school and talent development contexts. The literature presented was identified through a series of sequential and targeted searches conducted between autumn 2024 and spring 2026. Searches were conducted in PubMed, SPORT Discus, and Google Scholar. The search strategy was refined throughout the process as relevant terminology, studies, authors, and research groups were identified. Key search terms included “youth elite athletes,” “adolescent elite athletes,” “sports high school,” “sports academy,” “injury,” “health problems,” “injury risk,” and “injury prevention.” Where relevant, these terms were supplemented with search terms related to training load, sleep, recovery, well-being, and mental health. Search terms were combined using AND and OR and adapted to the requirements of each database.

Studies were considered eligible if they involved young elite athletes or athletes enrolled in sports high schools, sports academies, or comparable talent-development environments, and examined injuries, illness, health problems, risk factors, or relevant health-promoting factors. Studies

focusing on adult recreational athletes, performance outcomes without health-related outcomes, or treatment and rehabilitation without preventive relevance were excluded.

As the searches were conducted at several time points and involved different search terms and combinations, a complete historical search log, including total numbers of records retrieved and screened, is not available. The table should therefore be regarded as a structured overview of relevant studies rather than as a complete or systematic review of the literature.

Table 1. Empirical studies outlining broader health promotion needs among young elite athletes in sports schools.

Study	Country and context	Design and sample	Key findings
Abrahamson et al., 2025	Sweden; adolescent elite/high-school athletes.	One-year prospective cohort study (n=171).	Identified female sex, high training volume, and low sleep duration as risk factors for sports-related injuries, supporting the inclusion of sleep, load monitoring, and individual risk profiling in prevention and health promotion programmes.
Nyhus Hagum et al., 2023	Norway; athletes transitioning into sports academy high school.	Randomised controlled trial in football and handball athletes, 22-week follow-up (n=42).	Progressive and individualised sport-specific training reduced the prevalence of all-complaint injuries after enrolment, highlighting the transition to sports academy high school as a key window for structured preventive support.
Ekenros et al., 2023	Sweden; sports high school	Prospective observational study with adolescent elite athletes starting at sports high school (n=489).	Found supporting evidence of increased injury risk among female adolescent elite athletes after starting sports high school. Previous injury, training volume, and lower wellbeing were identified as relevant risk factors.
Moseid et al., 2023	Norway; sports academy high school context	Longitudinal cohort study of young elite athletes (n=210).	Indicated that accumulated health problems may be associated with psychological strain and symptoms of burnout, supporting a broader health promotion approach that includes recovery, wellbeing, and mental health.
Lundqvist et al., 2023	Sweden; elite sports high schools	Cross-sectional study (n=8).	Showed that the combined demands of adolescence, elite sport, and sports high school may negatively affect mental health, including stress, burnout, depression, and anxiety, strengthening the rationale for psychosocial support in sports schools.
Jacobsson et al., 2023	Sweden; sports-specialised high schools	Qualitative study; focus groups, interviews with youth athletes (n=61).	Explored how sports high school athletes understand injuries and what support they needed, supporting athlete-centred education and co-designed approaches to injury prevention and health management.

Study	Country and context	Design and sample	Key findings
Kampe et al., 2023	Sweden; youth elite sport, sports school-related context	Qualitative interview study (n=10).	Coaches perceived injury prevention as important but reported barriers such as limited time, knowledge, and support, indicating that coach education and interdisciplinary support are central for prevention in practice.
Fridén et al., 2023	Sweden; adolescent elite athletes, sports high school-related context	Longitudinal study, 20 weeks (n=422).	Previous injury, sex, and well-being were associated with different injury profiles, supporting the need for individualised monitoring and targeted preventive strategies.
Nordström et al., 2021	Norway; junior male elite ice hockey players in sports academy high schools	Prospective cohort study, 44 weeks (n=206).	Documented substantial prevalence and burden of health problems, demonstrating the value of weekly health monitoring and the need to address both injuries and illnesses in sports-school settings.
Moseid et al., 2019	Norway; Sport Academy High Schools	Prospective study of youth elite athletes (n=259).	Low physical fitness was not clearly associated with injury and illness rate or severity, suggesting that preventive systems should not rely on physical screening alone but include load, recovery, wellbeing, sleep, and psychosocial context.
Moseid et al., 2018	Norway; Sport Academy High Schools	Prospective cohort study, 6 months. (n=320 youth elite athletes).	At any given time, 43% of athletes reported a health problem and 25% reported a substantial health problem. The total burden was approximately divided between overuse injuries, acute injuries, and illnesses, documenting a high and multifaceted health burden in the target context.
von Rosen et al., 2018a	Sweden; adolescent elite athletes in sports high school-related context	Prospective cohort study, 52 weeks (n=284).	Documented a high weekly injury burden among adolescent elite athletes, supporting long-term surveillance and preventive strategies in adolescent elite sport environments.

Study	Country and context	Design and sample	Key findings
von Rosen et al., 2017	Sweden; Adolescent elite athletes	Prospective study of lifestyle-related risk factors (n=340).	Too little sleep and insufficient adherence to nutritional recommendations were associated with increased risk of sustaining a new injury, supporting the inclusion of sleep, nutrition, and recovery as health promoting components of injury prevention.

While the empirical literature established that young elite athletes experience a substantial and multifaceted health burden, this evidence does not in itself explain how preventive and health promoting initiatives can be successfully integrated into everyday practice. Table 2 provides an overview of main implementation studies that comment on the challenges involved in translating injury prevention and health promoting programmes into practice.

The literature presented in Table 2 was identified through a series of sequential and targeted searches conducted between autumn 2024 and spring 2026, with the final updated search performed on 10 June 2026. Searches were conducted in PubMed, SPORT Discus, and Google Scholar to identify studies addressing the development, implementation, adaptation, and delivery of injury-prevention interventions in youth sport, school sport, and youth elite-sport settings.

Search terms related to youth athletes, injury prevention, neuromuscular training, implementation, adherence, fidelity, feasibility, barriers, facilitators, and coaches were used, together with searches for named programmes such as I-PROTECT, FIFA 11+, and iSPRINT. Reference lists, citation searches, and related-article functions were also used.

Studies were considered relevant if they provided information on implementation, adherence, feasibility, coach involvement, barriers, adaptation, or organisational integration. As a complete historical search strategy and exact record counts could not be reconstructed, Table 2 should be regarded as a structured overview of relevant studies rather than as a complete or systematic review of the literature.

Table 2. Implementation studies addressing the translation of injury prevention and health promoting programmes into practice.

Study	Country and context	Design and sample	Key findings
Nauta et al., 2026	Sports injury prevention, implementation processes during and after effectiveness trials	Study of implementation processes and strategies used in trials and subsequent scale-up. (n=39 authors, 107 papers)	Implementation is often less planned and documented than intervention effectiveness. The study emphasises the need for explicit planning, documentation and sustainability strategies when programmes move from research to ordinary practice.
Gao et al., 2026	ACL injury prevention, neuromuscular training programmes	Systematic review of implementation effectiveness, barriers, and real-world delivery (n=2847 in 13 studies).	Effective neuromuscular training may lose impact if adherence, fidelity and contextual fit are weak. Supports assessing implementation outcomes such as feasibility, acceptability, adoption and sustained delivery.
Lucander et al., 2025	Sweden; Youth handball, I-PROTECT	Qualitative study of coaches' perspectives (n=6).	Coaches must balance injury prevention with time, technical and tactical priorities, athlete motivation and perceived relevance. Highlights the need for implementation strategies that fit coaching routines.
Staes et al., 2025	Belgium; Elite youth team sport school context	Practice-based opinion clinical commentary.	Limited time, resources, staffing and competing performance demands constrain prevention work in elite youth sport schools. Supports pragmatic, resource-sensitive and maturation-aware strategies.

Study	Country and context	Design and sample	Key findings
Ageberg et al., 2024	Sweden; Youth team handball, I-PROTECT	Cluster-RCT protocol combining injury prevention training and implementation support (n=+-3500 in 18 clubs).	Presents a hybrid approach that considers both intervention effects and implementation outcomes. Anticipated challenges include adherence over time, coach role, team-level variation and organisational anchoring.
Kempe et al., 2023	Sweden; Youth elite sport, sports school-related context	Qualitative interview study with coaches (n=10).	Coaches value injury prevention, but experience barriers related to time, knowledge, resources and support. Emphasises coach education, interdisciplinary support and practical integration into daily training.
Barden et al., 2022	England; Schoolboy rugby, Activate injury prevention programme	Qualitative study of coaches' experiences (n=10).	Time pressure, competing priorities, programme length, variable buy-in and adaptation needs affect implementation. Emphasises coach ownership, organisational support and integration into existing warmup routines.
Ageberg et al., 2022	Sweden; Youth team handball, I-PROTECT	Co-creation study involving research and practice stakeholders (n= 11 experts, 7 coaches and 15 players)	Standardised programmes may be less feasible if they do not fit the sport's language, logic, and routines. Strongly supports stakeholder involvement, co-creation and local adaptation.

Study	Country and context	Design and sample	Key findings
Minnig et al., 2022	Organised sport, injury prevention training programmes	Narrative review of barriers and facilitators (23 publications)	Common barriers are limited time, knowledge, motivation, resources and weak integration into training. Key facilitators include coach involvement, education, simplicity, relevance, and adaptation.
Emery et al., 2020	Canada; Canadian junior high schools; iSPRINT	Cluster randomised controlled trial (n=1067 students in 12 schools)	A structured school-based neuromuscular warmup can reduce injuries, especially among female students. Demonstrates school-based feasibility, although transfer to specialised sport schools requires adaptation.
Slauterbeck et al., 2019	USA; US high school teams, FIFA 11+	Cluster randomised trial in high school sport (3611 athletes in 14 high schools)	Found no reduction in lower-extremity injuries, alongside low coach-reported adherence. Illustrates how weak implementation quality can undermine expected effects of evidence-informed programmes.
Foss et al., 2018	USA; US middle/high school athletes	Prospective randomised controlled clinical trial (n=474)	School-based neuromuscular training can reduce sport-related injury incidence. Supports the feasibility of structured warmup programmes in school sport, though not specifically in elite sport schools
Sommerfield et al., 2021	New Zealand; school curriculum context	School-based intervention with adolescent female students (n=103)	Examines a progressive injury-prevention programme embedded in the school curriculum. Provides an example of curriculum-based prevention, although the context differs from specialised sport schools and elite athletes.

Study	Country and context	Design and sample	Key findings
Collard et al., 2010	Netherlands; primary schools	Cluster randomised trial and process evaluation (n=2210 children 10-12 years)	Shows how an injury-prevention programme can be delivered and evaluated within ordinary school systems. Useful as a school-based implementation precedent, but less directly transferable to young elite athletes.

Together, these studies indicate that the success of injury prevention and health promoting programmes depends not only on evidence-informed content, but also on how programmes are introduced, adapted, delivered, and sustained in everyday sport settings. This implementation literature is relevant to the development of Prep to be PRO, supporting the need for stakeholder involvement, feasibility, local adaptation, coach engagement, and integration into the daily routines of young elite athletes in specialised sport school contexts.

From evidence to sustainable practice

A recurring paradox in the literature is that interventions with strong evidence are not necessarily implemented consistently in practice. This gap between research evidence and real-world uptake has been described in sports injury prevention, where effective interventions often fail to achieve broad dissemination, adoption and sustained use in everyday sport settings (Finch, 2006; Hanson et al., 2014). Neuromuscular training programmes have a documented preventive effect on sports injuries, particularly when they include strength, balance, proprioceptive and multi-component training (Emery et al., 2015; Lauersen et al., 2014). In addition, systematic load management is recommended in both empirical research and consensus statements, including monitoring of training and competition load, psychological load, athlete wellbeing and injury/illness risk (Schwellnus et al., 2016b; Soligard et al., 2016b). However, the implementation literature shows that knowledge alone is insufficient; adoption and sustained use depend on behavioural, contextual and organisational factors, including coach engagement, perceived relevance, feasibility, time constraints, confidence, resources and fit with the local sport environment (Bolling et al., 2018; Finch, 2011; Minnig et al., 2022; Verhagen et al., 2010).

Preventive measures must be adapted to the everyday realities of school and training environments, anchored among coaches and support staff, and maintained over time. Young athletes are expected to develop athletically while also managing academic demands, social development, recovery needs, and increasing performance expectations. Injury prevention work should therefore be understood as part of a broader health promoting system in which physical training, load monitoring, psychosocial support, and school organisation are considered together.

In the present thesis, the term overall health is used to capture the multidimensional nature of health in young athletes (Bergeron et al., 2015; Organization, 1995). Within the context of elite sports schools, this concept reflects an established ambition to consider the athlete as a whole person, encompassing physical, mental, emotional, and social dimensions of health (Thompson et al., 2022). Overall health may therefore be understood as a balanced, athlete-centred approach that acknowledges both the performance-oriented and developmental demands placed on young

athletes (Bergeron et al., 2024; Bergeron et al., 2015). It involves a long-term perspective in which the development of sport performance, optimal functioning, wellbeing, and personal growth is pursued alongside systematic efforts to reduce the risk of sports injuries, psychological distress, and other forms of ill health (Schwellnus et al., 2016a; Soligard et al., 2016a). In this sense, Prep to be PRO is positioned not merely as an injury prevention initiative, but as a broader educational and health promoting intervention aimed at equipping young athletes with the knowledge, attitudes, and competencies needed to make informed decisions about their own health and development. By translating evidence-based principles of injury prevention, load management, and athlete health into a coach-driven educational format embedded in everyday sports school practice, Prep to be PRO represents an attempt to bridge the gap between research evidence and sustainable implementation.

To our knowledge, no previous studies have examined whether a coach-driven educational tool implemented in elite sports school settings, across both Sports Junior and Sports Academic high school levels, can improve young athletes' knowledge of and attitudes towards their own health, and, over time, contribute to health promotion and the prevention of physical and mental illness and injury. Moreover, previous research has not investigated whether a coach-driven educational intervention such as Prep to be PRO can support the development of greater athlete autonomy by enhancing knowledge, facilitating learning, and promoting attitude change related specifically to preventive training, but also to the broader range of health promoting behaviours addressed in the Prep to be PRO programme.

The present thesis examines whether a coach-driven educational intervention can function as a feasible and sustainable strategy for integrating health promoting and preventive principles into the everyday practices of elite sports schools. Future research is needed and practice development should place even greater emphasis on implementation qualities: how evidence-based measures can become a stable and sustainable part of everyday practice in sports schools. This requires models that combine evidence-based interventions with practical feasibility, coach education, interdisciplinary collaboration, and continuous monitoring of health, wellbeing, and performance (Guilfoyle et al., 2024).

Implementation science

Implementation science is concerned with understanding and improving the processes through which evidence-based interventions, programmes, and practices are adopted, implemented, sustained, and scaled in real-world settings (Fullan, 2016). Whereas implementation research typically refers to empirical studies of implementation processes, determinants, strategies, and

outcomes, implementation science represents the broader scientific field that develops and applies theories, models, frameworks, and methods to support effective implementation (Nilsen, 2020; Proctor et al., 2011).

Historical and conceptual foundations

Although Rogers's seminal book, *Diffusion of Innovations*, which addresses how innovations spread across different fields, first published in 1962 (Rogers, 2003), implementation research is still considered a young discipline (Flottorp & Aakhus, 2013). The field developed partly in response to the persistent gap between research, policy, and practice: interventions shown to be effective under controlled or well-supported conditions often fail to achieve similar effects when introduced into everyday practice. Early implementation research was influenced by policy studies examining how national intentions and reforms were translated into local action, often demonstrating that implementation "did not go as planned" (Pressman & Wildavsky, 1984). This historical trajectory highlights a central premise of implementation science: the effects of an intervention depend not only on the quality of the intervention itself, but also on how, by whom, under what conditions, and with what support it is implemented. The institutional development of the field is also relatively recent. For example, the first journal dedicated specifically to implementation research, *Implementation Science*, was launched in 2006 (<https://implementationscience.biomedcentral.com/about>). Since then, implementation science has expanded considerably, with increasing emphasis on the use of theoretical frameworks, implementation strategies, process evaluation, and implementation outcomes.

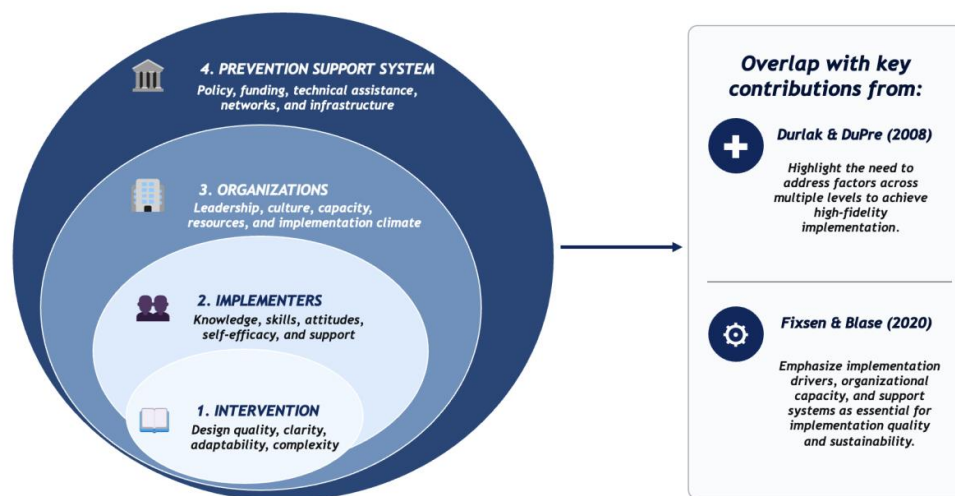
Implementation research has not had a strong tradition in Norway (Flottorp & Aakhus, 2013), although interest in the field has increased over recent decades. In educational and school-based contexts, several influential contributions have emphasized that implementation is a complex, multi-level process shaped by interactions between individuals, organizations, systems, and the wider sociopolitical context (Domitrovich et al., 2008; Durlak & DuPre, 2008).

Implementation as a multilevel process

In their *Conceptual Framework of Factors Affecting Implementation*, Domitrovich et al. (2008) describe implementation quality as being influenced by factors at multiple levels, including factors related to the intervention, the implementers, the organization, and the broader prevention support system. These perspectives overlap with key contributions from Durlak and DuPre (2008) and Fixsen and Blasé (2020), who similarly emphasize that implementation is not a single event, but a dynamic and staged process requiring sufficient capacity, supportive structures, clear planning, leadership, training, coaching, monitoring, and strong organizational anchoring. Strong

organizational conditions and support systems enable implementers to deliver interventions with high quality and increase the likelihood of intended outcomes (Domitrovich et al., 2008; Durlak & DuPre, 2008; Fixsen & Blase, 2020) (Figure 2).

Figure 2. Implementing quality is influenced by factors at multiple levels. (Adapted from Domitrovich et al., 2008; Durlak & DuPre, 2008 and Fixsen & Blasé, 2020)



Implementation quality and sustainable change

A recurring finding across implementation research is that interventions tend to produce smaller effects in real-world contexts than under optimal research conditions (Durlak & DuPre, 2008; Nilsen et al., 2025). Lendrum and Humphrey (2012) for example, note that effectiveness may be substantially reduced when programmes are transferred from controlled research settings to ordinary practice. This suggests that variation in implementation quality is likely to produce variation in outcomes. This is strongly supported by Durlak and DuPre’s review of more than 500 quantitative studies, which found that the level of implementation affects programme outcomes, and by Carroll et al., who argue that without assessing implementation fidelity it is difficult to know whether weak effects reflect poor implementation or weaknesses in the programme itself (Carroll et al., 2007; Durlak & DuPre, 2008). In other words, disappointing programme effects may reflect not only weaknesses in the intervention, but also insufficient

implementation support, limited organizational capacity, inadequate training, low stakeholder engagement, or poor fit with the local context (Durlak & DuPre, 2008; Fixsen & Blase, 2020; Metz et al., 2021).

An important implication is that implementation should not be treated as a technical process of simply delivering a predefined programme (Metz et al., 2021). Rather, implementation involves change. Most implementation efforts are vulnerable to being under-planned, and even systematic approaches may falter when they encounter existing organizational routines, competing demands, or insufficient leadership support (Fixsen & Blase, 2020). Fullan (2016) similarly warns against treating new initiatives as mere “add-ons.” When something new is introduced into a school or sport setting, something else may need to be reduced, reorganized, or removed. Without this kind of prioritization, new initiatives risk becoming superficial, short-lived, or dependent on individual enthusiasts rather than embedded in ordinary practice (Fixsen & Blase, 2020; Fullan & Quinn, 2015; Wolthuis et al., 2022).

Implementing and changing practice within school typically require several years, often 3 to 5 years or more, particularly when the aim is to establish new routines, build competence, and achieve organizational ownership (Fixsen & Blase, 2020; Fullan, 2016). Short-term implementation efforts may lead to initial uptake, but without continued support, monitoring, leadership engagement, and alignment with organizational priorities, programmes may fade over time (Donaldson et al., 2017).

Within sport, injury prevention, and health promotion, there is a growing body of literature addressing implementation. Earlier studies in this area often focused primarily on programme outcomes, such as reduced injury incidence or improved health-related outcomes, while paying less attention to how programmes were implemented in practice. Consequently, there is a clear need for studies that examine not only whether injury prevention and health promotion programmes are effective, but also how they are implemented, what challenges arise, which stakeholders are involved, how contextual adaptations are made, and which mechanisms appear to support sustained use. Such knowledge is essential for bridging the gap between evidence and practice and for ensuring that interventions become embedded in everyday routines rather than remaining temporary, externally driven projects.

Implementation in school and sport settings

In school settings, the implementation of new educational, health promoting, or injury prevention programmes is particularly complex because schools are already characterized by competing priorities, established routines, time constraints, and multiple stakeholder groups.

Implementation may involve coaches, students, athletes, parents, school leadership, and external collaborators. A holistic understanding of implementation therefore requires attention not only to whether a programme is delivered, but also to how it becomes integrated into existing practices, professional roles, and organizational routines. From this perspective, implementation begins with the identification of a concrete need and continues through exploration, preparation, initial implementation, full implementation, and, ideally, establishing long-term sustainable practice (Fixsen & Blase, 2020; Fullan, 2016).

Relevance for the present thesis

For the present thesis, implementation science provides a useful lens for understanding the introduction, delivery, and sustainability of preventive or health promoting initiatives in school and sport contexts. Given the limited number of studies that explicitly describe implementation components in sport-related injury prevention and health promotion programmes, it is important to examine which principles, strategies, and contextual factors may function as key drivers of successful implementation (Finch & Donaldson, 2010). It is equally important to identify the challenges that may hinder implementation, including limited time, insufficient training, weak organizational anchoring, competing priorities, stakeholder resistance, or lack of support. These barriers are repeatedly reported in studies of sport injury prevention programmes, where time and financial burden, lack of coach confidence or knowledge, programme complexity, limited resources, and difficulties integrating interventions into regular training routines are common obstacles to adoption and maintenance (Minnig et al., 2022). This thesis therefore draws on implementation science to move beyond the question of whether an intervention works, and instead addresses how implementation unfolds in practice, under what conditions it is feasible and acceptable, and what may be required to support sustainable change.

Theoretical frameworks underpinning this thesis

In sports medicine research and practice, there is a need for theoretical frameworks that capture the full process from identifying health and injury problems to developing, implementing, and evaluating preventive interventions (Bolling et al., 2018). Sports injuries constitute a significant public health concern and may have considerable consequences for athletes, particularly when they affect health, development, participation, and performance over time (Bergeron et al., 2015). This has led to the development of several theoretical models for prevention and implementation, which have evolved from a basic understanding of injury processes to more comprehensive frameworks that account for the complex realities of sport and sports settings across different populations. No single framework fully addresses all stages of this process.

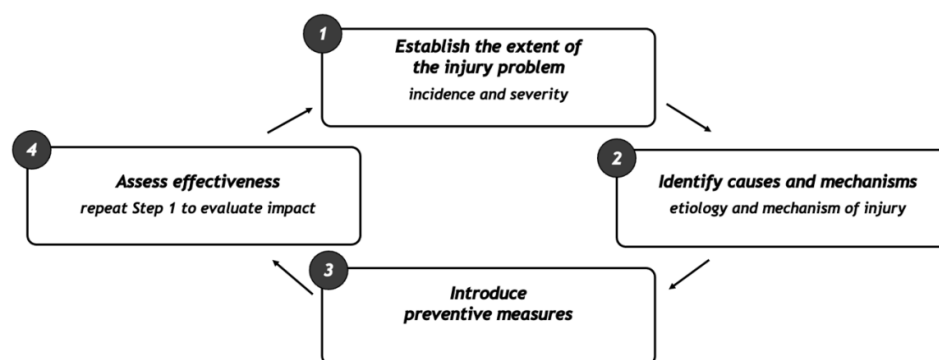
However, taken together, the Sequence of Prevention, TRIPP, RE-AIM, RE-AIM SSM, and Durlak and DuPre's eight dimensions of implementation quality can be understood as complementary and provide a comprehensive basis for analysing how a preventive intervention is developed, introduced, implemented, and sustained in a real life setting for youth elite athletes attending sports schools. Each of these frameworks is described in greater detail below.

The Sequence of Prevention

The Sequence of Prevention framework provides a foundational model for sports injury prevention research (van Mechelen et al., 1992). It outlines injury prevention as a stepwise process in which the researcher first establishes the extent of a health or injury problem, then identifies underlying causes and risk factors, develops an appropriate preventive intervention, and finally evaluates its effectiveness. In youth sports school setting this may involve documenting injury and illness among adolescent athletes, identifying contributory factors such as excessive training load, insufficient recovery, or limited health literacy, and subsequently designing measures intended to reduce injuries.

In relation to Prep to be PRO, this framework helps explain the rationale for the programme's development. The programme can be understood as a response to documented health challenges among young athletes (Moseid, 2020), with the aim of strengthening knowledge, self-regulation, and health-related decision-making to reduce the risk of injury, illness, and overload. However, this framework does not fully account for how preventive interventions are implemented in practice.

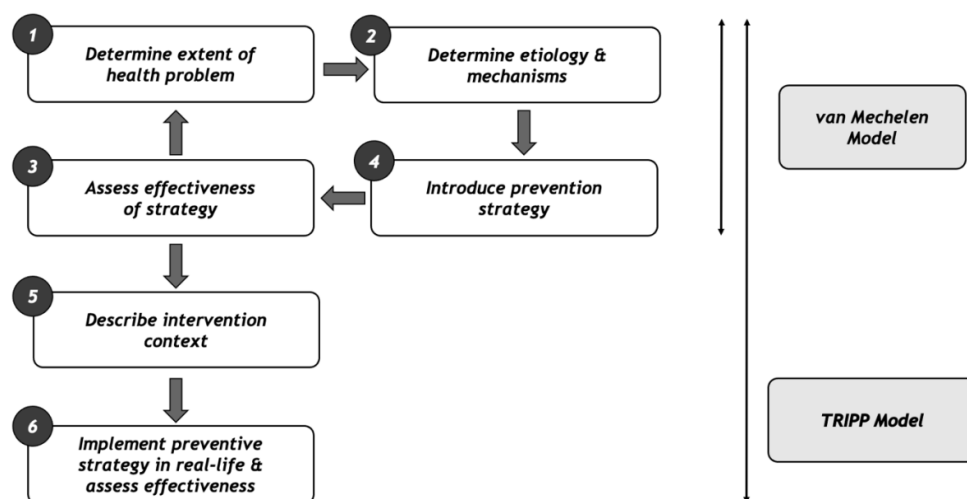
Figure 3. The Sequence of Prevention research model for sports injuries. (Adapted from van Mechelen, 1992)



Translating Research into Injury Prevention Practice (TRIIPP)

While the Sequence of Prevention provides an important basis for understanding intervention development and efficacy testing, it pays less attention to how interventions are translated into real-world practice. To address this limitation, Finch introduced the TRIIPP framework, which builds on van Mechelen's model by adding two further steps: understanding the implementation context and related behaviours and evaluating interventions under real-world conditions (Finch, 2006). TRIIPP is particularly relevant in sports medicine, where interventions shown to be effective under controlled conditions may nevertheless prove difficult to implement in complex everyday environments. The framework underscores that an injury-prevention intervention must not only be theoretically or experimentally effective but also adapted to the intended users and the context in which it will be applied. In the case of Prep to be PRO, a TRIIPP-informed perspective made it necessary to examine how the programme functioned within the realities of school life, training environments, and youth sport. It was therefore not sufficient to evaluate whether the programme content was academically good; it was also necessary to consider whether coaches and athletes perceived the content as relevant, whether it was feasible to deliver in practice, and whether it was appropriately adapted to the context in which it was intended to be used.

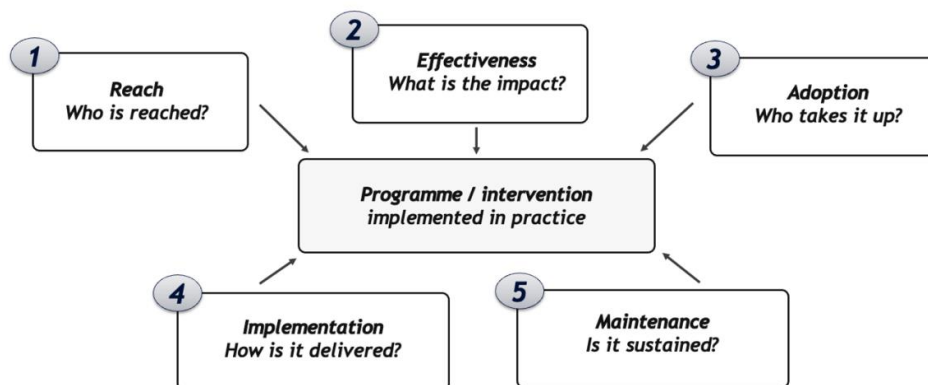
Figure 4. The Sequence of Prevention research model for sports injuries (van Mechelen et al., 1992) and the model of Translating Research into Injury Prevention Practice (the TRIIPP model) (Finch, 2006). (Adapted from Moseid 2020)



Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM)

Whereas Sequence of Prevention and TRIPP mainly illuminate intervention development and translation into practice, RE-AIM provides a framework for evaluating how an intervention functions once it has been adopted (Glasgow et al., 1999). The framework comprises five dimensions: Reach, Effectiveness, Adoption, Implementation, and Maintenance (Figure 5). In sports medicine, this allows for a broader assessment of preventive interventions than effectiveness alone. Applied to Prep to be PRO, *Reach* refers to the extent to which the programme engages its intended target groups, including students, classes, school, and sports environments. *Effectiveness* concerns whether the programme contributes to desired outcomes, such as increased health literacy, improved recovery practices, reduced injury and illness burden, or enhanced robustness among young athletes. *Adoption* addresses the extent to which schools, teachers, and coaches choose to use the programme. *Implementation* concerns whether delivery occurs as intended, with adequate quality and continuity. *Maintenance* refers to whether the programme is sustained over time and becomes integrated into routine practice, rather than disappears after the project period ends. RE-AIM is particularly valuable because it demonstrates that the impact of a preventive intervention depends not only on whether it is effective, but also on whether it reaches its intended audience, is adopted by relevant stakeholders, is implemented with sufficient quality and can be sustained in practice.

Figure 5. The RE-AIM framework. (Adopted from Glasgow et al., 1999)



Reach, Effectiveness, Adoption, Implementation and Maintenance - Sports Setting Matrix (RE-AIM SSM)

In 2010, Finch and Donaldson further developed this implementation-oriented perspective by introducing the RE-AIM Sports Setting Matrix, or RE-AIM SSM (Finch & Donaldson, 2010). This framework adapts the established RE-AIM framework from public health to the sports sector and provides a context-sensitive tool for evaluating the implementation and potential impact of sports-based interventions. RE-AIM SSM emphasises the same five core dimensions as RE-AIM: Reach, Effectiveness, Adoption, Implementation, and Maintenance. However, its contribution lies in applying these dimensions specifically to sports settings, where preventive interventions depend on the interaction between athletes, coaches, clubs, school, organisational structures, and everyday routines. The framework is designed to assist researchers, practitioners, and policymakers in assessing whether an intervention is likely to have an impact on the target population and in identifying the contextual factors that may influence its success.

In sports medicine, this is highly relevant because young athletes' health and injury prevention are shaped by interactions across multiple levels, including the individual athlete, teachers, coaches, school, parents, club culture, and organisational structures. In the context of Prep to be PRO, this means that the programme must be evaluated not only in terms of whether it exists and is delivered, but also in relation to how organisational and social conditions affect its implementation. The same programme may function differently across school settings depending on factors such as leadership support, staff competence, available time, collaboration between educational and sporting contexts or perceived relevance among users. RE-AIM SSM thus highlights that implementation, and outcomes must always be interpreted considering the system and context in which the intervention is embedded.

Durlak and DuPre's eight dimensions of implementation quality

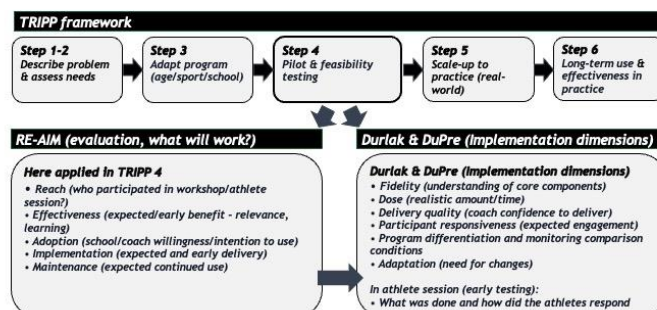
An additional and important perspective is provided by Durlak and DuPre (2008), who focus explicitly on the factors that facilitate or hinder successful implementation. Whereas Sequence of Prevention and TRIPP primarily describe stages in the process, and RE-AIM and RE-AIM SSM primarily support evaluation, Durlak and DuPre offer an explanatory lens for understanding why implementation succeeds or fails. From this perspective, implementation quality is influenced by factors such as organisational capacity, leadership support, staff training, resource availability, user motivation, and the possibility of local adaptation without compromising the core elements of the intervention.

This perspective is particularly relevant to Prep to be PRO, as the effectiveness of an educational programme depends not only on its content, but also on the conditions surrounding its delivery. Even a well-designed programme may be implemented with varying quality depending on whether teachers and coaches possess sufficient competence, whether time is allocated within the curriculum, whether school leadership prioritises the programme, and whether athletes perceive the content as meaningful and relevant. Durlak and DuPre therefore make clear that prevention in sports medicine is shaped not only by the intervention itself, but also by the implementation conditions that surround it.

Durlak and DuPre (2008) outline eight key factors for good implementation. *Fidelity* is how close the delivered program matches the original plan. *Dosage* is the amount and length of time participants engage with the program. *Quality of delivery* refers to how well the program is taught. *Participant responsiveness* measures how engaged and interested participants are. *Program differentiation* ensures the program is clearly different from other offerings. *Monitoring of control/ comparison conditions* means tracking what happens in groups that do not receive the program. *Program reach* is about how many people, and which groups, the program reaches. Finally, *Adaptation* is the ability to adjust the program to local needs without losing its core elements.

Taken together, these frameworks provide a coherent and comprehensive theoretical foundation for this PhD. Based on identified health and injury challenges, they help explain why the programme was developed, how it may be translated into practice, how its implementation and impact can be evaluated, and which contextual and organisational factors influence whether it achieves meaningful and lasting effects on young athletes' overall health and injury prevention.

Figure 6. How we combined TRIPP (step 4), RE-AIM SSM and Durlak & DuPres eight dimensions of implementation quality in the evaluation in the final development phase.



Aims of the thesis

General aim

To document the development and implementation of Prep to be PRO, a national school based educational programme for sports schools in Norway.

Specific aims

Paper I

The aim was to retrospectively document the development process of Prep to be PRO.

Paper II

The aim was to evaluate the final development phase, by exploring early coach and athlete experiences as well as examining what factors that may facilitate or hinder the programme's future implementation and integration into routine practice.

Paper III

The aim was to examine the early uptake, delivery, and perceived value of Prep to be PRO, based on coaches' and athletes' evaluations of the programme during the first 18 months of use.

Methods

Study design

The thesis employed a multiphase, pragmatic study design to examine the development, implementation, and early evaluation of Prep to be PRO. First, the four-year development period from 2019 to 2023 was examined using a descriptive, retrospective design guided by the TRIPP framework (*Paper I*). Second, during the final development and pre-rollout implementation phase, the process of introducing the programme in school was investigated through a mixed-methods case study, in which the TRIPP framework, RE-AIM SSM, and DuPre's eight dimensions of implementation quality provided analytical support. The data material included workshop evaluations, observational field notes generated through researcher participation, and athlete feedback following instructional sessions (*Paper II*). Finally, the first 18 months of national implementation were evaluated using self-reported questionnaires completed by coaches and athletes (*Paper III*). Overall, the thesis combines a retrospective programme description, a mixed-methods case study and an early evaluation study to examine the programme's development, implementation, and perceived value.

Participants

The participants comprised coaches, athletes, school administrators, and other contributors associated with Norwegian sports schools. During the development phase, the programme was developed in close collaboration with the schools and involved more than 40 contributors, over 100 collaborative meetings, 10 focus groups, and 20 workshops (*Paper I*). In the pre-rollout mixed-methods case study, 174 coaches, 986 athletes, and 10 schools participated (*Paper II*). In the evaluation of the first 18 months following national rollout, 57 coaches, 1143 athletes, and 20 schools took part (*Paper III*). Overall, the participant sample provides insight from both those responsible for facilitating and delivering the programme and the young athletes who constituted the target group of the programme.

Data collection & Study procedures

Data collection for *Paper I* was conducted between June 2019 and June 2023. The workshops, questionnaires and fieldnotes data for *Paper II* were collected during the final year of the development, and the evaluations in *Paper III* were collected between August 2023 and December 2024.

Methodologically, the development process described in *Paper I* was conducted as a stepwise and collaborative process. More than 100 meetings, 10 focus groups, and 20 workshops were held with over 40 stakeholders. Meetings were conducted at the Norwegian School of Sport Sciences. The focus groups took place during an early stage of the development process and consisted of two athletes and two coaches in each group. Both the focus groups and workshop sessions were organized at the participating schools and within the local communities. To promote broad and diverse participation, our team travelled to different regions across the country, ensuring representation from schools with varying contexts, settings, and sports. Input from key stakeholders, including school management, coaches, athletes, and external experts, contributed to shaping each module throughout several stages of development. Initial meetings and focus groups informed the early design of the program, while collaboration with Olympiatoppen and specialists in nutrition and sport psychology helped expand the program's content and scope. Feedback from pilot testing, together with input from Olympiatoppen and professionals within nutrition and sport psychology was used to revise and refine the modules. Throughout the whole process, the content of Prep to be PRO was developed and adjusted based on input from relevant user groups and professional experts.

Data collection in *Paper II* and *III* was conducted through self-report questionnaires administered to coaches, school leaders, and athletes in connection with the implementation and evaluation of Prep to be PRO. The questionnaires were developed by the research team and informed by the applied theoretical frameworks, which identified relevant implementation and evaluation domains, but did not prescribe specific questionnaire items. The questionnaires included both structured items and open-ended questions to capture participants' background characteristics and prior knowledge of Skadefri (a well-established national injury-prevention initiative based on a website (www.skadefri.no) and app, on which two Prep to be PRO modules draw content). They also assessed perceptions of the programmes' relevance, usefulness, and content, as well as perceived facilitators and barriers to future implementation. Participants completed the questionnaires online using SurveyXact.

Questionnaire development and pilot testing

In *Paper II*, the questionnaires included background data, such as age, sex, and sport type, as well as items addressing participants' prior awareness of Skadefri and Prep to be PRO. They included questions about what participants valued in the programme, what they perceived to be missing, and how relevant they found the Prep to be PRO modules for athletes (Appendix IX and X). The development of the questionnaires was adapted to the aims and target groups.

In *Paper III*, the self-report questionnaires were revised through linguistic adaptations and adjustments to the number of items to better suit the target population and support feasible administration in school settings. The revised questionnaires were pilot tested with three healthcare workers and two coaches, to assess item clarity and comprehensibility. Pilot testing was also used to ensure that the questions were understandable, neutral, and non-leading (Appendix XI, XII and XIII).

Questionnaire administration

The questionnaires were completed digitally using the participants' own mobile phones. Participants accessed the relevant questionnaire by scanning a QR code, which directed them to the appropriate questionnaire. Time was then allocated during the workshop or teaching setting to allow all participants who wished to respond to complete the questionnaire. This procedure made data collection feasible and efficient within the practical constraints of the school and workshop contexts, while maintaining voluntary participation.

Participation was voluntary, and all responses were anonymized. The questionnaires were modular, all items were optional, and no filter or skip logic was applied. Consequently, the number of respondents varied between questionnaire items.

Coach and school leader questionnaires

The coach questionnaires in *Paper II* addressed demographics, background and coaching experience, teaching-related evaluations, feedback on the modules, perceived athlete outcomes, and perceived implementation factors. Open-ended questions were included to gather feedback on aspects of the programme that coaches and school leaders valued, as well as their perspectives on challenges that could promote or hinder integration of the programme into future practice (Appendix IX).

In *Paper III*, perceived school leadership support was also assessed. Eleven items specifically measured leadership support using the validated Implementation Leadership Scale. Two versions of the coach questionnaire were used: a pre-post module evaluation consisting of 18 items (Appendix XI) and a semester evaluation consisting of 20 items (Appendix XII). Both versions addressed similar domains but differed in timing and structure. The pre-post module evaluation was intended to capture coaches' perceptions in relation to specific instructional modules, whereas the semester evaluation captured broader feedback after coaches had completed one or more modules during the semester.

Athlete questionnaires

The athlete questionnaires in *Paper II* included background variables such as age, sex, and sport type, as well as items designed to assess athletes' prior knowledge, experience, and perceptions of the teaching session (Appendix X). In *Paper III*, the athlete questionnaire consisted of 20 items covering demographics, knowledge of the topic, perceived usefulness of and interest in the modules, and the extent to which the modules increased confidence in decision-making and promoted independence. Different rating scales were used according to the content of the individual items (Appendix XIII).

Adaptation of data collection

During the initial phase of data collection in *Paper III*, school management identified barriers to completing the planned pre-post module evaluation. To maximize response rates and reduce the burden on participants, an alternative semester evaluation was therefore introduced. This enabled participants who had completed instructional modules but had not responded to the pre-post evaluation earlier in the semester to also provide feedback.

Workshop documentation and supplementary field notes

In addition to the questionnaire data, spontaneous discussions and conversations during the workshop sessions were documented in detailed minutes and field notes written by the researchers during and immediately after each workshop. These notes provided contextual information about the data collection setting and captured observations related to interaction, engagement, practical conditions, and implementation-related challenges or facilitators during the sessions. In *Paper II*, quantitative and qualitative analyses were combined. The field notes and open-ended questionnaire responses were analysed using a descriptive, topic-oriented thematic approach. Rather than developing interpretive or conceptual themes, the analysis focused on organizing the material into relevant topics.

In the first stage, one researcher conducted repeated, systematic reviews of all textual data to identify meaningful comments. These comments were then coded into concise, descriptive categories, which were subsequently organized into broader thematic areas reflecting key aspects of the data. In a second step, the final themes were mapped onto the RE-AIM framework and the Durlak and DuPre dimensions. These frameworks were used as complementary lenses for interpreting and reporting implementation-related findings, rather than to guide data collection or the initial coding process.

The material was reread and checked throughout the analysis to reduce the risk of overlooking important content. Although the primary analysis was carried out by one researcher, the emerging categories were discussed within the research team to strengthen the interpretation of the material. To prevent methodological confusion, we clarify that the approach was purely descriptive and exploratory, focusing on what was described in the data rather than on underlying shared meanings.

Quantitative and qualitative data sources

Quantitative questionnaire data

The quantitative questionnaire data make it possible to examine patterns, distributions, and tendencies in participants' evaluations. Through standardized questions, responses can be compared across participants, and the analyses may provide insight into which experiences, assessments, or attitudes appear to be prevalent in the material.

Qualitative open-ended responses and field notes

Quantitative data have limited capacity to explain how participants understand their experiences, or why particular patterns emerge (Bryman, 2006; Creswell & Clark, 2017). For this reason, the qualitative data are central. The open-ended responses allow participants to articulate their experiences, reflections, and evaluations in their own words, thereby helping to nuance and elaborate the quantitative findings (Braun & Clarke, 2006). The researcher's field notes from the workshops further provide access to observations and reflections related to the context of data collection, for example concerning interaction, engagement, practical conditions, and situations that may have influenced participants' experiences (Emerson et al., 2011).

The qualitative data were analysed with the aim of identifying meaningful patterns and themes that illuminate the research questions. The analysis may be understood as a systematic interpretive process in which open-ended responses and field notes are read, coded, and organized thematically (Braun & Clarke, 2006, 2019; Nowell et al., 2017). Transparency and reflexivity were central to this process. This involved accounting for how the material was analysed, how themes were developed, and how the researcher's own perspectives and positionality may have influenced both data collection and interpretation (Berger, 2015; Nowell et al., 2017).

The integration of quantitative and qualitative data occurs by comparing and interpreting findings from the different data sources in relation to one another (Creswell & Clark, 2017; Fetters et al., 2013). The quantitative data provides an overview of tendencies in the material, while the

qualitative data contribute context, elaboration, and possible explanations. In this way, open-ended responses and field notes can help clarify what lies behind patterns in the questionnaire data, while the quantitative findings can indicate which qualitative themes are particularly relevant for further examination (Creswell & Clark, 2017; Fetters et al., 2013).

Within a postpositivist framework, knowledge is understood as something the researcher seeks to develop through systematic and verifiable methodological procedures, while also acknowledging that all knowledge is provisional, situated, and shaped by the researcher's theoretical and methodological choices (Creswell & Creswell, 2017). This means that questionnaire data, open-ended responses, and field notes are all understood as data produced within contexts and frameworks. By combining multiple data sources, and by being transparent about how the data were collected, analysed, and interpreted, the study's credibility and analytical depth are strengthened (Fetters et al., 2013; Nowell et al., 2017).

Overall, the mixed-methods approach used in this thesis makes it possible to examine the research questions in both breadth and depth. The questionnaire data contribute to identifying patterns and tendencies, the open-ended responses provide insight into participants' own experiences and meanings, and the field notes contribute a contextual understanding of the workshops as a research setting. The combination of these data sources thus provides a richer and more nuanced empirical basis for understanding different implementation factors.

[Link to implementation research frameworks](#)

To enhance the analytical relevance of the findings, results were interpreted considering established frameworks in implementation research. In particular, the framework proposed by Durlak and DuPre (Durlak & DuPre, 2008) was used as a lens to understand factors influencing implementation. This framework highlights domains such as characteristics of the intervention, provider characteristics, organizational capacity, and support systems.

The descriptive quantitative findings (e.g., perceived relevance of the programme) may be understood as reflecting key aspects of intervention characteristics, including perceived usefulness and compatibility. The qualitative findings provided complementary insights into implementation processes, including perceived barriers and facilitators related to the delivery context, available resources, and participant engagement.

These findings can also be related to domains described in the Consolidated Framework for Implementation Research (Damschroder et al., 2009), particularly intervention characteristics and inner setting factors. Although this was not applied as an explicit analytical framework in this

study, the findings appear to align with key constructs within the framework. The combined analyses contributed to identifying which aspects of implementation seemed well addressed and which may require further attention in future implementation or scaling efforts.

Ethical considerations

Ethical approvals

The study was conducted in accordance with the World Medical Association Declaration of Helsinki (Association, 2025). The study was approved by the Norwegian Agency for Shared Services in Education and Research (Project no. 628912) (Appendix II) and from the Ethics Committee at the Norwegian School of Sport Sciences (Protocol no. 289-150623) (Appendix III).

Ethical context

The study involved young elite athletes within a sports school context and therefore required ethical attention, especially in relation to the participants' age, their dependence on adult authority figures, and the performance-oriented environment of which they were part. Although the data collection was assessed as minimally burdensome, key ethical considerations were safeguarded through informed consent, voluntariness, confidentiality, and procedures for follow-up if needed.

Participants received written and accessible information about the purpose of the study, what participation entailed, which data were collected, how the data would be processed, and that participation was voluntary. To reduce potential pressure from the school, coaches, or classmates, it was emphasised that participation could be declined without negative consequences, and the data collection was organised in such a way that individual decisions regarding participation were not visible to others. The adolescents' own right to consent or decline participation was emphasised, while age and capacity to consent were assessed in accordance with relevant ethical requirements (Appendix VI). Data were collected directly via SurveyXact. Nonparticipants were removed from the dataset, and results were reported at group level to protect anonymity, particularly in small school and sporting environments.

The schools identified relevant support personnel, such as a school nurse or equivalent, should participants require follow-up. The researcher's responsibility was limited to the collection and analysis of data. However, the project was conducted with an emphasis on integrity, transparency, and respect for the participants' rights, autonomy, and welfare.

Statistical methods

This thesis applied a descriptive design combining quantitative and qualitative approaches to provide an overall assessment of participants' experiences with the programme and to identify factors relevant to its implementation.

Quantitative analysis

The quantitative analysis had a descriptive aim, as the purpose was to provide an overview of participants' evaluations rather than to examine relationships between variables or test hypotheses. This approach is consistent with early-phase implementation research, where the focus is commonly on outcomes such as acceptability, appropriateness, and perceived relevance (Proctor et al., 2011). All variables were treated as categorical and are presented as frequencies (n) and percentages (%). Demographic background variables (e.g. sex, age), as well as outcome variables (e.g., perceived relevance of the programme), were summarized using frequency distributions. Analyses were conducted using the Statistical Package for Social Sciences (SPSS) v.28.

No statistical tests of differences or associations were performed. Accordingly, the findings are not intended to support generalization beyond the study sample but rather to provide a structured overview of response patterns. Such descriptive data may nevertheless inform further development and refinement of the intervention, particularly in the early stages of implementation (Field, 2024).

Missing data were handled by excluding respondents from analyses for variables with incomplete responses (variable-by-variable exclusion). While this approach ensures accurate estimates for each variable, it may influence comparability across variables if the extent of missing data differs (Little & Rubin, 2019).

Qualitative analysis

The qualitative analysis was descriptive and based on field notes and open-ended responses from the evaluation questionnaires. The material was analysed using a topic-oriented thematic approach aimed at identifying and organizing key themes in participants' accounts. The analysis focused on what participants explicitly reported, rather than on interpreting underlying meanings, corresponding to a semantic and descriptive level of thematic analysis (Braun & Clarke, 2006, 2021).

One researcher systematically reviewed the material multiple times to identify and code meaningful units, which were subsequently grouped into broader categories reflecting recurring topics. While the use of a single analyst may enhance consistency in coding, it also introduces a potential limitation related to subjectivity. To strengthen the credibility of the analysis, the material was revisited and cross-checked throughout the process, and emerging categories were discussed within the research team to refine and clarify the categorization.

The analysis was deliberately limited to a descriptive level, focusing on organizing and summarizing participants' experiences rather than developing interpretative or theory-driven insights. Such an approach is particularly suitable when the aim is to identify patterns and practical issues in applied settings (Miles et al., 2014; Saldaña, 2021), but it may capture less depth and complexity in participants' experiences.

Main Results

The following section presents a summary of the main findings from *Papers I–III*. For more detailed information, the reader is referred to the original articles included at the end of this thesis.

Paper I

In *Paper I*, we describe the development of Prep to be PRO. We presented a systematic development process grounded in the TRIPP framework and informed by empirical evidence, expert knowledge, and stakeholder involvement. We developed ten educational modules targeting key determinants of athlete health and performance, including growth and maturation, nutrition, training load, recovery, total load, critical periods, and sport psychology (Figure 1).

The development process was guided by several key principles identified through dialogue between the project group, the multidisciplinary team, and the participating sports schools. A central premise was that the programme should be athlete-centred, but coach-led, with coaches at each school delivering the teaching rather than external speakers, to strengthen coach-athlete relationships and support long-term implementation. To ensure quality and confidence in delivery, the schools emphasized the need for an obligatory training session or workshop before gaining access to the programme. Given the considerable variation in how sports schools structure their annual plans, flexibility was also regarded as essential; the modules therefore needed to function independently and be adaptable to different athlete groups, classes, and time points throughout the school year. Finally, the teaching was intended to be practically applicable beyond the classroom, including in sport-specific settings such as the training field.

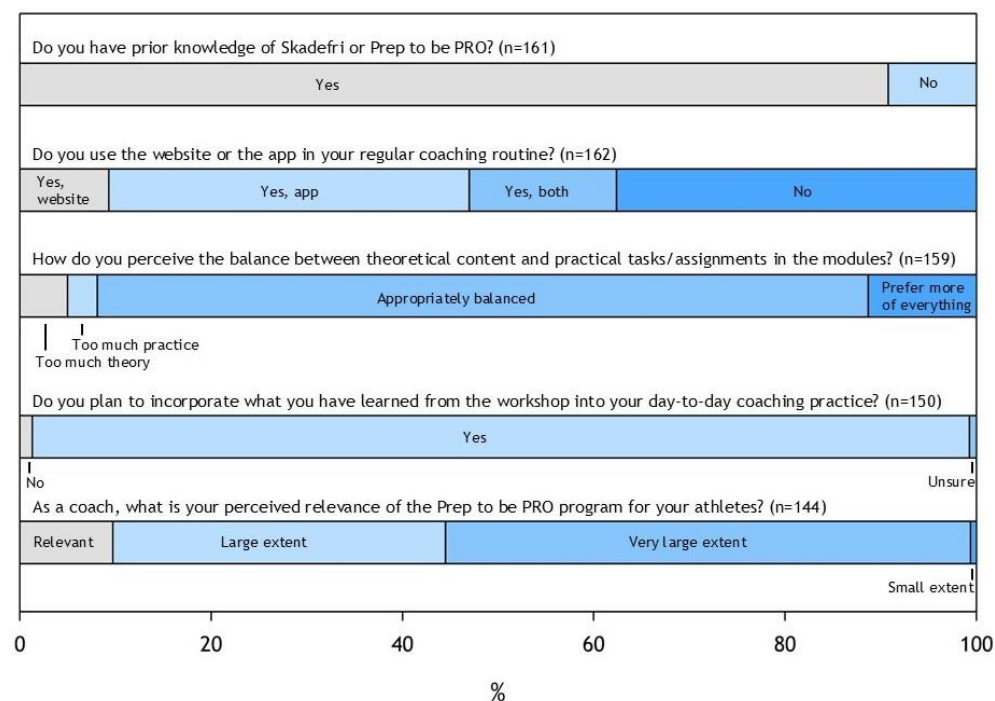
By aligning the content with the Norwegian school curriculum and emphasizing practical, reflective, and interactive learning activities, we aimed to make the programme contextually relevant and feasible for implementation in Norwegian specialised sports schools. Overall, *Paper I* resulted in a theoretically informed and practically oriented programme intended to strengthen the focus on overall health, introduce a more individualised approach, promote sustainable athlete development and reduce the risk of injury, illness, and maladaptive performance pressures in young athletes from age 13-19.

Paper II

In *Paper II*, evaluations were collected from 174 school administrators and coaches and 986 athletes, representing 34 different sports in 10 schools.

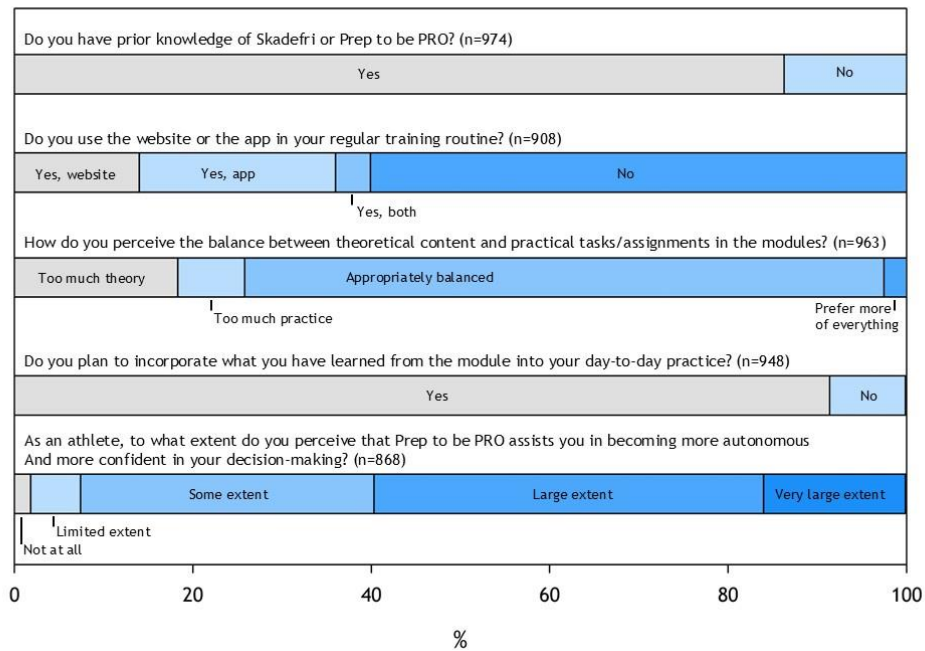
Results showed that most coaches and school leaders were already familiar with Skadefri (injury prevention website and app) or Prep to be PRO. Many of them were already using either the website, the app, or both in their regular coaching routine, they planned to incorporate knowledge from workshop into their coaching-practice, and a substantial majority found Prep to be PRO relevant "to a large or very large extent" (Figure 7).

Figure 7. *Workshop-evaluation by coaches and school leaders (n=174).*



The participating athletes revealed that only a minority of the athletes integrated the website or the app into their regular training routine, whereas the majority judged the modules to strike an appropriate balance between theoretical content and practical assignments. Most participants reported plans to apply the knowledge gained from the program in their daily training routines and felt that it enhanced their autonomy and confidence in decision-making (Figure 8).

Figure 8. Athlete evaluations following a Prep to be PRO module session, representing 31 different sports and 10 schools (n=986).



Overall, the programme was perceived as relevant, practical, and user-friendly, with participants highlighting the value of varied learning methods, theory–practice integration, ready-to-use resources, and opportunities for knowledge sharing across sports. Key facilitators for uptake included perceived relevance of the content, robust training and support for coaches, engaged school leadership, and systems for feedback and follow-up.

Main barriers included limited time and resources, the extensive scope of some modules, variation in coach experience and instructional quality, concerns that some content was too generic or insufficiently adapted to specific sports or athlete groups and competing institutional priorities. Together, our findings suggest that Prep to be PRO was perceived as relevant and had strong potential for adoption and implementation but also highlighting that sustained use require need for purposeful infra structural support.

Paper III

Within 18 months, 20 of 35 eligible schools (57%) adopted the programme. Delivery varied across schools, ranging from one to three modules per semester, with differences in module content and instructional time. Coaches reported high module relevance and perceived that the programme helped athletes make better choices (Table 3).

Table 3. Coach ratings of “Module relevance” indicate perceived relevance of the modules they had delivered to their athletes, while “Enables better choices” indicate a perceived extent to which these Prep to be PRO modules enables athletes to make better choices for themselves.

Response category	Module relevance	Enables better choices
1 (Very low degree)	-	-
2	1 (1.8)	-
3	5 (8.8)	8 (14.0)
4	13 (22.7)	31 (54.4)
5 (Very high degree)	37 (64.9)	18 (31.6)
Missing	1 (1.8)	-
Total (valid)	57 (100)	57 (100)

Note. Ratings were on a 5-point Likert scale (1=very low degree, 5=very high degree). Values are n (%).

Implementation leadership support was rated positively overall, particularly for encouragement and persistence, but lower for planning, clear procedures, barrier removal, and leader knowledge (Table 4).

Table 4. Perceived implementation leadership related to Prep to be PRO.

Item	N	Mean	SD
My leader sustains the implementation of Prep to be PRO in the face of both favourable and unfavourable conditions.	54	3.5	0.7

My leader supports employees' efforts to use Prep to be PRO.	54	3.5	0.8
My leader supports employees' efforts to learn more about Prep to be PRO.	54	3.5	0.6
My leader continues with the implementation of Prep to be PRO despite challenges.	53	3.3	0.8
My leader addresses pressing issues related to the implementation of Prep to be PRO in an open manner.	54	3.2	0.9
My leader acknowledges and appreciates employees' efforts to succeed with the implementation of Prep to be PRO.	53	3.2	0.8
My leader has removed barriers to the implementation of Prep to be PRO.	55	3.0	1.0
My leader has developed a plan to facilitate the implementation of Prep to be PRO.	55	3.0	1.0
My leader knows what he/she is talking about regarding Prep to be PRO.	54	2.9	1.1
My leader is knowledgeable about Prep to be PRO.	55	2.9	0.9
My leader has established a clear procedure for the implementation of Prep to be PRO.	54	2.8	1.1

Athletes also reported positive perceptions of usefulness, relevance, learning, and confidence in making choices, although they were less positive about looking forward to the sessions (Table 5).

Table 5. Athlete ratings of the teaching sessions.

Statement / Item	N	Mean	SD
Knowledge about these modules is useful to me	1129	4.5	0.8
The materials related to the modules will be useful to me in the long term	1092	4.3	0.9
The module instruction is relevant to me	1093	4.3	0.8
What I learned about these topics in the modules is useful in everyday life	1093	4.2	0.8
The module instruction makes me confident in making my own choices that are good for me	1089	4.0	0.9
I have learned something new in these modules	1130	4.0	1.0
What I have learned in these modules will lead to changes in my training routine	1129	3.9	1.0

I enjoyed the instruction in these modules	1095	3.8	0.9
I found the teaching in these modules interesting	1091	3.8	0.9
Prep to be PRO modules makes me more confident in my own choices	1124	3.8	0.9
I have learned a lot from the instruction in these modules	1092	3.7	0.9
The tasks/assignments during the sessions on these modules were interesting	1128	3.6	1.0
Knowledge from these topics will lead to changes in my training routine	1131	3.6	1.0
I looked forward to the instruction in these modules	1092	3.0	1.1
I was mostly bored during instruction in these modules	1095	2.6	1.1
I did not like the instructions in these modules	1091	2.1	1.1

Note. Items rated 1–5 (1=strongly disagree, 5=strongly agree). N varies by item. Values are mean and SD.

Discussion

The young athlete health challenge

Youth elite athletes develop within a demanding landscape in which increasing training and competition requirements coincide with biological growth, pubertal development, school demands, and psychosocial stressors. This makes youth sport a particularly vulnerable context, the same load that is necessary for performance development may also contribute to injury, illness, insufficient recovery, low energy availability, psychological distress, and/or dropout if it is not understood and managed systematically. The IOC has therefore emphasised that the aim of youth sport should not be performance alone, but the development of healthy, capable, and resilient young athletes within safe, sustainable, and developmentally appropriate environments (Bergeron et al., 2024; Bergeron et al., 2015).

This thesis takes that challenge as an important point of departure. Prep to be PRO can be understood as a response to this apparent paradox: young athletes need sufficient challenge to develop, but excessive or poorly coordinated demands may undermine the very health foundation on which long-term performance depends. The programme seeks to support athletes in making better and more informed choices for themselves, but it also aims to build structures around young athletes that make health protective choices more possible in everyday practice. This is particularly important in the sports school's context, where the school functions simultaneously as an educational arena, a training arena, and a developmental environment.

This addresses a fundamental question in sports medicine: how can we support high ambition and long-term athletic development without making health an unacceptable cost of performance? This requires a shift from viewing health and performance as competing priorities to understanding overall health as a prerequisite for sustainable performance development. For young athletes, training volume, competition demands, and performance expectations must be balanced against the need for recovery, nutrition, sleep, psychological safety, and individual development.

We argue that it is not sufficient to develop talented athletes. Sports schools must also develop systems that protect the athletes while they are developing. This aligns with the value base of Norwegian elite sport, where Olympiatoppen has articulated the principle that “health comes before performance,” particularly in relation to nutrition, body, weight, and athlete wellbeing (Øvrebo et al., 2021). This thesis can therefore be understood as a contribution to

operationalising this principle in the sports school's context by examining how young athletes can be supported in pursuing high ambitions and long-term development within structures that protect their health.

The overall contribution

The overall contribution of this thesis lies in describing, implementing, and evaluating a health promoting programme developed specifically for young ambitious athletes in Norwegian sports schools. This distinguishes the work from more narrowly defined injury prevention interventions, as the programme addresses several dimensions of athlete health simultaneously: training load, total load, recovery, nutrition, growth and maturation, psychology, and the ability to make informed and health promoting choices.

A central point is that the thesis does not claim to demonstrate clinical effectiveness. Rather, it establishes a knowledge base for how such a programme can be developed and implemented in practice. The findings indicate that Prep to be PRO is perceived as relevant and useful by both coaches and athletes, but also that sustainable use depends on leadership anchoring, coach competence, implementation support, and adaptation to local context. The contribution is therefore both sports medical and implementation oriented: it shows how medical and health related knowledge can be translated into practical pedagogical work in sports schools.

From purely injury prevention to overall athlete health

Traditionally, much preventive work in sports medicine has focused on specific injuries, isolated risk factors, or discrete training interventions. Prep to be PRO represents a broader perspective by connecting injury and illness prevention to overall athlete health. This is consistent with contemporary sports medicine recommendations, where health is understood as an interaction between physical capacity, load tolerance, recovery, nutrition, mental health, social support, and safe developmental cultures (Bergeron et al., 2015; Schwellnus et al., 2016b; Soligard et al., 2016b).

Prep to be PRO contributes to expanding the concept of health from the absence of injury and illness to include the physical, psychological, and social conditions that enable youth elite athletes to develop over time. In this understanding, overall health is not only about intervening when problems arise but about strengthening the capacity of both the athlete and the environment to identify risk early, make appropriate adjustments, and create conditions that support development.

For the concept of overall health to have concrete meaning in a sports medicine context, it must be linked to key areas such as load management, recovery, energy availability, growth and maturation, psychosocial pressure, and safe communication about symptoms and concerns. This thesis addresses that overall athlete health is not an alternative to performance development; rather, it is a necessary condition for youth elite athletes to perform, tolerate load, and remain in sport over time.

Load management, total load, and recovery as core elements of health protection

Load management is not only about the number of training sessions an athlete completes. It concerns the totality of demands that require physical, psychological, and emotional energy. The IOC consensus statement on load in sport emphasises that training load, competition load, psychological stress, travel, and congested schedules may all influence injury risk, illness risk, and athlete wellbeing. The consensus statement therefore recommends systematic monitoring of physical and psychological load, athlete wellbeing, and early signs of injury and illness (Schwellnus et al., 2016b; Soligard et al., 2016b).

In the sports-school context, this becomes particularly complex because load is not created by one actor alone. The athlete may simultaneously be exposed to school training, club training, individual training, competitions, academic work, social pressure, and insufficient sleep. For this reason, the Prep to be PRO modules addressing load management, total load, and recovery are especially important. They may help establish a shared language for identifying when load becomes inappropriate and when recovery needs to be prioritized. However, this cannot be the athlete's responsibility alone. Competent load management requires coordination and collaboration between the schools, coach, club, parents, and relevant support personnel. Without such coordination, even well-informed athletes may struggle to act on what they know.

Growth, maturation, and individual adaptation

Growth and biological maturation are core concerns in sports medicine for youth elite athletes. Research shows that growth and maturation processes may influence injury risk and injury burden among elite youth athletes, and that adolescents should not be treated as small adults in training planning (Malina et al., 2015; Parry et al., 2024). Young bodies are still developing, and two athletes of the same chronological age may be at very different stages of puberty and biological maturation. Some mature early, whereas others mature later. This may influence strength, speed, coordination, injury risk, confidence, and performance stability.

It is therefore important that both coaches and athletes understand the distinction between chronological age and biological maturation. Chronological age refers to the number of years an athlete has lived. Biological maturation refers to how far the body has progressed in its developmental process. In sport, this distinction can be highly consequential. An early maturing athlete may appear more talented because they are physically more developed, whereas a later maturing athlete may need more time, support, or individual adaptation.

Prep to be PRO may contribute to improved knowledge among coaches and athletes about growth and maturation (e.g. through the module “Growth and Maturation”). In sports schools, athletes are typically organised according to chronological age and school year, even though their biological development may vary considerably. Two athletes of the same age may therefore have different capacities to tolerate training, perform consistently, develop coordination, and manage total load. Knowledge of this variation may make it easier to understand performance fluctuations and adapt training more appropriately. The programme may therefore help correct a weakness in many talent development environments: maturation-related differences are sometimes misinterpreted as differences in talent, willpower, training quality, or motivation. By increasing awareness of these differences, Prep to be PRO may support more patient, individualised, and developmentally appropriate responses to young athletes’ performance and training needs.

A key question is whether the programme provides coaches and athletes with sufficient practical tools to translate knowledge about maturation into concrete choices in everyday training. It is one thing to know that adolescents develop at different rates; it is another to apply this knowledge when planning training volume, intensity, competition participation, and performance expectations. For the programme to have practical value, it should help coaches recognise periods when athletes may be particularly vulnerable, such as during rapid growth, altered coordination, increased fatigue, or recurrent minor injuries. At the same time, it should give athletes a language for understanding bodily changes as a normal part of development, so that temporary performance fluctuations are not interpreted as a lack of talent or effort.

Nutrition, energy availability, and the developing body in young performance environments

The nutrition modules in Prep to be PRO should be understood as sports medicine health interventions, not merely as general nutrition education or performance enhancing dietary advice. The updated IOC consensus statement on Relative Energy Deficiency in Sport describes REDs as a syndrome involving impaired physiological and/or psychological functioning due to low

energy availability and emphasises that it can affect both female and male athletes (Mountjoy et al., 2023).

For young athletes, this is particularly important because energy is required not only for training and competition, but also for growth, maturation, hormonal function, immune function, recovery, and general health. The modules “Eat Smart” and “Nutrition” draw attention to the importance of sufficient and appropriate energy intake during a period in which the body must both develop and tolerate sport specific demands.

At the same time, it is necessary to critically examine how nutrition messages are communicated in performance environments, as the competence, experience, and communication style of those delivering the modules may substantially influence how the content is understood and applied. If nutrition is primarily framed as a tool for performance optimisation, body composition, or control, it may unintentionally contribute to increased body focus, food related stress, and performance pressure. In contrast, appropriately qualified and trained educators may strengthen implementation by communicating the content in a consistent, developmentally appropriate, and health-promoting manner. An important implication is therefore that the Prep to be PRO modules should promote a safe, functional, and health-oriented language about food, body, and energy, supported by clear guidance and training for those responsible for delivery. The central message should be that sufficient nutrition is a prerequisite for recovery, development, health, and long-term performance, not yet another domain in which young athletes are expected to demonstrate control or perfection.

Psychological and social dimensions of athlete health

Mental health is an integral part of athlete health. Many youth elite athletes experience pressure, expectations, disappointment, injury, uncertainty, and comparison with others. These experiences may influence wellbeing, motivation, health, and performance. The IOC consensus statement on mental health in elite athletes emphasises that mental health symptoms and disorders occur among athletes and may affect health, quality of life, and performance (Reardon et al., 2019).

The modules “Be Aware” and “Sports Psychology” may contribute to reflection on pressure, stress, motivation, recovery, self-regulation, vulnerable periods, and situations in which athletes may need additional support. They may also make it easier to talk about challenges before they become too severe. However, mental health is not only an individual responsibility or a matter of individual coping strategies. The culture surrounding the athlete-coach responses, selection pressure, comparison, injury reporting, and expectations from school, club, and parents,

influences how safe it feels to speak up. It is of limited value to teach athletes to communicate concerns if the environment around them does not listen. Coaches, teachers, parents, and teammates must therefore contribute to a culture in which it is safe to be honest about how one is doing. A good performance environment should not only ask, “How did you perform?” but also, “How are you?” Mental health must be understood both individually and structurally: the programme may strengthen the athlete’s reflective competence, but it must also contribute to environments in which prioritising health is legitimate. The coach’s role is not to provide treatment for mental health difficulties, but to foster a psychologically safe environment, identify concerning changes, listen attentively, and facilitate access to appropriate support.

Implementation in sports schools: when knowledge becomes practice

One of the main strengths of the thesis is that it does not merely describe what should be done but investigates how a health promoting programme can be implemented in everyday school practice. The TRIPP framework was developed to reduce the gap between research and practice in injury prevention and emphasises that effective prevention requires knowledge of the implementation context, not only evidence of an intervention’s theoretical efficacy (Finch, 2006).

This is crucial for interpreting the findings. The fact that coaches and athletes perceive the programme as relevant and useful is promising, but it is not sufficient for sustainable use. Durlak and DuPre’s review of implementation research show that implementation level influences programme outcomes, and that contextual factors such as training, support, leadership, and organisational capacity are central to implementation quality (Durlak & DuPre, 2008).

Implementation is therefore not a secondary practical issue, but a precondition for effect. Medical knowledge does not protect athletes unless it is understood, prioritised, enacted, and followed up in practice. A programme may be scientifically sound and based on current knowledge about load, recovery, nutrition, and mental health, yet still have limited impact if coaches lack the time, competence, confidence, or organisational support to use it systematically. Implementation quality therefore becomes decisive for whether the programme influences everyday practice or remains a well-intentioned initiative without lasting significance for youth elite athlete health.

Standardisation, local adaptation, and core components

A central finding of the thesis is the tension between programme standardisation and local adaptation. This is a classic challenge in complex interventions: too much standardisation may reduce local relevance and ownership, whereas too much adaptation may weaken programme integrity and make it unclear what is being implemented. The RE-AIM framework is relevant

here because it emphasises Reach, Effectiveness, Adoption, Implementation, and Maintenance when interventions are evaluated in real-world settings (Glasgow et al., 2019; Glasgow et al., 1999).

An important issue for the further development and scaling of Prep to be PRO is the need to define clearer core components. When the programme is delivered across different schools, coach groups, athlete groups, sports, and organisational structures, it must be clear which elements are necessary for the intervention to retain its professional content and purpose. This may involve defining which modules should be included, which learning objectives athletes should achieve, what minimum dose is recommended, and which routines for follow up, evaluation, and feedback should be in place.

At the same time, such clarification must not make the programme too rigid. Sports schools vary in size, resources, sport profiles, coach competence, and athlete needs, and the programme must be adaptable to local conditions to be perceived as relevant and feasible. Schools should be able to adapt examples, sequencing, sport-specific cases, and pedagogical delivery, provided that the programme's core aims and functions are maintained. A constructive way forward may therefore be to build on the principle of standardised functions but flexible forms: the programme's intended contribution must be clear, while the way each school realises this contribution should remain adaptable to local context.

The coach as a health communicator

The coach has a key role in Prep to be PRO. In practice, the coach translates sports medicine knowledge into everyday decisions. The coach meets the athlete regularly and may be the person best placed to notice when an athlete should train, rest, report symptoms, eat more, adjust load, or seek help. At the same time, the coach may also, consciously or unconsciously, contribute to excessive pressure if performance is always prioritised.

The programme may strengthen the coach role by providing a structured language for health, load, and development. However, even a relevant programme may have limited effect if coaches lack the time, confidence, competence, or organisational support to deliver it well. A key point is that coaches should not be expected to become medical experts, but they need sufficient competence to identify risk, support good choices, and know when an athlete should be referred to appropriate professionals. This has a practical clinical implication: coach education and follow up systems are not merely implementation support; they are part of the health protection mechanism itself.

Athlete health literacy: opportunities and limitations

The athletes in the studies perceived the teaching as useful, relevant, and conducive to learning. This may indicate that the programme can contribute to increased health literacy. In this context, health literacy is not only about possessing knowledge, but about understanding bodily signals, assessing risk, communicating needs, and making informed decisions in a performance context. For a young athlete, this may involve understanding when the body needs rest, why food is important, how sleep affects performance, why total load matters, and when to report pain, stress, or low energy.

However, the interpretation must remain cautious. Perceived usefulness does not necessarily mean that athletes change behaviour over time, or that the risk of injury, illness, or REDs is reduced. The programme may strengthen the conditions for better choices, but choices are always made within a social context. An athlete may know that rest is appropriate, but continue training if the coach, team, school, or selection system rewards constant participation. Health literacy should therefore be understood as necessary but not sufficient. The programme must develop both the athlete's competence and an environment in which healthy choices are practically possible. It should be noted that this study does not provide information about how coaches or the training environment contributed to this.

System responsibility: school, parents, club, and support personnel

Youth elite athletes' health is influenced and shaped by multiple actors simultaneously: school coaches, club coaches, teachers, parents, peers, health professionals, sport organisations, and selection systems. It is therefore not enough to educate athletes alone; the entire system around the athlete must understand what affects their health and development. Contemporary implementation and injury prevention literature increasingly emphasise the importance of involving stakeholders across the socioecological system, including coaches, parents, health professionals, and administrators (Bergeron et al., 2015; Bolling et al., 2018; Donaldson & Finch, 2013; Patterson et al., 2025).

This is especially important regarding total load, which often emerges across arenas. A school may teach recovery and load management, but if the club coach increases training volume, parents do not understand energy needs, or the athlete hides symptoms out of fear of losing selection opportunities, the programme's potential effect is limited. The next phase of Prep to be PRO development should therefore include parents, club coaches, and possibly health

professionals more systematically. This could shift the programme from being a school-based educational intervention to becoming a broader model for coordinated athlete health protection.

Methodological considerations and limitations

Methodologically, this thesis contributes by examining how a complex educational programme was developed, implemented, and evaluated in its early phase. The thesis combines a retrospective programme description, a mixed-methods case study, and questionnaire data. This makes it possible to gain insight into several aspects of Prep to be PRO: how the programme was developed, how it was received, and which factors facilitated or hindered implementation. This aligns well with recommendations from implementation research, where context, process, adoption, delivery, and maintenance are essential for understanding whether an intervention has the potential to influence real-world practice (Glasgow et al., 1999; Moore et al., 2015).

By using both quantitative and qualitative data in *Paper II*, the study gained a broader and more nuanced data basis than it would have had with only one method, as a mixed-methods case study allows different types of data to contribute different forms of knowledge (Gibson, 2017; Plano Clark, 2017). The quantitative data contributed overview, structure, and the opportunity to identify overarching patterns in participants' responses (Creswell & Creswell, 2017; Fowler Jr, 2013). At the same time, the qualitative data, including workshop documentation and supplementary field notes, provided more detailed knowledge about participants' experiences and the context in which the programme was to be implemented.

In *Paper III* we adapted the data collection. The original planned pre-post design, in which participants were intended to respond before and after specific modules, was changed to also include a semester evaluation. This means that participants assessed the programme more retrospectively, based on their overall experiences across the modules. Such an approach may have influenced the data, as responses may have been shaped by recall bias, experiences accumulated over time, or a more general impression of the programme. At the same time, the semester evaluation strengthened the breadth of the data by including participants who otherwise would not have been represented in the data collection. This adaptation can therefore be understood as a pragmatic methodological adjustment that increased the feasibility of data collection and strengthened participant representation, while reducing the precision of the originally planned pre-post comparisons. Overall, this shows how methodological choices in practice often involve balancing precision, feasibility, and the aim of capturing participants' experiences in a real educational context.

The studies have several limitations that must be considered when interpreting the findings. First, the findings should be understood as evidence of programme development, feasibility, acceptability, perceived relevance, and early implementation potential, rather than as evidence of clinical effectiveness.

Second, the studies rely largely on self-reported data from coaches and athletes. Such data are valuable for understanding experiences and perceived usefulness, but they may be influenced by social desirability, positive response bias, recall bias, or participants' wish to support the programme. Perceived usefulness should therefore not be interpreted as evidence of actual behavioural change.

Third, the timing of evaluation may mainly capture immediate impressions rather than sustained learning, behaviour change, or long-term integration into practice. Follow up over time is needed to determine whether knowledge from the programme is retained and used in everyday training and decision making.

Fourth, the absence of a control or comparison group limits the ability to attribute observed perceptions or changes directly to Prep to be PRO. Other factors, such as school culture, coach development, maturation, or parallel health initiatives, may also have influenced the findings.

Fifth, the real-world sports school setting creates both strength and complexity. Variation in leadership support, coach competence, available time, school routines, sport type, and student needs may have affected how the programme was delivered and received. This limits the ability to separate programme content from implementation context.

Sixth, implementation fidelity and local adaptations may not have been fully captured. If schools and coaches delivered the programme differently, participants may not have received the same intervention. This makes it difficult to determine which components were most important and how the programme should be replicated or scaled.

Seventh, the broad and holistic scope of the programme is both a strength and a limitation. Because Prep to be PRO addresses load, recovery, nutrition, growth and maturation, psychology, and decision making, it may be difficult to identify which components drive change. Some complex topics may also require more depth, repetition, and follow up than a single module can provide.

Eighth, transferability may be limited. The programme was developed in Norwegian sports schools, a specific educational and sports context. Findings may not apply directly to other countries, clubs, academies, or more performance driven environments without adaptation.

Ninth, the thesis may not fully capture variation between athletes. Age, sex, gender, maturation status, sport type, previous injury experience, and performance level may influence how athletes understand and use the programme. Future research should examine whether different groups require different pedagogical approaches or programme adaptations.

Tenth, Prep to be PRO depends heavily on coaches and the wider support system. Coaches are key health communicators, but their ability to deliver the programme depends on time, competence, confidence, and organisational support. In addition, parents, club coaches, health personnel, and school leadership were not necessarily captured sufficiently, even though they strongly influence youth elite athletes' total load and health related decisions.

Finally, the programme may increase awareness without ensuring action unless clear follow up routines are in place. For example, schools need procedures for responding to persistent pain, fatigue, suspected REDs, psychological distress, or other health concerns. Without such systems, the programme may improve knowledge but have limited practical impact.

These limitations do not undermine the relevance of the programme, but they clarify what the present studies can and cannot conclude.

Practical and clinical implications

For sports schools, the findings imply that a health promoting programme such as Prep to be PRO must be integrated into annual plans, coach meetings, athlete follow up routines, and leadership structures. It must become part of the school's ordinary work rather than an isolated educational initiative.

For coaches, the findings indicate a need for training, ready-to-use teaching resources, guidance, feedback systems, and follow up procedures. Coaches also need clear routines for what to do if they become concerned about an athlete.

For sports medicine personnel, the Prep to be PRO offers an opportunity to work more preventively through collaboration with schools before problems develop into clinical injuries or illness conditions.

Prep to be PRO may contribute to earlier identification of risk. If athletes, coaches, and school leaders develop a shared language around total load, energy availability, recovery, growth and maturation, and mental health, concerns may be identified earlier and referred onwards when needed. This is consistent with contemporary sports medicine, where prevention, early identification, and interdisciplinary collaboration are central principles. However, this requires

clear procedures. Who follows up an athlete reporting persistent pain or fatigue? Who assesses suspected REDs? Who is contacted when there are mental health concerns? Without such routines, the programme may increase awareness without ensuring action when action is required.

Conclusions

Overall, this thesis demonstrates that supporting the development and protecting the overall health of young ambitious athletes require a holistic understanding and approach. Knowledge related to training load, recovery, nutrition, growth and maturation, and mental health should be embedded within the structures, practices and relationships surrounding the athlete.

In the sports school's context, the findings indicate that Prep to be PRO is relevant and useful and has potential for broader implementation across sports schools. The programme provided a structured framework for translating health-related knowledge into practice and was perceived to address topics of importance to both athletes and coaches. However, its suitability for national implementation depends on sufficient flexibility for local adaptation, clear organisational responsibility, adequate resources, and integration into existing school and training practices.

Factors that may facilitate future implementation include strong leadership support, coach involvement, clear roles and responsibilities, practical and adaptable content, and integration into established routines. Potential barriers include competing priorities, limited time and resources, inconsistent delivery, and variation in coaches' engagement and competence.

The early implementation of Prep to be PRO was generally perceived as valuable, although uptake and delivery varied across settings and over time. Coaches and athletes highlighted the relevance of the programme content, while also indicating that its value depended on how consistently the programme was delivered, how actively coaches engaged with it, and how well it was adapted to athletes' needs and everyday sporting contexts.

Altogether, the findings indicate that the programme's potential does not lie primarily in the modules alone, but in the quality of implementation, the role of the coach, the school's priorities, and the ability of the support system to create a culture in which overall health can genuinely be prioritised. The most important contribution of this thesis is therefore likely its demonstration that health protection in youth sport cannot be left to the athlete alone but must be built into the system around the athlete. Ultimately, the challenge is to develop talented youth elite athletes without exhausting, harming, or burning out the individuals who carry that talent.

Future perspectives / Future research

Future research should build on the Prep to be PRO project by examining whether the programme influences athlete health and development over time. Although the present findings provide a solid foundation, they primarily document perceived usefulness and early acceptability rather than objective or clinical effects. Future studies should therefore include longer follow-up periods, stronger study designs, clearer measures of implementation, broader stakeholder involvement, and objective or clinical outcome data. Relevant outcomes include injury incidence and burden, illness incidence, sleep, recovery, energy availability, REDs-related indicators, mental health, dropout, training participation, and long-term performance development.

An important next step is to examine how implementation quality relates to athlete outcomes. Future studies should investigate whether schools that deliver more modules, provide more coach education, demonstrate stronger leadership anchoring, and conduct more systematic follow-up achieve better health and learning outcomes than schools with lower implementation levels. This aligns with both TRIPP and RE-AIM, which emphasise that real-world programme effects cannot be understood without considering implementation, reach, adoption, and maintenance.

Future research should also explore which components of the programme are most effective, for whom, and under what conditions. Different age groups, sexes, sports, maturation stages, and school types may have different needs. Research should therefore move beyond asking whether the programme works, and instead examine for whom it works, through which mechanisms, under which conditions, and at what dose.

Continued implementation and development of the programme across schools is also important. As part of this process, a planned programme revision will invite input from relevant stakeholders, with particular emphasis on the perspectives of the schools themselves. This collaborative approach may help ensure that the programme continues to evolve in accordance with the needs, priorities, and everyday realities of the settings in which it is delivered.

A further direction for development is the creation of dedicated parent packages. Parents are an important source of support for young athletes, but may also, intentionally or unintentionally, contribute to pressure and stress. Engaging parents as informed allies, rather than positioning them as passive bystanders, therefore appears both appropriate and valuable. This ongoing work is being carried out in close collaboration with Olympiatoppen, the Norwegian Olympic and

Paralympic Committee and Confederation of Sports, Sunn Idrett, and the specialised sports schools.

Overall, despite some methodological limitations, this thesis suggests that Prep to be PRO provides a promising foundation for future research and continued development in the field of youth elite athlete health promotion in specialised sports school settings.

“Knowledge is of no value unless you put it into practice” – A. Tjekhov

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Article I-III

Making, not breaking the young, aspiring athlete: the development of Prep to be PRO (Nærmere Best) – a Norwegian school-based educational programme

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ABSTRACT

Background The most talented young athletes often face challenges related to sports health problems (ie, injury and illness), largely due to inappropriate training, condensed competition schedules and high demands. Previous preventive measures in Norway have lacked successful integration into young athletes' routines, highlighting the need for a systematic approach to safeguarding their health.

Objective To document the development of Prep to be PRO, an educational module-based programme, designed to support the development and protect the health of young athletes enrolled in sports junior high schools and sports academy high schools. Prep to be PRO aims to empower athletes with the relevant knowledge and skills to prevent health problems.

Methods The development process, guided by the Translating Research into Injury Prevention Practice framework, involved extensive collaboration with school leaders, coaches and athletes. From June 2019 to June 2023, the process incorporated multidisciplinary input from more than 40 stakeholders, including health personnel, as well as experts in sports science, nutrition and sports psychology.

Results Prep to be PRO consists of 10 modules tailored for both sports Junior high schools and sports academy high schools. The modules cover a range of topics, including performance training, growth and maturation, load progression, recovery, total load, nutrition and sports psychology. The programme is athlete-centred, but coach-driven, including student-active approaches, collaboration, use of digital tools and deep learning. Prep to be PRO is anchored in the National High School Curriculum, ensuring relevance and alignment with educational standards. Specific competence goals and learning objectives from the curriculum are addressed and linked to each individual module.

Conclusions This educational programme appears to be a notable step forward in the Norwegian sports school's approach. Specifically, it may enhance the focus on overall health, introduce an individualised approach and foster long-term athlete development. The integration into the national curriculum and the involvement of school staff in its delivery is expected to facilitate implementation. Future work will focus on the next phases of implementation, as systematic data collection from coaches and athletes,

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The most talented young athletes often face challenges related to sports health problems, largely due to inappropriate training, condensed competition schedules and high demands. Previous preventive measures in Norway have lacked successful integration into young athletes' routines, highlighting the need for a systematic approach to safeguarding their health.

WHAT THIS STUDY ADDS

⇒ Our mission was to develop and implement a national school-based educational programme. To our knowledge, this is the first programme in Scandinavia, addressing such a holistic approach to young athlete health provided by their school coaches. The main target group of Prep to be PRO is sports school coaches and the young athletes they train, with the overarching aim of fostering resilience and robustness among these athletes.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This educational programme appears to be a notable step forward in the Norwegian sports school's approach, potentially enhancing its focus on overall health, an individualised approach and long-term athlete development. The integration into the national curriculum and the involvement of school staff in its delivery is expected to facilitate implementation.
⇒ While this study already focuses on implementation, future work and research will build on these findings by continuing to explore ways to facilitate smooth implementation and identify barriers that may arise and focus on long-term sustainability.

ongoing stakeholder engagement, continuous adaptation and support for educators to ensure fidelity and relevance. Updates and analyses from all evaluations will examine the programme's effectiveness. Long-term sustainability will be secured by organisational commitment, resource alignment and integrating the initiative into existing structures.



INTRODUCTION

The careers of young, aspiring athletes are challenged by health problems, in many cases caused by inappropriate training, competition schedule, high demands, stress and pressure.¹ The top talents are at particular risk; they run faster, throw harder and jump higher and are more likely to be given more opportunities to train and compete, often with older teammates and opponents.² Not only is each step, throw or jump associated with greater load, but there may be many more of them. These athletes often have to relate to several coaches, for the school team, the various club teams (a 16-year-old may play for the U-17 and U-19 team, and senior teams) and even more for those selected for regional or national squads.³

At the same time, more professionalised youth development programmes are established globally, some organised as sports academies, typically in sports like football, tennis and gymnastics, and others as school-based programmes with athletes from multiple sports. In Scandinavia, the sports academy high school model is common, providing a college-preparatory educational programme, where young athletes combine school-based training in the morning with club-based training after school and on weekends.

Sports academy high schools have grown substantially in Norway during the last decade.⁴ The Ministry of Education has given Olympiatoppen (the Norwegian Olympic Training Center) the responsibility of ensuring the quality of the sports programmes at these schools. Despite having no formal role in the Norwegian sports model, sports academy high schools are recognised as an important resource to ensure diversity in Norwegian elite sports.⁴ The Independent School Law, which was introduced in 2015, allowed junior high schools to apply for approval as sports schools.⁵ Today, there are 18 sports junior high schools (ages 13–16, 3445 athletes) and 18 sports academy high schools (ages 16–19, 4198 athletes) in Norway.⁶

The guidelines from the Directorate for Education for the curriculum state that ‘elite sports’ are offered as a separate programme subject at sport academy high schools, consisting of 140 hours per year for 3 years. The main curriculum components of the elite sport programmes include training planning, basic training, skill development in sports, as well as interdisciplinary topics like public health and life skills. The curriculum requires that elite sport programmes involve systematic and targeted training to increase athlete awareness of their development, acquiring skills, knowledge and attitudes promoting long-term thinking while achieving mastery in their sport over time. The programme encourages athletes to be inquisitive, innovative and investigative while exploring their sport and various training methods, and through this maintaining sport enjoyment.⁷ In junior sport high schools, there is also a specialised school programme, ‘Development of Young Athletes’, comprising 285 hours over the course of 3 years.

The primary aim for schools is to tailor individual follow-up both athletically and academically. In addition to teachers and coaches, some schools have employed various specialists such as physiotherapists, mental trainers, and nutrition experts, and the coach-athlete relationship has been shown to be particularly important for enhancing athletic performance, fostering personal development and promoting overall well-being.^{4,8}

However, despite these benefits, recent studies indicate that health problems represent a grave concern among athletes enrolled in these programmes.^{9–16} Martinsen and Sundgot-Borgen¹⁶ studied the mental health of elite athletes, focusing on the prevalence of eating disorders. They found that young athletes were at a higher risk of developing eating disorders compared with non-athletes. Moseid *et al*¹⁷ reported a weekly injury and illness prevalence of 43% among young athletes, while Materne *et al*¹⁵ demonstrated that each squad of 25 players at one youth football academy averaged 30 injuries per season, resulting in 23 days lost on average. In sum, it appears that the combination of physical demands, rapid improvement in performance and high ambitions, during a vulnerable period of physical growth and maturation, makes these young athletes particularly vulnerable to health problems.^{18–20}

The solution—how to protect the health of the young, aspiring athlete—remains elusive. Previous initiatives in Norway have largely been of limited duration, focused on one factor only (eg, nutrition, mental health) and delivered by external speakers. Therefore, in close collaboration with school leaders and coaches at sports academy high schools, we created Prep to be PRO, as an educational programme specifically designed to empower young athletes to better manage their own health and development.

The aim of this descriptive paper is to document the development process of Prep to be PRO. It outlines how the Translating Research into Injury Prevention Practice (TRIIP) framework was used, as well as how stakeholders across all levels got actively involved and contributed to the development process. We also provide a more detailed description of each individual module along with how the programme addresses national curriculum requirements, and finally, we recount some of the experiences developing Prep to be PRO.

THE DEVELOPMENT PROCESS

To plan and develop the programme, we used the TRIIP framework,²¹ with a focus on involving programme implementers (school leaders and coaches) and end-users (athletes) (table 1). This article covers steps 1–3, while steps 4–6 will be detailed in subsequent studies. We selected the TRIIP framework due to its comprehensive and systematic approach, which spans from problem identification to intervention evaluation. It translates empirical findings into context-specific solutions and bridges the gap between theory and practice in sports. TRIIP has been extensively validated in the

Table 1 The TRIPP framework used in the development of Prep to be PRO		
TRIPP	Step	Description
Problem identification and monitoring	1	The study ‘Injury and illness in young athletes’ monitored common injuries and collected data on injury types, frequency and severity among students at Sports Academy High Schools in the school year 2014/2015. ⁹
Identification of risk factors and injury mechanisms	2	Two researchers (CHM and GM) analysed the identified injuries to understand the underlying risk factors and mechanisms, based on previous research. ^{10 18 31 32}
Development and introduction of preventive measures	3	We developed Prep to be PRO, a 10-module pedagogical resource and educational programme, based on insights from step 1 and 2. The modules aim to reduce the identified risks.
Evaluation of preventive measures	4	A comprehensive pilot study documented the efficacy of Prep to be PRO during the school years 2021/2022 and 2022/2023 by assessing coach experiences and evaluating athlete knowledge and attitudes towards the module after implementing different instructional modules.
Implementation in practice	5	Information about Prep to be PRO was disseminated to all Sports Junior High Schools and Sports Academy High Schools. Schools that were interested in using the programme organised a teacher/coach training day before they gained access to the modules. The first full-scale implementation of Prep to be PRO, across 15 different schools nationwide, took place during the school year 2023/2024. Research data were collected throughout the same period. The coaches evaluated their experiences with the programme and gave feedback on perceived leadership and support during the implementation period. Additionally, the end users (athletes) reported their knowledge, attitudes and perceived benefits on each specific module content before and after class.
Maintenance and update	6	Continued follow-up and evaluation are ongoing and essential to ensure the programme remains effective and relevant in the subsequent years. Regular updates based on new research and continuous feedback from end-users are future steps to maintain Prep to be PRO as a continuously evolving educational programme.
TRIPP, Translating Research into Injury Prevention Practice.		

injury prevention literature, thereby enhancing the external validity and credibility of our methods.^{22 23} By employing this framework, our interventions remain evidence-based, adaptable to evolving conditions, and firmly grounded in practical needs, which is expected to promote injury prevention strategies in the sports domain.

STAKEHOLDER INVOLVEMENT

This project was initiated and coordinated by clinicians and researchers from the Oslo Sports Trauma Research Center. We established and engaged a multidisciplinary team of school administrators and leaders, coaches, athletes, clinicians, researchers, experts from Olympiatoppen, Healthy Sport (a unit within the Norwegian

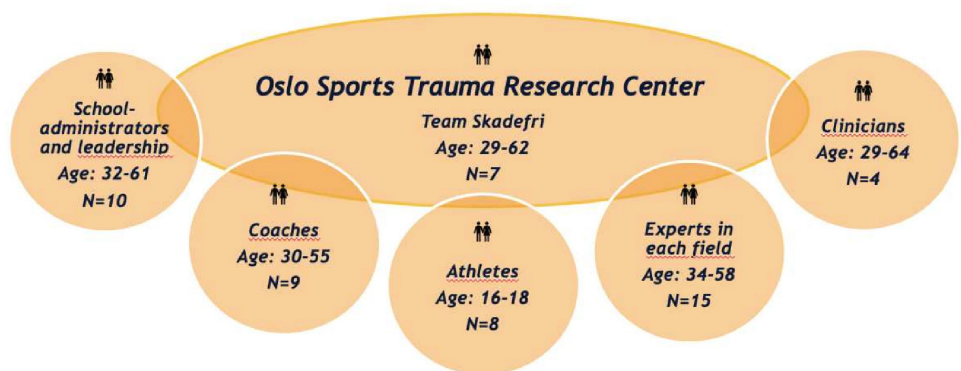


Figure 1 Stakeholder participation in the development of Prep to be PRO.

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Confederation of Sports, aiming to disseminate knowledge about sports nutrition and promote athletic environments that uphold positive attitudes and values related to food, body, health and performance) and other experts in each field (figure 1).

Specifically, Team Skadefri included one sports physiotherapist, one specialist in paediatric and adolescent physiotherapy, one professor of sports medicine, one sports physician researcher and clinician, specialised in physical medicine and rehabilitation and three advisors with MSc degrees in Sports Psychology and Coaching or Sport Science. The expert panel consisted of nine nutrition experts, one psychologist, one specialist in general medicine, one physiotherapist, one graphic designer, one development consultant for the Norwegian Olympic Training Center (Olympiatoppen), and Head of Performance and Research and Development at Olympiatoppen. Also, the stakeholder groups included four clinicians: two specialist physicians and two sports physiotherapists. Each group's contribution and age range are depicted to highlight the diversity of the project's collaborators.

We describe the entire development process based on a retrospective, thorough review of all meeting minutes, emails, relevant field notes and documents that were exchanged or recorded throughout the process. The development took place from June 2019 to June 2023 and was anchored in more than 100 collaborative meetings, 10 focus groups and 20 workshops, involving more than 40 different stakeholders at all levels (figure 1). Meetings were held at the Norwegian School of Sport Sciences. The focus groups were held initially during the first year of the development process, including two athletes and two coaches in each group. The focus groups and workshop sessions took place at the respective schools and within local communities (table 2). We travelled to all parts of the country to ensure the highest possible level of participation from a diverse group of schools, representing different settings and sports. Stakeholders from school management, coaches, athletes and external experts input shaped each module at multiple stages. Early meetings and focus groups guided initial design, while collaboration with Olympiatoppen and experts in nutrition and sports psychology broadened the programme's scope. Feedback from pilot testing informed final revisions, ensuring the 'Prep to be PRO' modules are both relevant and effective.

KEY DEVELOPMENTAL PRINCIPLES FROM WORKSHOPS AND COLLABORATION MEETINGS

The schools supplied needs and thoughts on risk factors and provided useful and relevant feedback on which elements and factors they believed could make a difference for the athletes. The meetings helped identify several key principles that served as a foundation for our development. These principles focus on known challenges and have been shaped through discussions between the project group and wider multidisciplinary

team. We intended for the sports schools to take the lead, and therefore, sought their feedback and input on how they could contribute to addressing these issues. The essential principles were as follows:

- Coaches at each school, not external speakers, should conduct the teaching. This was considered important and necessary to best facilitate a good relationship and long-term cooperation between the coach and each young athlete.
- To ensure that coaches were confident in teaching the modules, the schools highlighted the need for and requested that an obligatory training session or workshop should be organised at each school before the school could access the programme.
- The schools varied greatly in, for example, how the annual plan for each sport is structured, so the programme had to be flexible enough to be tailored to the athlete group and class, with the modules able to function independently and at different times throughout the year.
- The teaching should be applicable also in settings outside of the classroom, such as on the training field.

MOVING FROM 4 TO 10 MODULES, INVOLVING EVEN THE YOUNGER ATHLETES

The schools initially focused their main interest on four topics: injury prevention training (later named performance training), load management (later named load progression), total load and recovery, and these were the first modules developed. During the developmental process, we identified several additional themes, as well as the need to address even the younger athletes, those attending sports junior high schools (13–15 years). Therefore, from January 2022 to June 2023, we developed two additional modules for sports academy high schools, nutrition and sports psychology, and four specific modules for sports junior high schools: performance training, growth and maturation, eat smart and transition periods. Expanding from 4 to 10 modules provides the opportunity to cover a broader range of topics, focus more intently on specific areas and achieve greater flexibility. It also facilitates future growth and better adaptation to user demands. Although such an expansion may present challenges, including increased complexity and a higher resource demand, we think these issues can be addressed through effective planning and further collaboration.

ETHICS

Regarding step 1 in TRIPP, all necessary details pertaining to ethical approvals are provided in the cited reference in table 1. No ethical approvals were required for the development part of this project, as it focuses on the development of an educational programme without any interventions. As this part of the project falls outside the Health Research Act, no approvals were needed from the Regional Committee for Medical and Health Research Ethics, the Norwegian Agency for Shared Services in

Table 2 Overview of the main activities throughout the development process		
Year	Month	Main activities
2019	June	▶ Initial meeting with management at sport academy high schools. Discussion topics: curriculum plans, new teaching methodologies, relevant themes
2020	January	▶ Planning and development of modules 1 and 2 ▶ Meeting with management from the first sports academy high school ▶ Internal teamwork meetings
	April–June	▶ Meetings with management from another sports academy high school and the first sports junior high school ▶ Focus groups with coaches and athletes from 10 schools Collaboration with stakeholders and management ▶ Pilot of module 1 with two youth-athlete groups ▶ Development of module 1: ‘Performance Training’ fully complete
	August	▶ Pilot of module 1 at the first sports academy high school, followed by evaluation ▶ Development of module 2: ‘load progression’ fully completed
	September–October	▶ Coach training days for modules 1 and 2 ▶ First coach conducts teaching in class
	December	▶ Contact with additional sports academy high schools and sports junior high schools ▶ Beginning development of module 3: ‘total load’ and module 4: ‘recovery’
2021	January	▶ Further development of modules 3 and 4 ▶ Coaches conduct teaching in classes with modules 1 and 2
	March	▶ Coach training day at a new school ▶ Development of module 3; ‘total load’ fully completed
	April	▶ Finalising competency goals and learning objectives ▶ Collaboration meetings with Olympiatoppen for quality assurance ▶ Development of module 4: ‘recovery’ fully completed
	May–September	▶ Coach training day at five schools ▶ Workshops with experts on module 5: ‘nutrition’ ▶ Workshops with several sports junior high schools
2022	January–December	▶ Collaboration meetings for module integration into annual plans ▶ Development of the four modules for sports junior high schools ▶ Coach training days at sports junior high schools ▶ Starting development of module 5: ‘nutrition’ and module 6: ‘sports psychology’ for sports academy high schools
2023	January–June	▶ Coach training days with 11 sports schools, both sports junior high schools and sports academy high schools ▶ Finalisation of all 10 Prep to be PRO modules, all competency goals and learning objectives and quality assurance from Olympiatoppen ▶ Pilot testing of the modules

Education and Research or the Ethics Committee at the Norwegian School of Sport Sciences. We ensured a safe and supportive environment without requesting any personal information beyond gender, school and grade level, and by storing all data in accordance with Norwegian School of Sport Sciences guidelines. Consequently, there was no need for informed consent from anyone

other than the participants themselves; however, we nonetheless distributed information letters to parents through the schools to keep them informed about the study’s purpose and duration. On the first page of the digital feedback questionnaire, both students and coaches were presented with an overview of the study’s objectives, and the initial question explicitly asked whether they

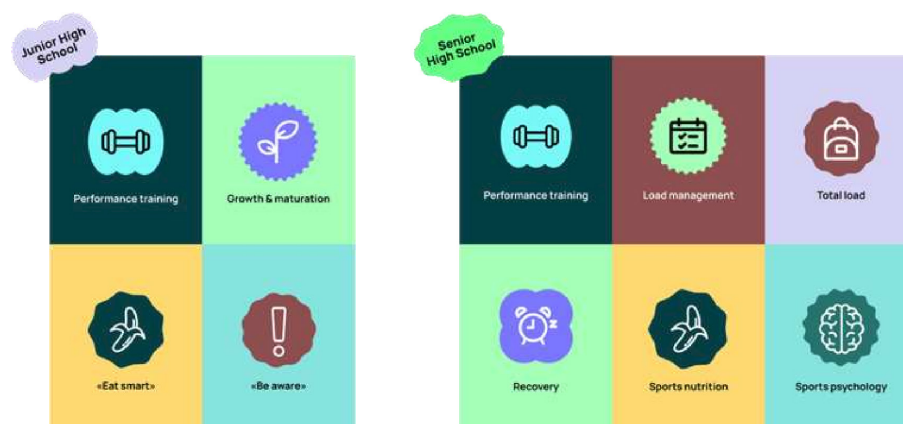


Figure 2 The 10 Prep to be PRO modules.

wished to participate. This safeguarded voluntariness, allowing participants to withdraw at any time without repercussions. By collecting only anonymous data, we strengthened privacy, and by clearly communicating how the information was managed, we fostered transparency and trust. Furthermore, clear guidelines and respectful communication contributed to participants feeling safe and well-supported. We also provided opportunities for follow-up if anyone had additional questions. In this way, we ensured that all individuals, including minors, could participate under secure and supportive conditions.

THE PROGRAMME

Figure 2 depicts the modules of the educational programme, four for sports junior high schools and six for sports academy high schools.

Each of the modules is constructed on a consistent framework, comprising the module's agenda, the learning objectives addressed, the theoretical foundation, assignments, reflective tasks, video clips, narratives and interactive elements such as Menti and Kahoot. Additionally, as shown in the example in online supplemental appendix 1, every module includes group activities, project proposals and concludes with an evaluation of the module.

Prep to be PRO is also addressing the learning objectives highlighted in each module (table 3).

Each module is anchored in the National High School Curriculum. The curriculum emphasises long-term development, practical sports skills, knowledge about skill development and understanding of the requirements for staying injury-free, as well as fostering reflection and a sense of self-responsibility. Table 4 describes how Prep to be Pro addresses these competency goals. Additionally, a dedicated landing page for Prep to be PRO was established at the end of September 2024, to ensure that all schools using the programme have easy access to new updates and versions of the modules.

EXPERIENCES

Prep to be PRO was originally developed as an educational programme for schools to promote knowledge dissemination and, through this, make students more resilient. However, as we observed a growing interest in the project over time, it became natural to examine both its development and the implementation process through a scientific lens. Converting a project into a research study retrospectively may involve analysing data that were not originally collected for research purposes. This can lead to challenges in ensuring data accuracy, consistency and completeness, complicating the analysis and interpretation of results. Addressing these weaknesses has involved careful planning, incorporating research methodologies from the beginning of the project and ensuring rigorous documentation and ethical oversight throughout the project's evolution into a research study.

THE DEVELOPMENT PROCESS

The multidisciplinary team assembled consisted of experts and leaders in their respective fields, and represented both genders, various regions of the country, different schools and athlete levels and ages as well as specialised knowledge across different sports disciplines (figure 1). This diversity provided relevant and distinct perspectives, enabling us to build a solid foundation for developing each module, based on the topics the schools requested.

To develop each module, our team held weekly meetings, reviewing relevant research, defining key content and selecting theories and tasks for further exploration. While the schools expressed a desire for external speakers to be more aligned and coordinated in their presentations, we specifically called for modules to be taught by internal staff or coaches at each school. This was to ensure that the athletes have trusted individuals available for further assistance, follow-up or conversations when

Table 3 An overview of the instructional modules within the programme Prep to be PRO

Module title (No)	Module content with main learning objectives	Additional notes and relevant scientific research
Performance Training (1)	1. Why sustained, systematic training is essential for peak performance 2. Introducing the Get Set-app and Fittoplay website 3. Discussing how injury prevention leads to more consistent training, development and improved performance	Focuses on long-term development, the importance of injury prevention and emphasises the effectiveness of preventive measures ^{33–36}
Growth and Maturation (2)	1. Gives an overview of physiological and psychological changes during puberty 2. Discuss typical developmental changes in the skeleton, muscles, tendons and brain during growth and maturation 3. Discuss individual differences during puberty, and why adhering to a developmental pathway is crucial to excel in sport	Discusses variability in maturation and its impact on training and advocates for personalised training programmes ^{20 37–39}
Eat smart (3)	1. Examines the interplay between nutrition and performance, as well as the impact food and drink have on athletic performance 2. Discusses sustainable nutritional strategies and alternatives to energy drinks 3. Suggests strategies to ensure adequate refuelling during busy schooldays and training throughout the day	Based on a lecture from ‘Healthy Sport’ ^{40–42}
Be Aware (4)	1. Promotes/highlights enjoyable aspects of sport 2. Suggests some strategic annual planning/preparation for critical periods 3. Discuss and promote the understanding of why some periods are critical, including postholiday or postinjury phases	Highlights the necessity for heightened awareness, for example, postholidays or after injuries ^{43 44}
Advanced Performance Training (5)	1. Based on module 1, as well as additional content specific to sports, this material is a more comprehensive version tailored for older younger 2. Athletes 3. Promotes 4. More sport-specific skills and training for sports excellence 5. Discuss acute and overuse injuries, as well as their treatment and prevention	Support overall health protection in training ^{33 34 36}
Load Progression (6)	1. Illustrates load progression through storytelling 2. Discuss how training diary is essential in load progression and management 3. Discuss training intensity management, explained through the Rating of Perceived Exertion scale	Supports the efficacy of gradual load increase/balanced training loads and encourages training diaries for monitoring ^{44–49}
Total Load (7)	1. Discuss what the term entails (Load progression involves the strategic regulation and distribution of stressors, such as training intensity or workload, to optimise performance and recovery, whereas total load encompasses the sum of all external and internal demands placed on an individual, including physical, mental and environmental factors.) 2. Outlines strategies for effectively managing daily responsibilities and stress. It emphasises the importance of focus and efficient task management, encourages identifying factors that consume time unproductively, and underscores the need for regular rest and recovery to maintain optimal performance	Analyses techniques for load progression and suggests practical tips for balancing sports and life responsibilities ^{29 37 50 51}

Continued

**Table 3** Continued

Module title (No)	Module content with main learning objectives	Additional notes and relevant scientific research
Recovery (8)	1. Discuss the symbiotic relationship between training and recovery 2. Discuss what recovery entails (sleep, proper and sufficient nutrition and hydration. Sufficient time to mentally recharge) 3. Provides evidence-based recovery strategies	Emphasises the role of recovery in enhancing performance and reducing injuries ^{52–56}
Sports Nutrition (9)	1. Based on module 3, it further discusses the important role of enough food and drink for performance in sport, advocating structured meal planning and eating habits 2. Highlights why nutrition is crucial for maintaining good health, preventing injuries, providing joy and social interaction, ensuring the quality of all training sessions and optimises recovery between sessions	Promotes nutrition as a cornerstone of athletic training ^{41 57 58}
Sports Psychology (10)	1. Addressing psychological pressures applied to youths in general and to young athletes more specifically 2. Discusses how social media, influencers, marketing and image retouching affect our mental well-being, promoting a more critical view on these 3. Introduces mental recovery techniques and social support strategies	Focuses on coping strategies, resilience and mental health in sports ^{59–64}

needed, to facilitate a good relationship and long-term cooperation between the coach and each young athlete.

Every module contains detailed notes for each slide, as well as a consistent visual design, to support coaches in their teaching. We sought external expertise on the nutrition and sports psychology modules to ensure their accuracy and relevance. We used a clinical psychologist, with extensive experience from working with young athletes at the highest international level, as well as experts from Olympiatoppen, who conducted a thorough content quality review of all modules.

We believe the numerous meetings and close collaboration with school leadership throughout the entire development process is crucial for successful implementation. Research has shown that when programs are implemented effectively, their impact can be up to three times greater.²⁴ Using structured implementation planning frameworks can help bridge the research-to-practice gap and maximise programme outcomes. Without a systematic and evidence-based approach to implementation, conclusions about a programme's limited effectiveness may result from inadequate execution rather than the programme itself.²⁵ Although Prep to be Pro was not conceived as a research project from the outset, the TRIPP methodology has been applied consistently from the beginning. Also, when stakeholders are engaged throughout the process, the real-world practice is more impactful.²⁶ Nevertheless, any implementation process usually takes several years and requires long-term commitment and dedication from all parties involved. We began by conducting a thorough needs assessment

by engaging all relevant stakeholders early to foster a shared vision. Subsequently, we developed an implementation plan, which included a pilot project, training and ongoing support, and established clear communication channels for regular updates and feedback. Furthermore, to secure sustained commitment from schools and coaches, the programme must undergo continuous evaluation and adaptation throughout its implementation to ensure long-term funding and the necessary resources, while simultaneously integrating it into the institution's overarching strategies and policies.

LINKING THE PREP TO BE PRO PROGRAMME WITH THE NATIONAL HIGH SCHOOL CURRICULUM

Prep to be PRO was fully developed as a 10-module coach-delivered educational programme, ready for use in both sports junior high schools and sports academy high schools in July 2023. All modules can be used across all sports and are rooted in the National High School Curriculum required by the Directory of Education,²⁷ where increased knowledge and learning that promotes athletes' own ability to think and develop in a long-term perspective are highlighted. In the development of the educational programme and each module, we emphasised the educational methods described in the general guidelines from the Ministry of Education general part of the curriculum.²⁸ Examples of this include student-active approaches, collaboration, the use of digital tools and deep learning. In addition, specific competence goals and learning objectives from the curriculum are addressed and linked to each individual Prep to be PRO

Table 4 An overview of the theoretical foundation for sports junior high schools and sports academy high schools in the National High School Curriculum covered by Prep to be PRO	
Category	Details
The overarching part of the curriculum	Prep to be PRO is anchored in the overarching part of the curriculum through interdisciplinary themes with competence goals in life mastery and deep learning, as well as through the development of basic skills.
Life mastery	Learning about good mental and physical health to make responsible life choices. Handling success and adversity and developing a positive self-image.
Deep learning	Gradually developing knowledge and understanding of concepts and methods. Reflecting on one's own learning in familiar and unfamiliar situations.
Basic skills	Describing and explaining training methods orally and in writing. Understanding written sources, calculating data and using digital tools.
Curriculum—general section	
Relevance and core values of sports programme	Increasing awareness of one's own development through systematic training. Developing skills, knowledge and attitudes that influence long-term thinking and enjoyment of sports.
Core elements of sports programme	Developing skills and attributes that lead to better performance. Learning about mental attributes and factors affecting performance and development.
Curriculum—specific part	
Sports scademic high schools, Competence goals, elite sports programme 1	Conducting systematic and targeted training and evaluating a training period. Familiarity with training forms, methods and injury prevention measures.
Sports academic high schools, competence goals, elite sports programme 2	Demonstrating and further developing skills for performance. Documenting and analysing training and integrating injury prevention measures.
Sports academic high schools, competence goals, elite sports programme 3	Developing skills for competitive situations and reflecting on training considering goals. Conducting long-term and targeted training, including injury prevention exercises.

module. The fact that each module is anchored in the National Curriculum is also important for the utility and commitment from the individual coaches and schools to implement the programme and has already demonstrated to boost coaches' motivation to use it.

EMPOWERING THE YOUNG ATHLETES (TO BETTER MANAGE THEIR OVERALL HEALTH AND DEVELOPMENT)

Prep to be PRO is designed to equip athletes with the skills to make informed decisions, foster a developmental mindset and cultivate patience during the formative years; in short, to help build resilience. The IOC 2015 consensus statement on youth athletic development stands as the foremost evidence-informed reference for sustainably developing healthy, resilient and capable young athletes. It underscores best practices to reduce illness and injury risk, enhance well-being and foster sustainable, enjoyable, long-term athletic development and success.²⁹ The modules are athlete centred, but coach-driven. This means that they are intended to help build a more robust relationship between athletes and coaches, not only in training sport-specific skills but also to help protect the health of each individual athlete by engaging

in conversations, discussions and reflections on relevant topics. The schools are legally required to adhere to the curriculum, in contrast to, for example, sports teams and clubs, which are not bound by any legally mandated curriculum. In our opinion, this also provides further justification for why the sports school is the most relevant arena for implementing Prep to be PRO. Due to the well-known risk factors for these young athletes, school systems should emphasise an overall health perspective and close follow-up of each student.^{19 30} However, this work must be carried out systematically, based on knowledge, and specifically implemented in the daily school routine.³⁰

Empowering the coaches

Positive experiences include the accessibility for all coaches and teachers across all sports at all sports junior high schools and sports academy high schools, as well as the user-friendliness. The programme has been developed in collaboration with all stakeholders and other experts, so we know that the topics in the modules are relevant and requested. Before schools gained access to the 'Prep to be Pro' materials, we visited interested

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schools to conduct coach workshops, with active participation from school leadership as well as from the coaches. These 3–6 hours sessions included an overview of the modules, group discussions on their relevance for each school, and ample time for questions and addressing potential barriers before implementation. The fact that the modules are general can also facilitate discussion and collaboration across different coaches, sports and schools. On the other hand, the programme is neither sport-specific nor school-specific, so its implementation will depend on how each school chooses to distribute it and facilitate its adoption by coaches. Furthermore, we do not know with certainty to what extent each coach has sufficient knowledge to teach the various modules. We are aware of and have experienced that the coaches display a wide range of engagement, experience and confidence in teaching the various topics. A final challenge we have observed is that the individuals and schools adopting the programme tend to be those who are already proficient, both on an individual level and across schools.

Further perspectives and the road ahead

There is an urgent need to educate young athletes on how to stay healthy while striving to develop in sport at the highest level throughout the vulnerable period of adolescence. The growth in injuries across youth sports is a maturing concern among most stakeholders, and a future direction of involving both the young athletes as well as their coaches in trying to solve this problem has been a priority.

By understanding the specific requirements and challenges faced by different sports and educational environments, the modules can be better tailored to each school, grade level and sport to provide the most relevant and effective training. We recognise that growth-related risk factors also apply to older athletes, though our current materials do not cover them. We will incorporate a more thorough discussion of these factors into the sports academy high school modules in the programme's next revision. As of today, schools have been informed that they may use the module on growth and development, if they so desire.

Insights into how the first schools use the programme can also inform better strategies for distributing and implementing the modules in schools, including the development of clear guidelines and support systems for contact persons, to ensure consistent and effective dissemination of the programme and information among colleagues. Each school designated a contact person—a coach who volunteers as a liaison between our team and those teaching Prep to be PRO. Furthermore, guidelines can highlight areas where some coaches may lack sufficient knowledge to teach the various modules effectively and spur the development of additional resources to enhance coaches' understanding and teaching skills.

In Norway, nationally mandated educational requirements exist for coaches at sport schools, and the Norwegian Sports Federation also offers a four-tiered

coach education programme. However, completion of this programme is not compulsory. Additional pedagogical training is required for coaches in sports academy high schools, and the coaches must possess specialised expertise in their respective sports disciplines. Each school autonomously selects their coaches, often prioritising former international-level athletes.

Many schools are actively working to incorporate the programme into each school's annual planning cycle, which we believe is crucial and important for long-term maintenance. Our team has regular contact with the leaderships and the contact persons at each school and organise an annual Prep to be PRO convention, providing school staff with a complementary day of inspiration and professional development to encourage ongoing implementation and usage of Prep to be PRO. The annual convention, held at the Norwegian School of Sport Sciences, offers a full day of lectures, group work, and workshops primarily for programme coaches and is developed in consultation with central school leadership.

All modules are hosted online, allowing for minor revisions as new research emerges. A comprehensive review is scheduled for fall 2026, after sufficient data have been gathered from initial implementation. To ensure ongoing sustainability, annual training and workshops for new coaches and other users are deemed essential.

Importantly, the educational programme can be used to establish a feedback loop where continuous input from end-users (coaches and athletes) is incorporated into the regular updates of the modules. This illustrates how the present experience can significantly influence the ongoing development and effectiveness of Prep to be PRO, ensuring that the programme remains dynamic, relevant, responsive to new research and evolving needs and that it remains a valuable resource for both coaches and athletes in the years to come.

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Original research

Implementing Prep to be PRO - Bridging the gap between design and delivery

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ABSTRACT

Objectives: Prep to be PRO is a comprehensive, module-based educational program for young athletes attending sport high schools, focusing on injury and illness prevention, long-term development, and health literacy, delivered by the school's coaching and teaching staff. Guided by the TRIPP and RE-AIM frameworks, this study aimed to evaluate the final development phase. We explored early coach and athlete experiences and examined the implementation process using Durlak and DuPre's eight dimensions of implementation quality to identify factors that may facilitate or hinder future integration of the program into routine practice.

Design: Mixed-methods case study.

Methods: Data were collected from school administrator and coach workshop evaluations, athlete feedback following an instructional session, and observational field notes generated through researcher participation. Quantitative and qualitative analyses were combined, with qualitative data first analyzed thematically and then interpreted through RE-AIM and Durlak and DuPre's framework to identify relevant factors.

Results: In total, evaluations were collected from 174 school administrators and coaches and 986 athletes. Key factors that facilitated program uptake included the perceived relevance of the content, robust training support, engaged leadership, and structured mechanisms for feedback and fidelity monitoring. The primary challenges were limited time and resources, variability in coach readiness, tensions between program standardization and local adaptation, and competing institutional priorities. Together, these factors shaped initial adoption and highlighted the need for purposeful infrastructural support to sustain the program over time.

Conclusions: Effective scaling depends on strengthening the implementation infrastructure, especially by boosting coach support, clarifying roles, and striking the right balance between fidelity and flexibility yet preserving the program's core elements.

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Practical implications

This study suggests that successful integration of Prep to be PRO into sports high schools requires more than relevant educational content. For practice and policy, schools should prioritise dedicated implementation support, including clear leadership responsibilities, protected time for delivery, coach training, and guidance on core programme components. At the same time, the programme should allow sufficient flexibility for local adaptation while maintaining fidelity to its essential aims. These strategies may strengthen programme consistency, sustainability, and its potential contribution to young athletes' health, development, and long-term sporting participation.

1. Introduction

A holistic understanding of implementation entails viewing the initiative as a dynamic process that begins with identifying a concrete need and culminates in establishing long-term sustainable practice.¹ Implementing new educational programs in schools is a complex process that requires a structured approach involving careful planning, execution, and evaluation.^{2–4} Such processes involve multiple stakeholders and levels, from teachers, coaches at sport schools, athletes/students and parents to school leadership and potentially external collaborators.^{5–7}

Although the body of literature addressing the implementation of sport injury prevention and health promotion programs is growing, research in this area is still limited. Previous studies have primarily focused on program outcomes (e.g., reduced injury risk),^{8–10} whereas more recent work includes explicit descriptions of how these programs can and should be implemented in practice.^{13–15} It is therefore

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important to clarify how distinct implementation components (e.g., stakeholder engagement, instructor training, ongoing monitoring, local adaptation) may act as key drivers of successful implementation and to identify the central challenges that deserve consideration across different sports and age groups.^{16,17}

Lendrum and Humphrey¹⁸ found that research indicates approximately 50% lower effectiveness in real-world contexts compared to what they describe as optimal research conditions. Consequently, variation in implementation will lead to variation in expected results.¹⁸ Most implementations are “under-planned,” and systematic approaches often falter at some stage, given that implementation invariably entails change.^{5,19,20} It is also important to avoid the pitfall of treating initiatives merely as “add-ons,” instead of recognizing that when something new is introduced, something else must likely be removed.¹ Implementing, and thereby altering practice within a school, typically requires at least three to five years.^{1,5}

In Norway, several private junior high schools offer a nationwide program that integrates daily training and sport-specific guidance with standard academic instruction. Later, students may enroll in sport academy high schools, which provide close support from both coaches and teachers. Collectively, these programs strive to enable athletic talents to develop both their sporting abilities as well as academic qualifications transitioning from junior to senior high school education.

Growing concerns about health issues among youth elite athletes have driven the development of a holistic, health-promoting and injury-preventive educational program called Prep to be PRO.²¹ Prep to be PRO is a structured program, designed for coaches in sport high schools, providing key health and performance insights to young athletes. The program was created at the Oslo Sports Trauma Research Center at the Norwegian School of Sport Sciences, in collaboration with experts and sport school leaders, to be implemented across various sports in sport high schools in Norway. The goal was to address the challenges young athletes face, related to intensive training and competition schedules. The program consists of ten teaching modules designed to support coaches in their teaching practice covering essential areas of athlete development, such as injury prevention, growth and maturation, load progression, nutrition, recovery and mental health, specifically tailored for each age group (Appendix 1).²¹

This study had two aims: (1) to conduct a developmental evaluation by end-users of the final phase of the four-year development of Prep to be PRO, and (2) to evaluate early implementation factors in authentic school settings.

2. Materials and methods

2.1. Study design

This paper presents a mixed-methods case study, outlining the evaluations from school administrators and coaches, athlete-post-session feedback and researcher field notes.

2.2. Participants

2.2.1. Schools and settings

The study comprised content-identical regional workshops delivered to coaches. They attended a workshop delivered either as a shared regional session (with multiple schools represented) at a designated venue, or as a single-school session hosted for coaches from one school only. Workshops were delivered in person during the final year of the program's four-year development. Athletes participated in one instructional session delivered by their coach at their school, during the last three months of the development period.

2.2.2. Coaches and school leaders

All school leaders responsible for sport programs and all coaches assigned to the participating sports were invited. Inclusion criteria

were employment at a participating school, responsibility for athletes in the target age groups, and attendance at a program workshop. Exclusion criteria were not providing consent or not attending the minimum training. In total, 174 persons participated, although incomplete attendance records preclude calculation of a response rate. Each coach completed a three-hour workshop-session and was invited to complete a questionnaire/evaluation form via their mobile phones during the last 5–10 min of the workshop.

The school leadership consented to serve as key drivers of the implementation process, ensuring the program would be integrated into the annual planning cycles across all participating schools. The program was distributed through an online platform, used across all participating schools, administrated by a designated contact person at each school. All modules could be used at the discretion of the recipients, both in terms of content and scope. No specific guidelines were imposed; coaches were encouraged to use the module in a manner they found appropriate, considering the nature of their sport, their own experience, competencies, and motivation.

2.2.3. Researcher observation

At least two researchers attended each workshop. One facilitated the session while another conducted non-participatory observation. In some workshops, researchers alternated roles during the session, so that each served as both facilitator and observer.

2.2.4. Athletes

Athletes were students enrolled at participating sport high schools who received one Prep to be PRO instructional session. During the last 5–10 min of the session, the athletes were invited to evaluate the session by completing a digital questionnaire via their mobile phones. Inclusion criteria were age 16–19 years, attending the targeted teaching module, and providing informed consent. Exclusion criteria were no consent or absence from the relevant session. A total of 986 athletes from sports completed the post-session feedback, although we could not estimate the response rate due to missing attendance data.

2.3. Evaluation framework

We applied both the Translating Research into Injury Prevention Practice (TRIPP)²² and the RE-AIM Sports Setting Matrix (RE-AIM SSM)²³ frameworks for the Prep to be PRO project, while concurrently evaluating the process through the lens of Durlak and DuPre's eight dimensions of implementation quality.⁶

We applied the TRIPP framework to guide Prep to be PRO. We first characterized the injury profile in the target population (Steps 1–2), adapted Prep to be PRO to age, sport, and type of school (Step 3), piloted core components/evaluated the final development phase (Step 4), and then implemented the program in routine practice with ongoing monitoring and feedback to coaches and leadership over 1.5 years (Steps 5–6). We also followed RE-AIM SSM framework in TRIPP steps 4–6, assessing Reach (participant coverage), Effectiveness (operationalized as proximal, participant-reported outcomes such as perceived usefulness/relevance), Adoption (uptake by schools/coaches and use), Implementation (fidelity, dose, delivery quality, participant response), and Maintenance (continuation and integration into school calendars).

We first performed a descriptive, topic-oriented thematic analysis aimed at mapping and organizing the main topics. In a second step, we mapped the final themes onto RE-AIM and used the Durlak & DuPre dimensions as a complementary lens for implementation-related interpretation and reporting, rather than to guide data collection or the initial coding (Fig. 1).

Durlak and DuPre⁶ outline eight key factors for good implementation. Fidelity is how close the delivered program matches the original plan. Dosage is the amount and length of time participants engage with the program. Quality of delivery refers to how well the program is taught. Participant responsiveness measures how engaged and interested

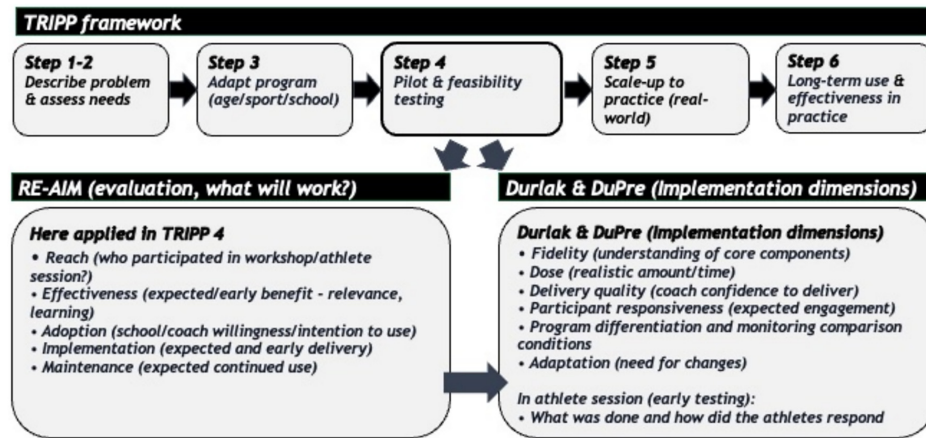


Fig. 1. How we combined TRIPP (step 4), RE-AIM SSM and Durlak & DuPre's eight dimensions of implementation quality in the evaluation in the final development phase.

participants are. Program differentiation ensures that the program is clearly different from other offerings. Monitoring of control/comparison conditions means tracking what happens in groups that do not receive the program. Program reach is about how many people, and which groups the program reaches. Finally, adaptation is the ability to adjust the program to local needs without losing its core elements.

2.4. Data collection

The questionnaires were informed by the applied frameworks, which specify key domains to be examined but do not prescribe specific items. Accordingly, we incorporated open-ended questions, to gather feedback on the aspects of the program that coaches and school leaders valued. We also discussed their perspectives on the challenges that may promote or hinder the program's integration into future practice. All questions were piloted to ensure clarity and neutral, non-leading wording. In addition to collect background data (e.g. age, sex, coaching experience), the questionnaire included items asking about prior awareness of Skadefri²⁴ (a well-established national injury-prevention initiative based on a website (www.skadefri.no) and app on which two Prep to be PRO modules draw content) and of Prep to be PRO. It also asked what participants liked and felt was missing in the program and how relevant they found the Prep to be PRO modules for their athletes (Appendix 2). Participation was voluntary and all responses were anonymized. Spontaneous discussions and conversations during the workshop sessions were documented in detailed minutes written by the researchers during and immediately after each workshop.

The athlete's questionnaire included both background variables (e.g. sex, age, sport type) and items designed to assess their prior knowledge, experience, and perceptions of the session (Appendix 3). Athlete questionnaire was modular, and all items were optional. No filter/skip logic was applied. Consequently, the number of respondents (n) varies between items. The questionnaire was developed by the research team, informed by previously developed questionnaires for young athletes and supplemented with relevant items adapted from prior studies.^{25, 26} Participation was voluntary and all responses were anonymized.

2.5. Data analyses

All variables were treated as categorical. Data are presented as frequencies (n) and percentages (%) for each category. Demographic background variables (sex, age, educational level) and outcomes (e.g., perceived relevance of the Prep to be PRO program) were reported

using frequency distributions. Analyses were conducted in SPSS version 28. No inferential statistical tests or multivariate analyses were performed; the objective was solely to provide an overview of response distributions. Missing data were excluded on a variable-by-variable basis (listwise deletion). Denominators reflect the number of respondents with non-missing data for each item.

The field notes and the open-ended responses from the evaluation questionnaires were subjected to a descriptive, topic-oriented thematic analysis aimed at mapping and organizing the main topics in the data rather than developing interpretative or conceptual themes as in reflexive thematic analysis.²⁷ The initial categorization was conducted by a single researcher, who systematically reviewed all textual material multiple times to identify and code meaningful segments descriptively according to the topics raised by participants. Codes were then grouped into broader categories reflecting central areas of the data, and the findings are presented as thematically organized summaries. To ensure that no relevant content was overlooked, the material was re-read and cross-checked throughout the process. Although the primary analysis was carried out individually, the research team engaged in discussions to refine the emerging categories, thereby contributing to the clarity and trustworthiness of the material. To avoid methodological conflation, we clarify that the approach was purely descriptive and exploratory, focusing on what was discussed rather than on underlying shared meanings.^{28,29} Although the qualitative material was limited, this informed our assessment of which implementation factors appeared to be well addressed for further implementation and where challenges were most evident.

2.6. Ethics

The Norwegian Agency for Shared Services in Education and Research (SIKT) evaluated the project to be in line with the Norwegian privacy act in June 2023 and it received approval from the Ethics Committee at the Norwegian School of Sport Sciences in August 2023.

3. Results

Background information for coaches and school leaders (n = 174) is presented in Table 1. The table indicates that most participants were men within the 31–40-year age group. Many held multiple roles but primarily serve as coaches. Most participants were involved at the competitive/performance level. Item nonresponse led to smaller denominators for some variables. These were not due to inclusion/exclusion criteria;

Table 1

Characteristics of 174 coaches and school-leaders, representing 34 different sports in 10 schools.

	n (%)
Total coaches and school-leaders	174 (100)
Sex	169 (100)
Women	47 (27.8)
Men	122 (72.2)
Other	0 (0.0)
Age	136 (100)
20–30 years	33 (24.3)
31–40 years	45 (33.0)
41–50 years	35 (25.7)
51–60 years	22 (16.2)
61–70 years	1 (0.7)
Role at school (more than one role may be selected)	174 (100)
Teacher	58 (33.3)
Coach	105 (60.3)
Sport administrator	45 (25.9)
Healthcare	12 (6.9)
At which level do you coach (more than one role may be selected)	174 (100)
Grassroot level	45 (25.9)
Competitive/performance team levels	112 (64.4)
District levels	14 (8.0)
Regional levels	22 (12.6)
Junior national team levels	27 (15.5)
Senior national team levels	9 (5.2)

Note. Coach level was self-reported in response to the item “At which level do you coach?”. The question did not specify whether respondents should consider school-based coaching only or include community/club coaching roles.

the survey did not force responses, so some participants skipped some items—all questionnaire items were optional. Analyses used pairwise deletion—denominators therefore reflect the number of respondents with non-missing data for each item.

Furthermore, the evaluations indicated that most coaches and school leaders were already familiar with Skadefri (injury prevention website and app) or Prep to be PRO, many of them were already using either the website, the app, or both in their regular coaching routine, and that a substantial majority found Prep to be PRO relevant “to a large or very large extent” (Table 2).

A summary of detailed minutes and the open-ended responses was organized into nine categories (Table 2).

The participants perceived the modules as clear, practical, and motivating, emphasizing their user-friendly format, applicability, and relevance for teaching and coaching practice, also reflected in representative quotes for overall perceptions and each of the RE-AIM dimensions (Table 3).

Athletes ($n = 986$) participated in the evaluation (48.6% girls, 50.6% boys, 0.8% other). In terms of schooling, 2.1% attended junior high school, while 72.7% were in 10th grade (senior high school), 13.7% in 11th grade, and 11.5% in 12th grade. Competitive level was reported as grassroots (16.9%), competitive/performance team (71.0%), district (13.1%), regional (19.8%), junior national team (12.1%), and senior national team (3.9%); because multiple responses were permitted for “At which level do you compete as an athlete?”, percentages for this item sum to more than 100%. This question did not specify whether

Table 2

A summary of the detailed minutes and the evaluation questionnaire completed by 174 coaches and school-leaders.

RE-AIM dimension	Category	General feedback	Facilitators	Barriers	Durlak & DuPre: Key factor
Reach	Varied Learning Methods	Employs a combination of lectures, group activities, practical assignments, and multimedia tools (such as Mentimeter and videos), including exercises tailored to various skill levels.	Encourages inclusive activities so participants of differing competencies can engage; group work fosters deeper understanding.	If not properly integrated or paced, the breadth of methods can overwhelm participants.	Participant responsiveness
Effectiveness	Theory-Practice Integration	Balances theoretical knowledge with practical application while allowing for individualization, so participants can adapt the learning to their own contexts.	Promotes relevant, hands-on practice aligned with theoretical instruction.	An imbalance (either too much theory or too much practice) can undermine coherence; coordinating theory and practice is especially challenging under time or resource constraints.	Adaptation
Effectiveness	Injury Prevention/Performance Training	Emphasizes performance-enhancement strategies, including prevention of illness and injury; offers targeted methods to improve performance and injury prevention during puberty.	Strategies designed to optimize performance and injury-prevention outcomes.	An excessive focus on performance may compromise long-term athlete health and safety.	Program differentiation
Adoption	Quality Teaching	Contributions ensure a high standard of instruction, supporting both current and future educators and coaches, and coaches valued having access to telephone support when needed.	Highlights best practices and research-informed approaches, emphasizing continuous refinement, interdisciplinary perspectives, and collaboration that motivate coaches.	Variation in instructional quality across coaches may create inconsistencies; differing teaching styles can send mixed messages about best practice.	Quality of delivery
Adoption	Experience and Knowledge Sharing	Promotes exchange of ideas and practical insights across multiple sport disciplines, integrating discussion of current practices.	Offers structured, purposeful engagement with opportunities for cross-sport dialog and discussion.	Some participants may resist abandoning traditional methods in favor of novel approaches.	Participant responsiveness
Implementation	The Modules	Clear, inspiring, knowledge-building, and practical modules suitable for daily use in educational and training contexts, thereby enhancing the overall learning experience.	User-friendly instructions, visually engaging content, and interactive assignments that can boost motivation.	Modules may be perceived as too generic for specialized needs in certain sports; experienced coaches may miss advanced or in-depth elements.	Program differentiation
Implementation	Module-based Learning	Encourages active participation in clearly defined modules, making the learning process more structured and adaptable.	Provides an overall coherent framework for the topic of holistic health.	Connections between modules can sometimes feel fragmented or repetitive.	Dosage
Implementation	Practical Application	Content supports easy implementation in practice with one's own athletes.	Practical examples and clear guidelines increase confidence in experimenting with new methods and exercises during training sessions.	May lack detailed, context-specific recommendations for certain athlete groups or sports.	Fidelity
Maintenance	Helpful Resources	Incorporates practical resources (e.g., an app, relevant websites, and actionable tips) that support ongoing learning and implementation.	Encourages deeper engagement by providing references and updates that facilitate continuous learning and application.	Reliance on digital sources may limit practical, hands-on experience; extensive modules can be overwhelming and make it challenging to get started.	Dosage

Note. RE-AIM and Durlak & DuPre's dimensions were applied in a post hoc mapping of the final themes to aid interpretation; they were not used to generate codes or themes.

Table 3

Qualitative quotes from coaches and school-leaders reflecting overall perceptions and perspectives related to each RE-AIM dimension.

RE-AIM dimension	Representative quotes
Overall perceptions	"There are well-structured and visually appealing slides"; "The modules are user-friendly"; "This module is something I can easily implement for my athletes"; "The modules include good, concrete measures such as the After-Action Review".
Reach	"The teaching methods seem varied and accessible"; "Preferably there could be fewer slides in some of the modules"; "Quality is preferable to quantity; this seem to be a big program".
Effectiveness	"Good integration of theory and practice"; "Clear focus in performance and injury prevention"; "I would like to see greater emphasis on mental/psychological strain".
Adoption	"A good structure of the programme and the tasks"; "It is interesting to reflect on one's own specific situation"; "All the modules can be used as an entry point for conversations with athletes"; "I appreciate ready-made teaching plans for relevant subjects"; "Nice to have research references in the subtitles"; "It might be challenging to coordinate across subjects".
Implementation	"The modules are directly applicable, but some of them are very extensive"; "I am not sure whether all of the content is suitable for my sport"; "For upper secondary school, some of the animations and images seemed rather childish"; "We already have a great deal to do, in a short amount of time".
Maintenance	"I appreciate the availability of ready-to-use and research-based resources"; "Preferably there will be more short video clips"; "E-learning modules with some interactive exercises would be desirable".

respondents should consider school-based sport only or also include community/club sport participation. The participating athletes revealed that only a minority of the athletes integrate the website or the app into their regular training routine, whereas the majority judged the modules to strike an appropriate balance between theoretical content and practical assignments. Most participants reported plans to apply the knowledge gained from the program in their daily training routines and felt that it enhanced their autonomy and confidence in decision-making (Fig. 3).

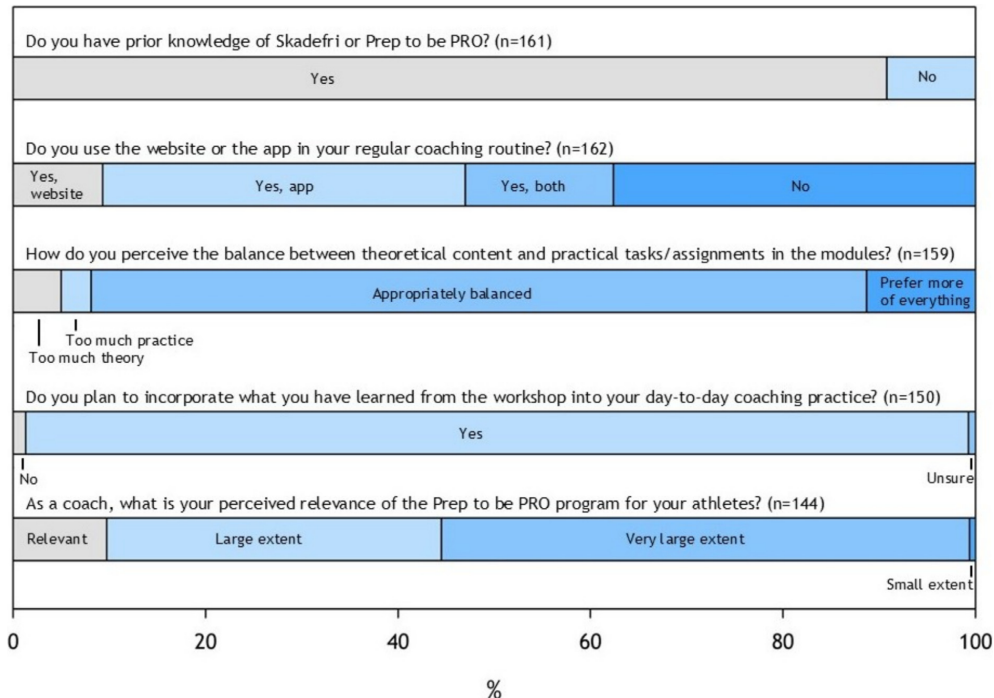
4. Discussion

Aligning our implementation with the eight dimensions of Durlak & DuPre showed that each dimension was addressed, but to a variable extent. However, we also identified deficiencies in several areas that could impede delivery with the level of quality desired. We discuss insights

from the study and highlight the main findings. Before interpreting the findings, we note that our Results present empirically derived themes from the descriptive thematic analysis. In this Discussion (Section 4.2), we synthesize these themes using Durlak and DuPre's eight dimensions as an interpretive lens rather than as an analytic structure that guided coding or data collection. We examine each of the eight dimensions in turn in Section 4.2, describing our initial planning and implementation, the evaluations, and how the findings can inform refinement and strengthening of the ongoing process.

4.1. Primary insights

The findings from the coach evaluations indicate a high perceived relevance of the program for their athletes. As illustrated in Fig. 2, most of respondents rated the program relevant "to a large or very large extent", suggesting a strong and consistent endorsement. This

**Fig. 2.** Evaluation by coaches and school leaders' Prep to be PRO program.

Note. Item level denominators vary due to optional responses (available-case analysis). Percentages show the item-specific n.

aligns with previous literature indicating that practitioner engagement is closely linked to the perceived applicability and usefulness of program content in real-world contexts.^{6,7} While this is encouraging, the results should be interpreted with caution. Perceptions of relevance do not necessarily translate into consistent or effective implementation in practice. Implementing evidence-based programs is often far more challenging than developing the intervention content itself, as it requires coordination of resources, training, ongoing support, and adaptation to local contexts. Several studies, including Domitrovich et al.,⁷ emphasize the necessity of systematic implementation support, running parallel to the core elements of the intervention plan.^{5,6,30} Such support entails structured training of key personnel, continuous coaching and mentoring, regular measurement of implementation quality (fidelity), and feedback loops for iterative refinement. Without this implementation infrastructure, organizations risk inconsistent delivery, low participant engagement, and diminished program effectiveness, even when the intervention is theoretically sound and methodologically robust.^{5,6,31}

In addition to the quantitative responses, the open-ended questions provided some insight into how the program was received and what factors might influence its sustainability. These qualitative responses were systematically categorized into nine categories as shown in Table 2, offering a richer understanding of the program's strengths and areas for improvement. Positive feedback most referenced the program's clarity, structure, as well as its alignment with athlete development needs. However, recurring concerns about time constraints, the program being only an “add-on”, and lack of sport-specific customization raise important questions about the program's scalability and adaptability across diverse coaching contexts.⁵

The findings by participating athletes offer promising indications that the program was perceived as both engaging and relevant. On the post-intervention survey, 59.6% (517/868) indicated that Prep to be PRO helped them to a great or very great extent to become more autonomous and confident in their decision-making. When including those reporting to some extent or more, the proportion was 92.5%. Furthermore, most of them also stated an intention to incorporate insights

from the program into their everyday training. While these findings reflect positively on the program's reception, these findings should also be interpreted considering important limitations.

4.2. Implementing Prep to be PRO through the lens of Durlak and DuPre's eight dimensions of implementation quality

As a complement to the TRIPP and RE-AIM frameworks, we chose to apply Durlak and DuPre's eight dimensions of implementation quality, as this affords a deeper understanding of what transpires when a program is rolled out in the field. Whereas TRIPP enables us to systematize the progression from basic research through piloting to practical application, and the RE-AIM Sports Setting Matrix emphasizes measurable outcomes and reach within sport and activity contexts, the Durlak & DuPre model captures the practical, organizational, and interpersonal factors that underlie whether an implementation succeeds or fails.^{6,22,23}

After the workshops and the pilot module sessions, we argue that all eight dimensions described by Durlak & DuPre were addressed to some degree. However, several dimensions still exhibit critical gaps that may impede high-quality implementation. Each of the eight dimensions is discussed in turn below, what we initially planned and executed, what the evaluation feedback revealed, and how these insights can strengthen further development and rollout of Prep to be PRO.

Regarding fidelity, both school leadership and coaches received thorough training in the program's content and methodology, and detailed module manuals were provided. A liaison at each school was appointed to verify that planned activities aligned with program intentions and to identify barriers to continued use. Although workshop participants found the training useful, coaches expressed a need for more hands-on guidance in delivering the modules. The absence of a comprehensive instructor's guide, systematic observation routines, and structured peer-reflection sessions may undermine our ability to ensure that the intervention is delivered as intended.³² Over time, we may need to implement a more formalized support system, including in-class coaching and feedback, as a core component of program maintenance.³³

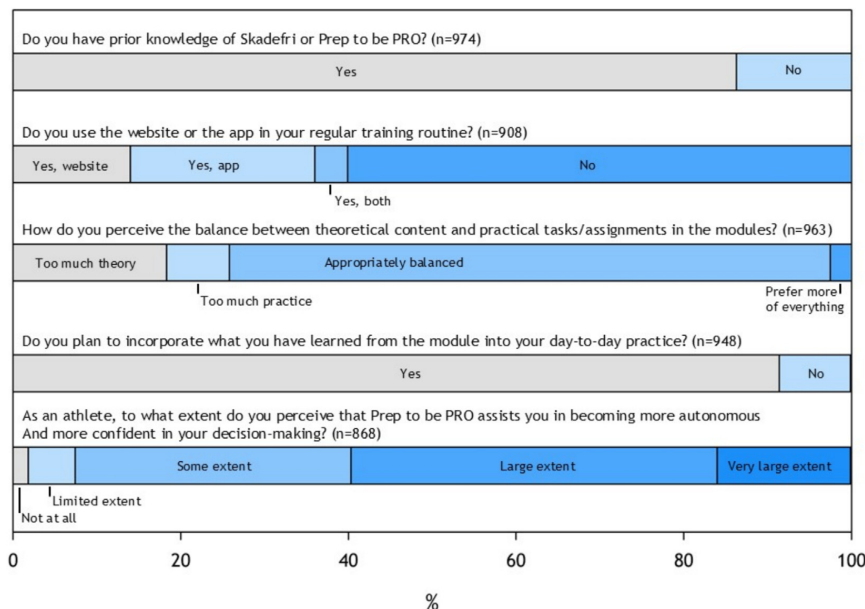


Fig. 3. Evaluations following a Prep to be PRO module session, representing 31 different sports and 10 schools. Note. Item level denominators vary due to optional responses (available-case analysis). Percentages show the item-specific n.

Regarding dosage, we granted each school and coach the flexibility to adapt the schedule to their own needs, while requesting pre- and post-module evaluations. School leaders integrated the modules into their annual planning, and coaches were asked to record the number of instructional hours in the evaluation surveys. This flexibility facilitated local adaptation but also risked inconsistency; without fixed schedules or participation requirements, it is difficult to guarantee that all modules receive sufficient attention. Studies conceptualize “dose delivered” as one of the key moderating factors and underscore that, without fixed schedules or mandatory participation, the integrity of the intervention’s core components may become fragmented.^{34,35} Coaches who are initially disengaged from a subject may readily opt out of entire modules or participation altogether, thereby further compromising both the breadth and depth of learning. The absence of mandatory requirements allows for selective engagement; certain core modules may be systematically neglected by those who perceive themselves as already sufficiently competent or who prioritize other responsibilities. To ensure uniform exposure to core content, we recognize the need for clear guidelines on e.g. minimum instructional hours per module.

For quality of delivery, we offered concrete recommendations for delivering each module and provided ongoing telephone support so that coaches felt well supported, aligning with research showing that ongoing coaching and feedback, rather than workshop-only training, leads to more sustained fidelity over time.³⁶ Coaches also requested a regular forum for experience sharing and pedagogical peer-coaching during their normal school days. The lack of a formal network for pedagogical exchange may lead to uneven teaching quality across schools; a structured peer-learning arrangement could help to standardize delivery and foster continuous professional development. A 2024 meta-analysis demonstrated that participation in structured collegial learning networks is significantly associated with more consistent instructional quality and enhanced teacher efficacy across schools, underscoring the importance of formal exchange forums for standardizing delivery and fostering continuous professional development.³⁷

In terms of participant responsiveness, we prioritized varied, active learning methods such as group work, reflective exercises, physical activities, and project assignments which generated high levels of engagement, motivation, and ownership among both coaches and athletes. These effects have also been well documented in other studies, such as those by Bonwell and Eison³⁸ and Prince.³⁹ Coaches, however, felt that the full suite of modules could be too time-consuming in a busy school context. To prevent the modules from becoming overly burdensome, we might consider shorter versions or clearer prioritization of key content for each topic.

Concerning program differentiation, we clearly communicated Prep to be PRO’s unique objectives and employed a consistent visual identity to distinguish it from other materials. This helped to position the program as a unique offering with relevant goals and content. Nonetheless, participants suggested broadening communication channels such as parent meetings, introducing formal recognition (e.g., program certification) or visibility campaigns to further cement the program’s identity within the school community. This is consistent with other research emphasizing that visibility campaigns and regular informational meetings with all stakeholders, including teachers, parents, and administrators, are essential for cementing a program’s unique profile,⁴⁰ and that targeted messaging to all stakeholders is critical for delineating program innovation from routine practice.³⁰

Under monitoring of control/comparison conditions, we tracked which schools elected to adopt the program, laying the groundwork for future comparisons between implementing and non-implementing institutions. Participating schools also agreed to conduct pre- and post-session evaluations. Several coaches, however, noted that adding these requirements could increase their workload, given their already full schedules and existing documentation demands.

Program reach; The extent to which an intervention engaged its intended audience, was enhanced by two synergistic strategies. First, active recruitment of schools, rather than passive dissemination, ensured that all eligible institutions were informed directly and invited to participate, thereby maximizing both quantitative and qualitative reach.⁴¹ Second, the option for local adaptation generated broad interest and participation, allowing schools to tailor elements such as session timing, thematic order, and activity intensity to their unique contexts. Local adaptation was shown to facilitate enhanced relevance and ownership among coaches and athletes.³¹ Our findings suggest that reach was also assisted by how the program was experienced once accessed: coaches valued varied learning methods that combined short lectures with group activities, practical assignments, and multimedia tools, and noted that inclusive exercises could accommodate participants with different competency levels. However, coaches also cautioned that if these components were not well integrated or appropriately paced, the variety in methods could feel overwhelming, potentially constraining engagement for some participants. Coaches further emphasized the importance of contextual customization and straightforward startup procedures, such as concise guides or information sheets, to minimize preparatory workload and facilitate rapid implementation. In line with this, coaches highlighted the role of high-quality teaching and valued having access to telephone support when needed, which reduced uncertainty and lowered the threshold for program uptake. Contextual customization, permitting coaches to adapt language, examples, and exercises to local norms, was reported to enhance participant engagement and sustainment of the program over time.⁴¹

Finally, for adaptation, we allowed schools to adjust modules as needed and maintained ongoing dialog with leadership to clarify changes. The intention was to offer the modules (and the program) as a flexible resource rather than a mandated intervention. While local customization likely enhances relevance and ownership, it also complicates cross-context comparisons of implementation outcomes. A potential limitation of our program lies in its deliberately minimal prescriptive guidance for implementation, which on the surface appears to conflict with, and indeed may risk undermining, one or more of the eight implementation quality criteria proposed by Durlak and DuPre (e.g., fidelity, dosage, and program delivery).⁶ By failing to specify detailed protocols, we acknowledge that implementers face a heightened risk of inconsistent delivery and diminished quality. However, this design choice was intentional. The wide variation in coaches’ and instructors’ prior experience, pedagogical styles, and contextual constraints precluded a “one-size-fits-all” approach. Rigid, overly detailed instructions would likely have reduced local ownership, discouraged adaptive problem-solving, and limited the program’s applicability across diverse sporting environments. In other words, while a flexible framework may introduce implementation variability and thus warrants careful monitoring and support, it simultaneously empowers implementers to tailor content to their unique needs, potentially enhancing engagement and sustainability in the long term.

4.3. Strengths and limitations

A strength of this study was the immediate and detailed minute-taking of spontaneous discussions following the workshop training sessions, which helped preserve rich, contextual information that might otherwise have been lost.^{42,43} The analytical process was further strengthened by regular discussions within the research team, supporting a structured and transparent thematic representation.²⁷ However, reliance on a single analyst may have introduced systematic bias and reduced reliability, as the immediate notes were shaped by the researcher’s own interpretations and may not have fully captured all nuances of participants’ perspectives.^{29,44}

Although participant comments suggested that athletes valued the reflective discussions, these data were analyzed only at a superficial, descriptive level. A more rigorous thematic analysis could have

provided deeper insight into how and why specific components of the program resonated, or failed to resonate, across different subgroups (e.g., sex, age and sport type).^{27,45} In addition, the findings relied partly on self-reported intentions, such as plans to implement program content into training routines. Such intentions should be interpreted with caution, as they do not necessarily translate into real-life behavior.⁴⁶ Longitudinal follow-up is therefore needed to assess whether intended changes are implemented and sustained over time, and whether they lead to measurable overall health, performance or well-being outcomes.⁴⁷

The overall feedback indicated a favorable view of the program, but these findings should be interpreted considering potential bias, the absence of behavioral data, and known practical challenges. Finally, the use of Durlak and DuPre's framework was a deliberate choice, as it offers measurable implementation indicators relevant to school and sport settings, including fidelity, dose, quality of delivery, and participant responsiveness. However, the framework does not encompass the full breadth of contemporary implementation science, such as detailed determinants, multilevel contextual factors, and newer reporting standards. This may have led to some barriers and facilitators being specified insufficiently. To mitigate this, the framework was complemented by RE-AIM for structured reporting and TRIPP for translation to practice. Future studies should consider incorporating more contemporary implementation frameworks and reporting checklists to enhance transparency and transferability.

5. Conclusions

Prep to be PRO represents a promising educational program designed to strengthen young elite athletes' self-management skills and their understanding of the links between health, performance, and well-being. Early feedback from schools indicates that the program is relevant, useful and suitable for broader national implementation. Effective scaling depends on strengthening the implementation infrastructure, especially through coach support, clear roles, and an appropriate balance between fidelity and flexibility while preserving the program's core elements. Overall, Prep to be PRO shows potential as a scalable model to support young athletes' development, health, and well-being.

CRedit authorship contribution statement

All authors contributed to the manuscript preparation. GM, CHM and HH contributed to the planning of the study and CHM and HH were responsible for the data collection. RB is responsible for the overall content (guarantor).

Confirmation of ethical compliance

The project was assessed by the Norwegian Agency for Shared Services in Education and Research (SIKT) as compliant with the Norwegian Privacy Act in June 2023 and was approved by the Ethics Committee at the Norwegian School of Sport Sciences in August 2023. Authorship and reporting follow the Vancouver recommendations.

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RB is responsible for the overall content as guarantor.

Declaration of interest statement

The authors declare no conflicts of interest.

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Appendix A. Supplementary data

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Empowering Young Athletes: An early Evaluation of the Prep to be PRO program in Norway - Uptake, Delivery, and Perceived Value after 18 months.

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Abstract

Objectives: Young athletes in sports high schools must balance intensive training with academic and social demands, which may affect health, well-being, and long-term development. Prep to be PRO is a coach-delivered educational programme supporting holistic development across physical, mental, and academic domains. While the development and pilot phase have been described, less is known about its functioning after broader implementation. This study examined early uptake, delivery, and perceived value during the first 18 months of implementation in Norwegian sports high schools.

Methods: Evaluation data were collected over 18 months from 20 Norwegian sports high schools using self-reported questionnaires, including pre-post and semester evaluations. The sample included 57 coaches and 1134 athletes from three Sports Junior High Schools and 17 Sports Academy High Schools.

Results: Within 18 months, 20 of 35 eligible schools (57%) adopted the programme. Delivery varied, ranging from one to three modules, with differences in content and time allocation. Coaches reported high relevance and perceived that the programme helped athletes make better choices. Athletes also reported positive perceptions of usefulness, relevance, learning, and confidence in choices, but were less positive about anticipating sessions. Leadership support was rated positively overall, especially for encouragement and persistence, but lower for planning, clear procedures, barrier removal, and leader knowledge.

Conclusion: Prep to be PRO demonstrated promising early acceptability and perceived value following national rollout. However, variability in delivery indicates that implementation conditions influence programme content and extent. Strengthening leadership support, a core dose, and practical implementation tools may improve consistency and sustainability.

Keywords: Young athletes, Performance training, Overall Health, Sports Junior High Schools, Sports Academy High Schools.

Key Messages

What is already known on this topic - summarize the state of current scientific knowledge and/or clinical practice on your intended study's subject

Young athletes face complex physical, psychological, social, and academic demands, and sports high schools play an important role in supporting both performance development and well-being. Previous research has described the development and pilot testing of Prep to be PRO, whereas this study presents the first findings on its broader implementation and perceived value following national rollout.

What this study adds - summarize the report's take-home messages, highlighting their scientific and/or clinical relevance.

This study provides early evidence that Prep to be PRO is feasible and generally well accepted in Norwegian sports high schools, with high perceived relevance among both coaches and athletes. At the same time, it shows substantial variation in uptake and delivery across schools, and indicates that leadership-related factors such as procedures, planning, and barrier removal may be important for more consistent implementation.

How this study might affect research, practice or policy - summarize the intended study's potential impact and implications.

The findings support continued scaling of holistic, coach-delivered programmes for young athletes, while highlighting the need for stronger implementation supports at school level. For practice and policy, the study suggests that clearer guidance on core content, minimum dose, and leadership responsibilities may improve programme consistency, sustainability, and potential impact on athlete development and health.

INTRODUCTION

Young athletes aiming to reach elite performance level face a range of physical, psychological, and social challenges.[1, 2] A central difficulty is balancing demanding training loads with academic requirements and social life, which necessitates motivation, self-discipline, and effective time management.[3] Athletes are also exposed to injury risk, recovery needs, and the constant contest for improvement and peak performance.[4, 5] In addition, expectations from oneself, coaches, parents, and peers may create stress and anxiety, while setbacks can undermine long-term motivation.[6] Socially, investing fully in sport may require sacrificing typical adolescent experiences, potentially resulting in feelings of isolation or missed/reduced opportunities for social development.[7, 8] Taken together, these factors render everyday school life particularly demanding for young athletes.[7]

Sports high schools in Norway are responsible for supporting both athletic and educational development, as an integral part of the school curriculum (280/140 hours of specialized subjects).[9, 10] To address this need, Prep to be PRO was developed in collaboration with schools, aiming to equip athletes with knowledge and strategies for maintaining holistic health.[11] Prep to be PRO is a structured educational program for coaches, comprising ten modules covering core aspects of athlete development such as performance training, growth and maturation, load management, nutrition, recovery, and mental health, adapted to age-specific needs. Across all modules, the coach–athlete relationship is emphasised as a central theme, given that it is widely recognised as a significant factor influencing athletes' performance and psychological well-being.[12, 13] The program's central aim is to prepare athletes both physically and mentally, not only for high-level competition but also for a balanced life, fostering resilient and disciplined individuals capable of managing both sport and life with confidence.

Although earlier studies have documented experiences from the development and pilot phase of Prep to be PRO, systematic knowledge about how the programme functions in a broader implementation context following national rollout, including how coaches and athletes perceive its content and delivery, remains limited. This article addresses this gap by examining uptake, delivery, and perceived value across 20 schools in Norway during the first 18 months of implementation. Specifically, the study explored the experience of coaches and

athletes with the program, and coaches' perceptions of the extent of support provided by school leadership during implementation.

METHODS

Study design

This study evaluated data collected from coaches and athletes in sports high schools over 18 months, either as pre-post module evaluations or through a semester evaluation conducted during the same period.

Participants

The study included 57 coaches (24 pre-post evaluations and 33 semester evaluations) and 1134 athletes (847 pre-post evaluations and 287 semester evaluations) across 20 sports high schools, of which three were Sports Junior High Schools and 17 were Sports Academy High Schools.

Questionnaire Development

The development of the questionnaires has been described previously (reference to manuscript under review). The self-report questionnaires were revised through linguistic adaptations as well as adjusting the number of items, to better suit the target population. Following these revisions, the questionnaires were pilot tested with five professionals (three healthcare workers and two coaches) to assess item clarity and comprehensibility. These modifications were made to improve usability and support feasible and efficient administration of the evaluations in school settings. The evaluations assessed uptake, delivery, and perceived value of the program, as well as participants' experiences of the teaching process. In addition, the questionnaires captured perceptions of school leadership support for the coaches.

Coach Questionnaire

Two versions of the coach questionnaire were used, a pre-post module evaluation version consisting of 18 items (Appendix 1) and a semester version consisting of 20 items (Appendix 2). In both questionnaires, 11 items specifically assessed perceived leadership support,

measured with the validated Implementation Leadership Scale.[14] Both questionnaires addressed the following domains: demographics, background and experience, teaching-related evaluations, feedback on the module and perceived athlete outcomes. Item responses were recorded on scales, with the scale format varying according to item content (Appendix 1-2).

Adaptation of Data Collection

School management identified barriers to the pre-post module evaluation during the initial phase of data collection. To maximize response rates, an alternative semester-based evaluation was introduced. This allowed participants who had completed the instructional module but had not responded to the pre-post evaluation earlier in the semester, to also provide feedback.

Athlete Questionnaire

The athlete version contained 20 items covering demographics, knowledge of the topic, perceived usefulness of and interest in the modules and the extent to which the module increased confidence in decision-making and promoted independence. Different rating scales were used to assess these domains (Appendix 3).

Ethical Considerations

The evaluation was conducted with clear ethical safeguards to ensure privacy and safe participation. Participants were informed about the aims of the study and the voluntary nature of participation, could withdraw at any time without consequences, and parents or legal guardians were informed through the schools. The study has been approved by the Norwegian Agency for Shared Services in Education and Research (Project no. 628912) and from the Ethics Committee at the Norwegian School of Sport Sciences (Protocol no. 289-150623).

RESULTS

Program uptake and delivery

During the first 18 months, 20 of 35 sports high schools in Norway (57%) adopted the Prep to be PRO program. Of these, 17 were Sports Academy High Schools and 3 were Sports

Junior High Schools. Implementation varied across schools, ranging from one to three modules, but in most cases, schools delivered one module per semester, whereas a smaller number implemented two or three modules within a single semester. The most frequently implemented modules were Recovery, Load management, Total load and Nutrition, while Performance training (part one and two), Mental health, Growth & maturation and Critical periods were applied less frequently.

Coach sample and perceptions

The background characteristics of the 57 coaches completing surveys are presented in Table 1.

Table 1. Coach characteristics (N = 57).

Variable	N (%)
Gender	
Female	27 (47.4)
Male	30 (52.6)
Age (years)	
20–29	4 (7.0)
30–39	27 (47.4)
40–49	20 (35.1)
50–59	6 (10.5)
60+	0 (0.0)
Position at school	
Coach	40 (70.2)
Teacher	8 (14.0)
Other	24 (42.1)
Coaching/teaching experience (years)	
0–2	5 (8.8)
3–5	9 (15.8)
6–10	29 (50.9)
> 10	13 (22.8)
Missing	1 (1.7)

Note: Values are n (%). Denominators vary due to optional responses (available-case analysis). For position at school, multiple responses were allowed; percentages may exceed 100%.

As shown in Table 2, coaches reported highly positive evaluations of both module relevance (n=56; median 5, IQR 4–5) and the extent to which the Prep to be PRO modules supported athletes in making better choices for themselves (n=57; median 4, IQR 4–5), with only a small minority assigning a moderate rating and no ratings in the lower range.

Table 2. Coach ratings of “Module relevance” indicate perceived relevance of the modules they had delivered to their athletes, while “Enables better choices” indicate a perceived extent to which these Prep to be PRO modules enables athletes to make better choices for themselves.

Response category	Module relevance	Enables better choices
1 (Very low degree)	-	-
2	1 (1.8)	-
3	5 (8.8)	8 (14.0)
4	13 (22.7)	31 (54.4)
5 (Very high degree)	37 (64.9)	18 (31.6)
Missing	1 (1.8)	-
Total (valid)	57 (100)	57 (100)

Note. Ratings were on a 5-point Likert scale (1=very low degree, 5=very high degree). Values are n (%).

Perceived implementation leadership support

Descriptive statistics for the Implementation Leadership Scale items are presented in Table 3.

On a 0–4 numeric scale, mean item scores ranged from 2.8 to 3.5 (SD 0.6–1.1).

Table 3. Perceived implementation leadership related to Prep to be PRO.

Item	N	Mean	SD
My leader sustains the implementation of Prep to be PRO in the face of both favourable and unfavourable conditions.	54	3.5	0.7
My leader supports employees’ efforts to use Prep to be PRO.	54	3.5	0.8
My leader supports employees’ efforts to learn more about Prep to be PRO.	54	3.5	0.6
My leader continues with the implementation of Prep to be PRO despite challenges.	53	3.3	0.8
My leader addresses pressing issues related to the implementation of Prep to be PRO in an open manner.	54	3.2	0.9
My leader acknowledges and appreciates employees’ efforts to succeed with the implementation of Prep to be PRO.	53	3.2	0.8

My leader has removed barriers to the implementation of Prep to be PRO.	55	3.0	1.0
My leader has developed a plan to facilitate the implementation of Prep to be PRO.	55	3.0	1.0
My leader knows what he/she is talking about regarding Prep to be PRO.	54	2.9	1.1
My leader is knowledgeable about Prep to be PRO.	55	2.9	0.9
My leader has established a clear procedure for the implementation of Prep to be PRO.	54	2.8	1.1

Note. Items rated 0–4, higher scores indicate stronger agreement. Values are mean and SD. Item-level n varies due to missing responses.

Coach semester evaluations, module satisfaction and instructional time

Coaches (N=33) rated each module on a 1–5 scale, where 1 indicated very low satisfaction and 5 indicated very high satisfaction (Table 4). Mean module ratings ranged from 3.5 (Growth and maturation) to 4.2 (Recovery).

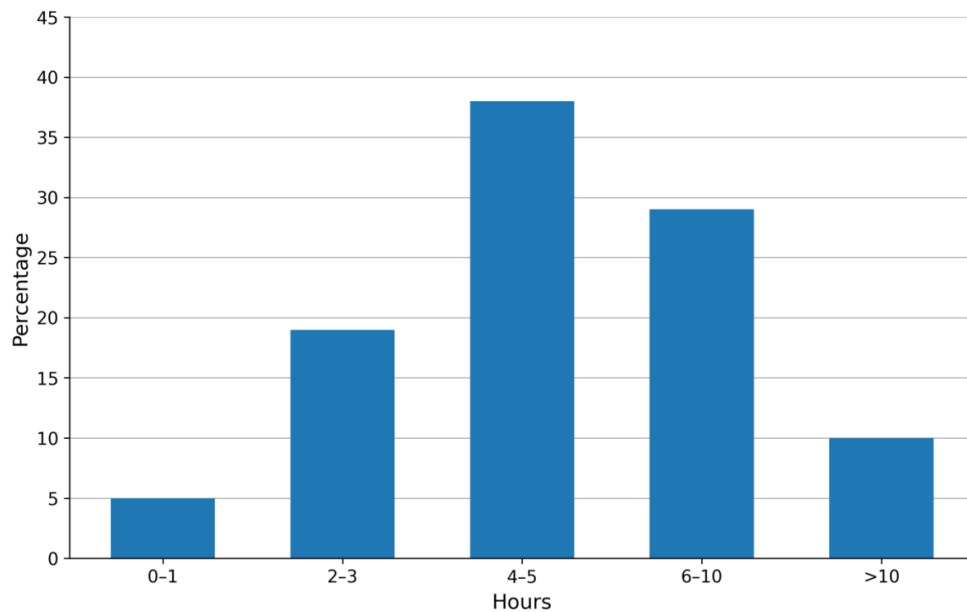
Table 4. Coach module satisfaction (semester evaluations, n=33).

Module	N	Mean	SD
Recovery	12	4.2	0.8
Sports Nutrition	8	4.1	0.6
Nutrition («Eat smart»)	9	4.0	0.9
Total Load	10	4.0	0.8
Load management	9	3.9	0.8
Critical periods («Be aware»)	6	3.8	0.4
Sports psychology	6	3.7	1.0
Performance training (part one and two)	5	3.6	1.0
Growth and maturation	6	3.5	1.1

Note. Satisfaction rated 1–5 (1=very low, 5=very high). Numbers (n) are presented according to the frequency with which each module was implemented. Values are mean and SD.

Coaching time used per module is shown in Figure 1. Twelve coaches did not report instructional time.

Figure 1. Average instructional time per module (valid responses, n=21)



Athlete sample and ratings of the teaching sessions

Athlete background characteristics are presented in Table 5 (n=1134). Participants were Sports Academy High School athletes (67.6%), and Sports Junior High School athletes (32.4%).

Table 5. Athlete characteristics (N = 1134).

Variable	N (%)
Gender	
Female	512 (45.2)
Male	607 (53.4)
Other	10 (0.9)
Prefer not to disclose	2 (0.2)
Missing	3 (0.3)
Class/grade	
Sports Junior High Schools:	367 (32.4)
Grade 8	60 (5.3)
Grade 9	55 (4.9)
Grade 10	252 (22.2)

Sports Academy High Schools:	767 (67.6)
Vg1 / Grade 11	402 (35.4)
Vg2 / Grade 12	290 (25.6)
Vg3 / Grade 13	75 (6.6)

Note: Values are n (%). Denominators vary due to optional responses (available-case analysis).

Athletes represented 35 different sports, with football (N=287), handball (N=215), ice hockey (N=142), cross-country skiing (N=82), alpine skiing (N=39), swimming (N=38), and cycling (N=32) as the most common.

Ratings of the teaching sessions are presented in Table 6. Across items, mean scores ranged from 2.1 (SD 1.1) to 4.5 (SD 0.8), with the lowest mean for “I did not like the instructions in these modules” 2.1 (SD 1.1) and the highest mean for “Knowledge about these modules is useful to me” 4.5 (SD 0.8).

Table 6. Athlete ratings of the teaching sessions.

Statement / Item	N	Mean	SD
Knowledge about these modules is useful to me	1129	4.5	0.8
The materials related to the modules will be useful to me in the long term	1092	4.3	0.9
The module instruction is relevant to me	1093	4.3	0.8
What I learned about these topics in the modules is useful in everyday life	1093	4.2	0.8
The module instruction makes me confident in making my own choices that are good for me	1089	4.0	0.9
I have learned something new in these modules	1130	4.0	1.0
What I have learned in these modules will lead to changes in my training routine	1129	3.9	1.0
I enjoyed the instruction in these modules	1095	3.8	0.9
I found the teaching in these modules interesting	1091	3.8	0.9
Prep to be PRO modules makes me more confident in my own choices	1124	3.8	0.9
I have learned a lot from the instruction in these modules	1092	3.7	0.9

The tasks/assignments during the sessions on these modules were interesting	1128	3.6	1.0
Knowledge from these topics will lead to changes in my training routine	1131	3.6	1.0
I looked forward to the instruction in these modules	1092	3.0	1.1
I was mostly bored during instruction in these modules	1095	2.6	1.1
I did not like the instructions in these modules	1091	2.1	1.1

Note. Items rated 1–5 (1=strongly disagree, 5=strongly agree). N varies by item. Values are mean and SD.

DISCUSSION

The findings describe early evidence on uptake, delivery, and perceived value of the Prep to be PRO program across 20 Norwegian sports high schools. During the first 18 months, 57% of eligible schools adopted the program, although delivery varied substantially across schools in terms of number and selection of modules delivered and the time allocated to each module. Coaches and athletes generally reported high perceived relevance and usefulness of the content, whereas athletes expressed more moderate agreement with the statement that they looked forward to the instruction in these modules. Overall, implementation leadership was rated positively, but with comparatively lower scores for leadership behaviours related to establishing clear procedures and removing barriers. Together, these findings indicate promising acceptability alongside clear signals that implementation processes and conditions likely influence the dose and breadth of content delivered.

The findings should be interpreted considering Prep to be PRO's holistic profile. Unlike many prevention initiatives that focus primarily on physical training, the program is coach-delivered and targets several domains that matter for young athletes: sport-specific skill development and positive health behaviours, mental conditioning (e.g., staying calm and making good decisions under pressure, building resilience, confidence, and strategies for managing stress and expectations), as well as an academic dimension that supports balance and future opportunities. This broader scope may help explain the generally high perceived relevance reported by participants, but it also increases the demands on implementation, especially when schools and coaches have limited time, or feel less confident delivering certain themes.

Prep to be PRO is intended to support athlete resilience and attentional focus. In addition, it emphasizes the academic dimension of youth athlete development. For young athletes aspiring to a professional career, educational goals may be deprioritized; however, Prep to be PRO acknowledges the importance of education for long-term balance and development. This dual focus may strengthen their preparedness for multiple future pathways, including careers outside professional sport. [15]

Uptake and variability in delivery

A key finding was that only about half of sports high schools adopted Prep to be PRO within 18 months, and that implementation ranged from one to three modules across schools. Such variation is common in early implementation phases, where local capacity, timetabling constraints, competing initiatives, staff turnover, and differing perceptions of fit can affect adoption and sustained delivery.[16-18] The most frequently implemented topics (Recovery, Load management, Total Load, Sports Nutrition and Nutrition) may be those that are easily integrated into existing sport-school routines, and that coaches may view as readily applicable in day-to-day-practice. In contrast, modules on Mental health, Growth & maturation, and Critical periods were implemented less frequently, which may reflect lower confidence in addressing the topics, or uncertainty about pedagogical approaches for these themes. From an implementation perspective, the observed heterogeneity suggests a need to clarify a “core” minimum dose (i.e., essential modules and recommended instructional time) while retaining flexibility for local adaptation.[19] This might ensure that key learning objectives are delivered consistently, while still allowing contextual-specific tailoring that can support feasibility.[20, 21]

Coach perception of relevance and impact

Coaches rated the modules as highly relevant and enabling for their athletes to make better choices (Table 2). These findings support the acceptability and perceived value of the program among implementers, which is considered a necessary condition for continued use.[22-24]

Implementation leadership as a plausible enabling factor

Coaches reported generally high scores on perceived implementation leadership scale (Table 3), particularly on items reflecting support and persistence. This supports the idea that visible

encouragement and sustained prioritization by immediate leaders may foster implementation readiness and normalize the program as part of everyday practice. In educational improvement research, support from school leadership is consistently emphasized as a critical condition for long-term implementation; for example, Fullan highlights the central role of principals and school leaders in shaping and sustaining change initiatives over time, a point also underscored in recent syntheses of sustainment in school reforms.[18]

At the same scale, comparatively lower mean ratings for items related to planning, establishing clear procedures, removing barriers, and leaders' knowledge point to potential bottlenecks in the operationalization of the program. Despite generally positive perceptions of the program, these results suggest that leadership and coordination support were not equally established across schools. Such weaknesses may increase staff workload and implementation uncertainty, thereby undermine fidelity and contribute to inconsistent delivery of the program. It may also reduce the sustainability of implementation over time and may help explain the substantial variation in program delivery observed across schools.

Overall, these findings point to practical opportunities for strengthening implementation; providing leaders and schools with a simple implementation package (e.g., a handbook with brief plan template, role descriptions, recommended scheduling, and a barrier-removal checklist) could support a more consistent delivery across different schools. Increasing leaders' familiarity with the program content and purpose may also improve their ability to allocate time and resources and to respond to implementation challenges as they arise.

Module-specific satisfaction and time investment

In semester evaluations, coaches reported moderate-to-high satisfaction across modules (Table 4), with Recovery and Nutrition topics rated highest. The reasons for this ranking are not known; however, it may reflect that Recovery and Nutrition provide immediate, practical benefits for daily training readiness (e.g., better sleep, restored glycogen stores, and muscle repair). Adolescents may be particularly vulnerable to sleep loss and low energy availability under combined training and school demands and these factors are relatively easy to adjust within athletes' daily routines. Modules rated somewhat lower (e.g., Growth & maturation, Performance training) may benefit from targeted refinements to increase perceived usability, sport-specific relevance, or ease of instruction. Reported instructional time per module also

varied (Figure 1), which may reflect differences in school timetables and expectations, and/or differences in how schools interpret what constitutes “delivery” (e.g., a single session vs. multi-session integration). Standardizing guidance on recommended contact time and providing examples of low-resource vs. extended delivery formats could support more comparable implementation, without removing the option to adapt delivery to local constraints and sport-specific needs.[25]

Athletes’ perceptions: high usefulness, mixed expectations

Athletes reported consistently positive perceptions of usefulness and relevance across most items (Table 6), with the highest mean score for the item “Perceived usefulness of the topics” (M=4.5). Athletes also reported learning something new and increased confidence in their own choices, suggesting that the program may influence important outcomes such as perceived knowledge gains and self-efficacy. At the same time, items reflecting motivation or anticipation before sessions were somewhat lower, indicating that even when content is judged valuable, engagement may depend on delivery format, timing, and perceived relevance.

The findings are consistent with evidence that active learning and explicit communication of immediate personal relevance are associated with greater engagement and improved learning outcomes than passive instruction.[26, 27] Accordingly, this pattern has some pedagogical implications: schools may strengthen interest and excitement by increasing interactivity (e.g., athlete-led discussions, sport-specific case examples, brief applied tasks before or between sessions) and by clarifying why the content matters in relation to athletes’ upcoming training loads, competition phases, and recovery demands. Importantly, athletes’ low agreement with negative items indicates limited dissatisfaction, suggesting that improvements may be achievable primarily through engagement-oriented refinements rather than major content changes.

Strengths and limitations

Major strengths of the study are the large athlete sample size, coverage across multiple schools and sports, and the inclusion of a validated implementation leadership measure. Also, the self-developed questionnaires were piloted prior to rollout. Feedback from a small but multidisciplinary group (three healthcare professionals and two educators) was used to assess

whether the language and structure were clear and accessible. Only minor revisions were required before the questionnaires were integrated into the main platform, which suggests reasonable face validity and practical usability for the intended respondents.

However, some limitations also need to be addressed. When interpreting the results, it should be noted that we measured the perceived relevance and impact rather than direct evidence of behavioural change. Coaches may perceive impact from athlete engagement or conversations, but without objective measures (e.g., knowledge tests, observed behaviour, training diary changes, injury outcomes), the present data cannot determine whether the program changed athletes' practices. Future evaluations may benefit from combining perceived usefulness with near-term outcomes (e.g., knowledge and self-efficacy) and more long-term endpoints (e.g., training behaviour and health outcomes). In addition, differences in measurement design matter; while pre- and post-evaluations enable more longitudinal insight across schools, the semester evaluations were collected at a single measurement point where "baseline ratings" reflected retrospective perceptions after instruction, introducing potential recall bias.

Other limitations should also include that data is largely self-reported and cross-sectional, limiting causal conclusions and may lead to overly positive self-reports. Second, that item-level missingness varied due to optional responses, which may introduce nonresponse bias if those who responded differed systematically from those who did not. Finally, that uptake estimates reflect adoption within a defined period and do not capture longer-term sustainment.

Implications and future directions

The findings support continued scaling of Prep to be PRO, while highlighting the importance of implementation supports that can reduce variability in delivery. A practical next step is to define a recommended core module set, minimum dose guidance, and a simple implementation plan for leaders and coaches. Future research should assess whether perceived usefulness translates into measurable changes in knowledge, self-regulation, training behaviours, and health outcomes. Complementary qualitative work (e.g., interviews with leaders, coaches, and athletes) could identify context-specific barriers and facilitators.

Conclusions

Within 18 months, Prep to be PRO was adopted by 20 of Norwegian sports high schools and was generally perceived as relevant and useful by both coaches and athletes. Implementation varied markedly across schools, and leadership behaviours related to procedures and barrier removal may represent actionable strategies to improve consistency. Strengthening implementation support and incorporating objective outcome measurements should be prioritized in the next phase of evaluation. Equally important is adopting a whole-system approach that engages athletes and their entire support network (including parents, school leaders, teachers, and school- and club-based coaches) to promote ongoing development while safeguarding health and well-being, and to foster shared ownership and aligned goal setting.

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Authors' contributions

HH designed the research project and was responsible for the collection and analysis of data. All authors made substantial contributions to the drafting and writing of the manuscript. All authors have read and approved the final version of the article and agree with the order in which the authors are presented. The guarantor is Oslo Sports Trauma Research Center, represented by Professor Roald Bahr.

Competing interests

No competing interests declared. The project was financed and conducted by Oslo Sports Trauma Research Center at the Norwegian School of Sports Sciences, and the Norwegian School of Sports Science provided the funding. All authors are employed at the Oslo Sports Trauma Research Center at the Norwegian School of Sports Sciences. One author held a part-time position at the Norwegian Olympic Sport Center.

Supplementary Materials/Appendix

Appendix 1-3.

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Appendix I - XIII

Appendix I: The project does not require approval from the Regional Committees for Medical and Health Research Ethics

Appendix II: Approval letter from the Norwegian Agency for Shared Services in Education and Research (SIKT)

Appendix III: Approval letter from Ethical Committee, Norwegian School of Sports Sciences

Appendix IV: Official confirmation from Wang schools

Appendix V: Official confirmation from Norges Toppidretts Gymnas schools

Appendix VI: Information Sheet and Informed Consent Form for Athletes and Parents/Guardians

Appendix VII: Information Sheet and Informed Consent Form for Coaches

Appendix VIII: Information Sheet on Third-Party Personal Data

Appendix IX: Questionnaire, Coaches, Paper II

Appendix X: Questionnaire, Athletes, Paper II

Appendix XI: Questionnaire, Coaches pre-post evaluation, Paper III

Appendix XII: Questionnaire, Coaches end of semester evaluation, Paper III

Appendix XIII: Questionnaire, Athletes, Paper III

Region:	Saksbehandler:	E-post:	Telefon:	Vår dato:	Vår referanse:
REK sør-øst A	Elin Evju Sagbakken	rek-sorost@medisin.uio.no	22845502	12.06.2023	633717

Christine Holm Moseid

Fremleggingsvurdering: «Nærmere Best»

Utvikling, bruk og nytte av et undervisnings-verktøy for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Søknadsnummer: 633717

Forskningsansvarlig institusjon: Norges idrettshøgskole

Prosjektet vurderes som ikke fremleggingspliktig

Søkers beskrivelse

Det overordnede målet med prosjektet er å dokumentere utviklingsprosessen og implementeringen av Nærmere Best-undervisningsverktøyet, samt undersøke bruk og opplevd nytte av Nærmere Best-modulene. Vi vil innhente evalueringer fra både elever og trenere/lærere før og etter gjennomføring av hver enkelt modul på utvalgte idrettsungdomsskoler og toppidrettsskoler gjennom skoleåret 2023/24. Et langsiktig mål er at elevene gjennom undervisnings-modulene tilegner seg relevant kunnskap som gjør de mer motiverte for, og i bedre stand til, å ta gode valg for seg selv. Prosjektet inneholder en retrospektiv, longitudinell kohorte-studie. Primær målgruppe er elever i 10 klasse ungdomsskole og 1-3 klasse vgs. Sekundær målgruppe er trenere/lærere som underviser i Nærmere Best-modulene. Vi vil undersøke hvordan eksponering for Nærmere Best-undervisning kan påvirke ulike determinanter via repeterte spørreskjema-målinger.

Vi viser til innsendt fremleggingsvurderingsskjema datert 05.06.2023. Henvendelsen er behandlet av leder i Regional komité for medisinsk og helsefaglig forskningsetikk (REK) sør-øst A på fullmakt.

REKs vurdering

Slik prosjektet og dets formål vurderes, basert på de opplysninger som fremkommer av framleggingsvurderingen er hensikten med prosjektet å dokumentere utviklingsprosessen og implementeringen av Nærmere Best-undervisningsverktøyet, samt undersøke bruk og opplevd nytte av Nærmere Best-modulene.

De vil innhente evalueringer fra både elever og trenere/lærere før og etter gjennomføring av hver enkelt modul på utvalgte idrettsungdomsskoler og toppidrettsskoler gjennom skoleåret 2023/24. Et langsiktig mål er at elevene gjennom undervisnings-modulene tilegner seg relevant kunnskap som gjør de mer motiverte for, og i bedre stand til, å ta gode valg for seg selv.

Etter REKs vurdering faller prosjektet, slik det er beskrevet, utenfor virkeområdet til

helseforskningsloven da hovedfokus er å teste ut et undervisningsverktøy på elever ved utvalgte idrettsungdomsskoler og toppidrettsskoler.

Helseforskningsloven gjelder for medisinsk og helsefaglig forskning, i loven definert som forskning på mennesker, humant biologisk materiale og helseopplysninger, som har som formål å frambringe ny kunnskap om helse og sykdom, jf. helseforskningsloven §§ 2 og 4a. Formålet er avgjørende, ikke om forskningen utføres av helsepersonell eller på pasienter/sårbare grupper eller benytter helseopplysninger.

Konklusjon

Prosjekter som faller utenfor helseforskningslovens virkeområde kan gjennomføres uten godkjenning av REK. Det er institusjonens ansvar på å sørge for at prosjektet gjennomføres på en forsvarlig måte med hensyn til for eksempel regler for taushetsplikt og personvern.

Vi gjør oppmerksom på at vurderingen og konklusjonen er å anse som veiledende jf. forvaltningsloven § 11.

Dersom dere likevel ønsker å søke REK vil søknaden bli behandlet i komitémøte, og det vil bli fattet et enkeltvedtak etter forvaltningsloven.

Vi ber om at alle henvendelser sendes inn via vår saksportal: <https://rekportalen.no>.

Vennligst oppgi vårt referansenummer i korrespondansen.

Med vennlig hilsen

Kristian Bjøro
Professor dr. med.
Leder REK sør-øst A

Elin Evju Sagbakken
Seniorrådgiver, REK sør-øst A

Kopi til:
Norges idrettshøgskole

SIKT

Vurdering av behandling av personopplysninger

Skriv ut

11.07.2023

Referansenummer

628912

Vurderingstype

Standard

Dato

11.07.2023

Tittel

Nærmere Best

Behandlingsansvarlig institusjon

Norges idrettshøgskole / Senter for idrettsskedeforskning

Prosjektansvarlig

Christine Holm Moseid

Prosjektperiode

15.08.2023 - 25.06.2024

Kategorier personopplysninger

- Alminnelige
- Særlige

Lovlig grunnlag

- Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)
- Uttrykkelig samtykke (Personvernforordningen art. 9 nr. 2 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 25.06.2024.

[Meldeskjema](#)

Kommentar

OM VURDERINGEN Sikt har en avtale med institusjonen du forsker eller studerer ved. Denne avtalen innebærer at vi skal gi deg råd slik at behandlingen av personopplysninger i prosjektet ditt er lovlig etter personvernregelverket. Vi har nå vurdert at du har lovlig grunnlag til å behandle personopplysningene.

FREMLAGT FOR REK – IKKE SØKNADSPLIKTIG Du har lagt prosjektet frem for REK. REK mener prosjektet ikke fremstår som helseforskning, og derfor ikke trenger godkjenning fra REK.

ETISK GODKJENNING Etisk komite ved Norges idrettshøgskole (NIH) har vurdert prosjektet som forsvarlig og at det kan gjennomføres innenfor rammene av anerkjente etiske forskningsetiske normer nedfelt i NIHs retningslinjer.

TYPE PERSONOPPLYSNINGER Prosjektet vil behandle alminnelige og særlige kategorier av personopplysninger om helse. Det behandles kun særlige kategorier om utvalg 2. elevene.

LOVLIG GRUNNLAG UTVALG 1. Lovlig grunnlag for behandlingen av personopplysninger vil være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 a).

UTVALG 2. Prosjektet vil innhente samtykke fra foresatte til behandlingen av personopplysninger om elever som er under 16 år. Lovlig grunnlag for behandlingen av personopplysninger vil være den registrertes samtykke, jf. personvernforordningen art. 6 nr. 1 a). Den registrerte gir sitt uttrykkelige samtykke til behandlingen av særlige kategorier av personopplysninger. Dermed gjelder ikke forbudet i personvernforordningen art. 9 nr. 1, ettersom vilkår for unntaket i art. 9 nr. 2 a) er oppfylt.

TREDJEPERSONER Under datainnsamlingen av utvalg 1. det vil si, trenere/lærere/undervisere kan det fremkomme opplysninger om ledelsen på skolen eller i organisasjonen om hvordan de opplever lederstøtten i implementeringen av tiltaket. Den planlagte behandlingen av personopplysninger er nødvendig for å utføre en oppgave i allmennhetens interesse, jf. personvernforordningen art. 6 nr. 1 e). Ifølge art. 6 nr. 3 b) skal grunnlaget for slik behandling fastsettes nærmere i nasjonal rett. Personopplysningsloven § 8 stadfester at behandling av personopplysninger for arkiv-, forsknings- eller statistikkformål er i allmennhetens interesse og kan gjøres på grunnlag av art. 6 nr. 1 e). Prosjektet gjør nødvendige tiltak for å ivareta de registrertes rettigheter og friheter, jf. art. 89 nr. 1. I vår vurdering har vi lagt vekt på at tredjepersoner får informasjon, at det ikke vil være mulig å identifisere tredjepersoner i det publiserte materialet og at prosjektperioden er kort. Så lenge tredjepersoner kan identifiseres i datamaterialet vil de ha følgende rettigheter, jf. personvernforordningen: innsyn (art. 15), retting (art. 16), sletting (art. 17), begrensning (art. 18) og protest (art. 21).

TAUSHETSLIKT Forskningsdeltagerne, det vil si utvalg 1. har yrkesmessig taushetsplikt. De kan ikke dele taushetsbelagte opplysninger med forskningsprosjektet. Vi anbefaler at du minner dem på taushetsplikten. Merk at det ikke er nok å utelate navn ved omtale av elever, pasienter el. Vær forsiktig med bruk av eksempler og bakgrunnsopplysninger som tid, sted, kjønn og alder.

DATABASEHANDLER Vi legger til grunn at behandlingen oppfyller kravene til bruk av databehandler, jf. personvernforordningen art. 28 og 29.

IKKE BEHOV FOR DPIA Om utvalg 2 behandler prosjektet personopplysninger: - om sårbare registrerte - sensitive personopplysninger (særlige kategorier) I tillegg behandles det personopplysninger i stor skala om utvalgene, samt tredjepersoner og antall ganger spørreskjemaene skal besvares (mht. utvalgsstørrelse og regelmessighet) Vanligvis krever dette en mer omfattende vurdering (DPIA). Vi mener det likevel ikke er høy risiko for personvernet og at prosjektet derfor ikke trenger en DPIA. Dette fordi: - Alle forskningsdeltagerne får informasjon - Utvalg 1 og 2 samtykker - Rekrutteringen sikrer reell frivillighet - Det behandles begrenset opplysninger - Få personer har tilgang - Varigheten av behandlingen er kort - Prosjektet har etisk godkjenning

FØLG DIN INSTITUSJONS RETNINGSLINJER Det er institusjonen du er ansatt/student ved som avgjør hvordan du må lagre og sikre data i ditt prosjekt og hvilke databehandlere du kan bruke. Husk å bruke leverandører som din institusjon har avtale med (f.eks. ved skylagring, nettpørreskjema, videosamtale el.). Personverntjenester legger til grunn at behandlingen oppfyller kravene i personvernforordningen om riktighet (art. 5.1 d), integritet og konfidensialitet (art. 5.1. f) og sikkerhet (art. 32).

MELD VESENTLIGE ENDRINGER Dersom det skjer vesentlige endringer i behandlingen av personopplysninger, kan det være nødvendig å melde dette til oss ved å oppdatere meldeskjemaet. Se våre nettsider om hvilke endringer du må melde: <https://sikt.no/melde-endringer-i-meldeskjema>

OPPFØLGING AV PROSJEKTET Vi vil følge opp ved planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet. Lykke til med prosjektet!

Søknad 289 – 150623 - Utvikling, bruk og nytte av et undervisningsverktøy for ungdom på idrettsungdomsskoler og toppidrettsvideregående skoler

Komiteen viser til opprinnelig søknad med prosjektbeskrivelse, informasjonsskriv samt innsendt melding til SIKT/NSD. Videre vises det til møte av 19. juni og til ettersendt tilleggsinformasjon om prosjektet, herunder nærmere redegjørelse for prosjektet, bekreftelse fra to skoler om deltagelse i prosjektet samt spørreskjema. Med hensyn til spørreskjema er komiteen også blitt forelagt anbefaling fra Helsedirektoratet om bruk av målesystem for livskvalitet, som også er planlagt å inngå i prosjektet. Videre viser komiteen til at prosjektet er forelagt REK som ledd i en **fremleggelsesvurdering**.

I henhold til retningslinjer for behandling av søknad til etisk komite for idrettsvitenskapelig forskning på mennesker, ha komiteen basert på ovennevnte konkludert med følgende:

Vurdering

Av søknad med vedlagte dokumentasjon fremgår at formålet med prosjektet er å dokumentere utviklingsprosessen og implementeringen av et allerede utviklet undervisningsverktøy under navnet «Nærmere Best», samt undersøke bruk og opplevd nytte av verktøyet. «Nærmest Best» er utviklet med den hensikt å bidra til å forebygge skader og sykdom hos elever som går på idrettsungdomsskoler og toppidrettskoler. Primærutvalget for dette prosjektet er elever ved utvalgte skoler i skoleåret 2023/24. Elevenes alder er fra 15-19 år. Sekundærutvalget er lærere og trenere (over 18 år) som bruker undervisningsverktøyet ved de samme skolene. Prosjektet er et doktorgradsprosjekt med tre delprosjekter:

- 1) Beskrive utvikling av undervisningsopplegg som over flere år har vært under utprøving ved aktuelle skoler med idrettsfag.
- 2) Undersøke elevers bruk og gjennomføring av programmet
- 3) Undersøke læreres bruk og gjennomføring av programmet

Med bakgrunn i forelagte dokumentasjon samt dialog med prosjektledelsen, så er komiteen av den oppfatning at prosjektet ikke reiser vesentlige forskningsetiske problemstillinger. Når det er sagt finner vi grunn til å presisere at Komiteen i sin vurdering ikke har tatt stilling til selve utviklingen av verktøyet, da vi mener at dette utviklingsløpet i tid ligger utenfor selve prosjektet. Komiteen har imidlertid ingen forskningsetiske innsigelser at man i prosjektets del

1 foretar en deskriptiv gjennomgang av utviklingsløpet. Dette bør komme klart frem som ledd i publiseringen av resultater fra prosjektet slik at det ikke er tvil om hva som er en del av forskningen og hva som er gjort i forkant av selve doktorgradsprosjektet og som danner grunnlag for denne forskningsetiske vurdering.

I henhold til søknaden planlegges det en pilotering av spørreskjema til bruk i del 2 og 3 av prosjektet over sommeren. Komiteen gjør i den forbindelse oppmerksom på at dersom et prosjekt gjør vesentlige endringer i forhold til det komiteen har vurdert, som f.eks. endring av spørreskjema i form av nye og endrede spørsmål, så forutsetter dette en endringsmelding til komiteen før endringen kan implementeres. Komiteen gjør for øvrig oppmerksom på at det i forelagte søknad er forskjeller mellom spørreskjema og informasjonsskriv når det gjelder opplysninger om hvor lang tid det tar å besvare spørsmålene. Dette må etter komiteens vurdering kalibreres. I utkast til samtykkeskriv mangler også kontaktinformasjon til henholdsvis prosjektleder og personvernombudet. Dette bør legges inn og anbefaler at NIHs mal for informasjonsskriv benyttes i prosjektet.

Komiteen ber prosjektleder være oppmerksom på et mulig opplevd press til å delta og forutsetter at det etableres tiltak som reduserer dette. For elever som ikke ønsker å delta vil det være uheldig at spørreskjemaet skal fylles ut i skoletiden og det bør i samarbeid med skolen/lærer legges til rette for alternativ aktivitet/undervisning for de elever som ikke ønsker å delta.

Komiteen savner også et eget punkt i prosjektbeskrivelsen vedr etiske vurderinger i prosjektet i tråd med det som følger av punkt 4 i søknaden til NIH etisk komite.

Avslutningsvis minner Komiteen om at NSD har blitt en del av SIKT, og har skiftet navn til SIKT. For å unngå misforståelse må det nye navnet brukes i prosjektdokumentasjon.

Vedtak

På bakgrunn av forelagte dokumentasjon finner komiteen å kunne godkjenne prosjektet med de presiseringer som følger over ved del 1. Gitt denne presisering vurderer komiteen prosjektet som forsvarlig og at det kan gjennomføres innenfor rammene av anerkjente etiske forskningsetiske normer nedfelt i NIHs retningslinjer.

Til vedtaket har komiteen lagt følgende forutsetning til grunn:

- *Vilkår fra SIKT følges*
- *At prosjektleder etablerer tiltak for å redusere et mulig press til å delta i spørreundersøkelsen*
- *At informasjonsskriv/samtykkeskriv og spørreskjema justeres i tråd med komiteens merknader og ettersendes komiteen til orientering*

- *At prosjektbeskrivelsen oppdateres med et eget punkt om forskningsetiske vurderinger i tråd med komiteens merknader og at denne sendes til komiteen til orientering*

Leder av komiteen gjør oppmerksom på at vedtaket er avgrenset i tråd med fremlagte dokumentasjon. Dersom det gjøres vesentlige endringer i prosjektet som kan ha betydning for deltakernes helse og sikkerhet, skal dette legges fram for komiteen før eventuelle endringer kan iverksettes.

Med vennlig hilsen



Professor Anne Marte Pensgaard
Leder, Etisk komite, Norges idrettshøgskole

Bekreftelse på Nærmere Best-undervisning ved våre skoler.

Jeg bekrefter at Wang-skolene ønsker å bruke Nærmere Best-materiellet i ordinær skoleundervisning for våre elever.

Undervisningen vil gjennomføres av ansatte arbeidstakere på skolene, -trenere, lærere, helsepersonell eller andre.

Med vennlig hilsen

WANG videregående
WANG Toppidrett

Dato: 20/6 - 23

Navn: Sture A. Aamodt

Stilling: Prosjektleder

"Helhetlig helse"



Bekreftelse på Nærmere Best-undervisning ved våre NTG-skoler

Jeg bekrefter at NTG-skolene ønsker å bruke Nærmere Best-materiellet i ordinær skoleundervisning for våre elever.

Undervisningen vil gjennomføres av ansatte arbeidstakere på skolene, -trenere, lærere, helsepersonell eller andre.

Bærum 20.06.23

Med vennlig hilsen

A handwritten signature in blue ink, appearing to read 'Thorleif Gunhildrud', is written over a horizontal line.

Navn: Thorleif Gunhildrud

Stilling: Sportsdirektør

NTG Stiftelsen
Hans Burums vei 30, 1357 Bekkestua
Postadresse: Postboks 134, 1319 Bekkestua

Telefon: 67 10 15 60
ntg@ntg.no - www.ntg.no

Org.nr.: 967 341 266



Forespørsel om deltakelse i forskningsprosjektet

«Nærmere Best»

Utvikling, bruk og nytte av et undervisnings-verktøy for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Bakgrunn og hensikt

Dette er et spørsmål til deg om å delta i et forskningsprosjekt der vi ønsker å kartlegge Nærmere Best - undervisningen for unge idrettsutøvere som går på idrettsungdomsskole eller toppidrettsgymnas. Du forespørres om å bli med i studien, siden du begynner eller går i 10. klasse på en idrettsungdomsskole eller i 1-3. klasse på et toppidrettsgymnas, høsten 2023. Undersøkelsen er planlagt og gjennomføres av Senter for idrettsskedeforskning, Norges idrettshøgskole, i samarbeid med skolene Wang og NTG.

Hva innebærer studien?

Studien innebærer at du gjennom skoleåret vil svare på et spørreskjema i forkant og etterkant av hver enkelt Nærmere Best-modul-undervisning, for å undersøke hva Nærmere Best-undervisningen tilfører hver enkelt elev. Spørreskjemaene vil inneholde spørsmål om din kunnskap om og holdninger til de enkelte modul-temaene undervisningen, samt noen generelle spørsmål om hvordan du har det på skolen og i fritiden. Du vil også få et par spørsmål om livskvalitet, antall trenere og hvordan du trener gjennom skoleåret. Du vil ikke motta noen spørreskjema i skolens ferier.

Mulige fordeler og ulemper

Ulempen med å delta i studien er den tiden det tar å fylle ut spørreskjemaene. Spørreskjemaene, som kan fylles ut digitalt på telefonen din, tar ca.15 minutter å svare på, og vil gjennomføres i skoletiden. Det er ingen tilleggs-risiko forbundet med studien.

Hva skjer med informasjonen om deg?

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en navneliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til navnelisten og som kan finne tilbake til deg. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres.

Senere oppfølgingsstudier

Når denne studien er avsluttet, er det mulig at prosjektgruppen vil ta ny kontakt for eventuelle oppfølgingsstudier. Ved å samtykke i å delta i denne studien, gir du også ditt samtykke i å kunne bli kontaktet på ny for mulige oppfølgingsstudier. Opplysningene om deg vil derfor oppbevares i 10 år. Dersom du ikke har blitt kontaktet 10 år etter denne perioden, vil personopplysningene om deg anonymiseres.

Frivillig deltakelse

Det er frivillig å delta i studien. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til å delta i studien. Dette vil ikke få negative konsekvenser for deg. Dersom du ønsker å delta, undertegner du samtykkeerklæringen under. Om du nå sier ja til å delta, kan du senere trekke tilbake ditt samtykke, uten at det påvirker ditt forhold til skolen eller trenere. Dersom du senere ønsker å trekke deg eller har spørsmål til studien, kan du kontakte PhD-stipendiat: Hege Heiestad, e-post: hegeh@nih.no

Studien er godkjent av NSD og REK.

Samtykke til deltakelse i studien

Jeg er villig til å delta i studien

«*Nærmere Best*»

Utvikling, bruk og nytte av et undervisnings-verktøy

for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Navn:

(Signert av prosjektdeltaker, dato)

Godkjenning til deltakelse fra to foresatte (hvis deltager er under 16 år):

(Signert av foresatte, dato)

(Signert av foresatte, dato)

Forespørsel om deltakelse i forskningsprosjektet

«Nærmere Best»

Utvikling, bruk og nytte av et undervisnings-verktøy for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Bakgrunn og hensikt

Dette er et spørsmål til deg om å delta i et forskningsprosjekt der vi ønsker å kartlegge Nærmere Best - undervisningen. Du forespørres om å bli med i studien, siden du er trener eller underviser for elever som begynner eller går i 10. klasse på en idrettsungdomsskole eller i 1-3. klasse på et toppidrettsgymnas, høsten 2023. Undersøkelsen er planlagt og gjennomføres av Senter for idrettsskedeforskning, Norges idrettshøgskole, i samarbeid med skolene Wang og NTG.

Hva innebærer studien?

Studien innebærer at du gjennom skoleåret vil svare på et spørreskjema i etterkant av hver enkelt Nærmere Best-modul-undervisning, for å undersøke din kunnskap om og holdninger til implementeringen av Nærmere Best-undervisningen samt opplevd brukerstøtte fra ledelsen i implementeringsfasen, skoleåret 2023/24. Du vil ikke motta noen spørreskjema i skolens ferier.

Mulige fordeler og ulemper

Ulempen med å delta i studien er den tiden det tar å fylle ut spørreskjemaene. Spørreskjemaene, som kan fylles ut digitalt på telefonen din, tar ca.10-15 minutter å svare på, og vil gjennomføres i skoletiden. Det er ingen tilleggs-risiko forbundet med studien.

Hva skjer med informasjonen om deg?

Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Alle opplysningene vil bli behandlet uten navn og fødselsnummer eller andre direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en navneliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til navnelisten og som kan finne tilbake til deg. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres.

Senere oppfølgingsstudier

Når denne studien er avsluttet, er det mulig at prosjektgruppen vil ta ny kontakt for eventuelle oppfølgingsstudier. Ved å samtykke i å delta i denne studien, gir du også ditt samtykke i å kunne bli kontaktet på ny for mulige oppfølgingsstudier. Opplysningene om deg vil derfor oppbevares i 10 år. Dersom du ikke har blitt kontaktet ila denne perioden, vil personopplysningene om deg anonymiseres.

Frivillig deltakelse

Det er frivillig å delta i studien. Du kan når som helst og uten å oppgi noen grunn trekke ditt samtykke til å delta i studien. Dette vil ikke få negative konsekvenser for deg. Dersom du

ønsker å delta, undertegner du samtykkeerklæringen under. Om du nå sier ja til å delta, kan du senere trekke tilbake ditt samtykke uten at det påvirker ditt forhold til skolen eller trenere.

Dersom du senere ønsker å trekke deg eller har spørsmål til studien, kan du kontakte PhD-stipendiat: Hege Heiestad, e-post: hegeh@nih.no

Studien er godkjent av NSD og REK.

Samtykke til deltakelse i studien

Jeg er villig til å delta i studien

«*Nærmere Best*»

Utvikling, bruk og nytte av et undervisnings-verktøy

for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Navn:

(Signert av prosjektdeltaker, dato)

Informasjon om forskningsprosjektet

Nærmere Best! Utvikling, bruk og nytte av et undervisnings-verktøy for ungdom på idrettsungdomsskoler og toppidretts-videregående skoler.

Bakgrunn og hensikt

Wang og NTG-skolene sentralt ønsker at alle skolene deltar i forskningsprosjektet Nærmere Best. Hege Heiestad, stipendiat på Senter for idrettsskedeforskning ved Norges idrettshøgskole, vil fullføre sin Ph.d. knyttet til dette prosjektet. Formålet med forskningsprosjektet er å undersøke selve implementeringsprosessen ved å ta i bruk et nytt undervisningsverktøy på skolene, samt å kartlegge Nærmere Best-undervisningen i skoleåret 2023/24. Undersøkelsen er planlagt og gjennomføres av Senter for idrettsskedeforskning på Norges idrettshøgskole, i samarbeid med Wang og NTG-skolene. Norges idrettshøgskole er ansvarlig for forskningsprosjektet og behandlingen av personopplysninger er basert på allmenn interesse.

Hva innebærer studien?

Studien innebærer at trenere/lærere som underviser i Nærmere Best-modulene og elevene som deltar i undervisningen, i løpet av skoleåret vil svare på et elektronisk spørreskjema i for- og etterkant av undervisningen (totalt inneholder Nærmere Best 4 moduler for ungdoms-skoler og 6 moduler for videregående skoler).

Trenerne/lærerne vil svare på spørsmål om egen kunnskap om og holdninger til Nærmere Best-undervisningen, samt hvordan de opplever brukerstøtte fra skoleledelsen i implementeringsfasen. For å samle data om hvordan trenerne/lærerne i praksis opplever brukerstøtten, vil det være nødvendig å behandle personopplysninger om tredjepersoner.

Elevene vil få spørsmål om hva nærmere Best -undervisningen tilfører hver enkelt elev, deres kunnskap om og holdninger til de enkelte modul-temaene. Dette vil ikke involvere spørsmål om skoleledelsen.

Informasjonen om deg

Trenerne/ lærere skal svare på spørsmål om opplevd lederstøtte ved implementeringen. Dette blir skolelederne informert om, både i form av dette infoskrivet samt på fellesmøte på den enkelte skole som skal bruke Nærmere Best. Alle innsamlede opplysninger vil bli behandlet konfidensielt og i samsvar med personvernregelverket. Det er kun prosjektgruppen ved behandlingsansvarlig

institusjon som vil ha tilgang til innsamlede data. Det vil ikke være mulig å identifisere enkeltpersoner i resultatene av studien når disse publiseres. Vi behandler opplysningene for formål i prosjektet som er vurdert å være i allmenhetens interesse. Resultatene fra prosjektet vil formidles til alle ansatte på skolene når de foreligger.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til å protestere, be om innsyn, og til retting og sletting av opplysninger vi behandler om deg. Du vil da høre fra oss innen en måned. Vi vil gi deg en god begrunnelse hvis vi mener at du ikke kan identifiseres, eller at rettighetene ikke kan utøves. Du har også rett til å klage til Datatilsynet om hvordan vi behandler dine opplysninger.

Spørsmål

Ved spørsmål eller ønske om å utøve dine rettigheter er det bare å ta kontakt med PhD-stipendiat: Hege Heiestad, e-post: hegeh@nih.no

Prosjektansvarlig for prosjektet er Christine Holm Moseid, e-post: christinem@nih.no og Grethe Myklebust, e-post: grethem@nih.no, og vårt personvernombud for NIH er Rolf Haavik, e-post: personvernombud@nih.no.

Prosjektet faller utenfor helseforskningslovens virkeområde og er skriftlig bekreftet at det kan gjennomføres uten godkjenning av REK. Sikt har vurdert at behandlingen av personopplysninger er i overensstemmelse med personregelverket og Etisk komite ved Norges idrettshøgskole har godkjent prosjektet i sin helhet.

Coach Questionnaire

- 1) What is your gender? (Women, Men, Other)
- 2) What is your age? (20-30, 31-40, 41-50, 51-60, 61-70 years)
- 3) What is your role at school? (Teacher, Coach, Sports Administrator, or Health Personnel (multiple options allowed)?
- 4) Which sport(s) are you involved in?
- 5) At which level do you coach? (Grassroot, Competitive/Performance, District, Regional, Junior National, Senior National level)
- 6) Are you familiar with Get Set from before? (Yes, No)
- 7) Do you use the website or app as part of your regular coach training routine? (Yes, the website, Yes, the app, Yes, both the website and the app, No)
- 8) What do you think about the balance between theory and tasks in Prep to be PRO? (Too much theoretical content, Too many practical task/assignments, Appropriately balanced, I would have preferred more of everything)
- 9) Are you familiar with Prep to be PRO from before? (Yes, No)
- 10) What do you like best about Prep to be PRO?
- 11) Do you think anything was missing from Prep to be PRO?
- 12) On a scale from 1–5 (where 1 is not useful at all and 5 is very useful), how useful did you found the tasks?
- 13) Anything you would have changed?
- 14) Have you previously taught Prep to be PRO - topics to your athletes?
- 15) If you answered yes or partly to the previous question – how, how often, and what do you usually teach about?
- 16) Will you use what you have learned from Prep to be PRO going forward? (Yes, No, Unsure)
- 17) What will you use?
- 18) Comments
- 19) How relevant do you think the Prep to be PRO modules are for your athletes? (Relevant to a very small extent, Relevant to a small extent, Relevant, Relevant to a large extent, Relevant to a very large extent)
- 20) Do you have at least one tip that could make Prep to be PRO even better or more relevant for your athletes?

Athlete Questionnaire

- 1) What is your gender? (Women, Men, Other)
- 2) What grade are you in? (Junior High School, 10,11 or 12 grade Senior High School)
- 3) Which school do you represent?
- 4) What is your main sport?
- 5) What level do you participate in as an athlete? (Grassroot, Competitive/Performance, District, Regional, Junior National, Senior National level)
- 6) Are you familiar with Get Set from before? (Yes, No)
- 7) Do you use the website or the app today in your regular training routine? (Yes, the website, Yes, the app, Yes, both the website and the app, No)
- 8) Are you familiar with Prep to be PRO from before?
- 9) BEFORE today's lesson – how much knowledge do you think you had about the module topic?
- 10) Have you had lessons about the module topic before today?
- 11) From whom or where have you learned this earlier? Teacher at School, Coach at School, Club Coach, School Nurse, visit from Healthy Sports in club or school, Parents, Gym Staff, Siblings, Friends, Social Media, Other)
- 12) In this session about the module topic, what do you think about the balance between tasks, discussion, and theory? (Too much theoretical content, Too many practical task/assignments, Appropriately balanced, I would have preferred more of everything)
- 13) Did you like the tasks? (Yes, No)
- 14) What did you like best?
- 15) Anything you would have changed?
- 16) On a scale from 1–5, did you learn something new today? (Not at all, to a small extent, somewhat, to a large extent, to a very large extent)
- 17) Do you plan to incorporate what you have learned from the module into your day-to-day practice? (Yes, No, Unsure)
- 18) What will you use?
- 19) To what extent do you think Prep to be PRO help you become more independent and more confident in your decision-making? (Not at all, To a limited extent, To some extent, To a great extent, To a very great extent)
- 20) Do you have any tips for making Prep to be PRO even better?

Coaches' pre-/post-Questionnaire

- 1) What is your gender? (Women, Men, Other)
- 2) What is your age? (20-30, 31-40, 41-50, 51-60, 61-70 years)
- 3) What is your primary position at school? (Teacher, Coach, Other (multiple options allowed))
- 4) Which sport(s) are you involved in? (Name of the sport(s))
- 5) Coaching/teaching experience? (0-2 years, 3-5 years, 6-10 years, more than 10 years)
- 6) To what extent do you consider the modules to be relevant for your athletes? (1=Very low degree to 5=Very high degree)
- 7) To what extent do you consider the Prep to be PRO modules to enable athletes to make better choices for themselves? (1=Very low degree to 5=Very high degree)
- 8) My leader has developed a plan to facilitate the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 9) My leader has removed barriers to the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 10) My leader has established a clear procedure for the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 11) My leader is knowledgeable about Prep to be PRO. (0=not at all to 4=very great extent)
- 12) My leader knows what he/she is talking about regarding Prep to be PRO. (0=not at all to 4=very great extent)
- 13) My leader acknowledges and appreciates employees' efforts to succeed with the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 14) My leader supports employees' efforts to learn more about Prep to be PRO. (0=not at all to 4=very great extent)
- 15) My leader supports employees' efforts to use Prep to be PRO. (0=not at all to 4=very great extent)
- 16) My leader sustains the implementation of Prep to be PRO in the face of both favourable and unfavourable conditions. (0=not at all to 4=very great extent)
- 17) My leader continues with the implementation of Prep to be PRO despite challenges.
- 18) My leader addresses pressing issues related to the implementation of Prep to be PRO in an open manner. (0=not at all to 4=very great extent)

Coaches' end-of-semester Questionnaire

- 1) What is your gender? (Women, Men, Other)
- 2) What is your age? (20-30, 31-40, 41-50, 51-60, 61-70 years)
- 3) What is your primary position at school? (Teacher, Coach, Other (multiple options allowed))
- 4) Which sport(s) are you involved in? (Name of the sport(s))
- 5) Coaching/teaching experience? (0-2 years, 3-5 years, 6-10 years, more than 10 years)
- 6) To what extent do you consider the modules to be relevant for your athletes? (1=Very low degree to 5=Very high degree)
- 7) To what extent do you consider the Prep to be PRO modules to enable athletes to make better choices for themselves? (1=Very low degree to 5=Very high degree)
- 8) My leader has developed a plan to facilitate the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 9) My leader has removed barriers to the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 10) My leader has established a clear procedure for the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 11) My leader is knowledgeable about Prep to be PRO. (0=not at all to 4=very great extent)
- 12) My leader knows what he/she is talking about regarding Prep to be PRO. (0=not at all to 4=very great extent)
- 13) My leader acknowledges and appreciates employees' efforts to succeed with the implementation of Prep to be PRO. (0=not at all to 4=very great extent)
- 14) My leader supports employees' efforts to learn more about Prep to be PRO. (0=not at all to 4=very great extent)
- 15) My leader supports employees' efforts to use Prep to be PRO. (0=not at all to 4=very great extent)
- 16) My leader sustains the implementation of Prep to be PRO in the face of both favourable and unfavourable conditions. (0=not at all to 4=very great extent)
- 17) My leader continues with the implementation of Prep to be PRO despite challenges.
- 18) My leader addresses pressing issues related to the implementation of Prep to be PRO in an open manner. (0=not at all to 4=very great extent)
- 19) How satisfied were you with the Prep materials used in the module (module name)? (1=very low satisfaction to 5=very high satisfaction)
- 20) How much instructional time did you use per module? (0-1 hours, 2-3 hours, 4-5 hours, 6-10 hours, more than 10 hours)

Athlete Questionnaire

- 1) What is your gender? (Female, Male, another gender identity, prefer not to disclose)
- 2) What class/grade are you in? (Sports Junior High School grade 8,9,10 or Sports Academy High School, 11,12 or 13 grade)
- 3) Which school do you represent? (Name of the school)
- 4) What is your main sport? (Name of the sport)
- 5) Knowledge from these topics will lead to changes in my training routine. (1=strongly disagree to 5=strongly agree)
- 6) Knowledge about the modules is useful to me. (1=strongly disagree to 5=strongly agree)
- 7) What I have learned in these modules will lead to changes in my training routine. (1=strongly disagree to 5=strongly agree)
- 8) Prep to be PRO modules makes me more confident in my own choices. (1=strongly disagree to 5=strongly agree)
- 9) The tasks/assignments during the sessions on these modules were interesting. (1=strongly disagree to 5=strongly agree)
- 10) I enjoyed the instruction in these modules. (1=strongly disagree to 5=strongly agree)
- 11) I was mostly bored during instruction in these modules. (1=strongly disagree to 5=strongly agree)
- 12) I found the teaching in these modules interesting. (1=strongly disagree to 5=strongly agree)
- 13) What I learned about these topics in the modules is useful in everyday life. (1=strongly disagree to 5=strongly agree)
- 14) I did not like the instructions in these modules. (1=strongly disagree to 5=strongly agree)
- 15) I have learned a lot from the instruction in these modules. (1=strongly disagree to 5=strongly agree)
- 16) The module instruction is relevant to me. (1=strongly disagree to 5=strongly agree)
- 17) The materials related to the modules will be useful to me in the long term. (1=strongly disagree to 5=strongly agree)
- 18) The module instruction makes me confident in making my own choices that are good for me. (1=strongly disagree to 5=strongly agree)
- 19) I have learned something new in these modules. (1=strongly disagree to 5=strongly agree)
- 20) I looked forward to the instruction in these modules. (1=strongly disagree to 5=strongly agree)

