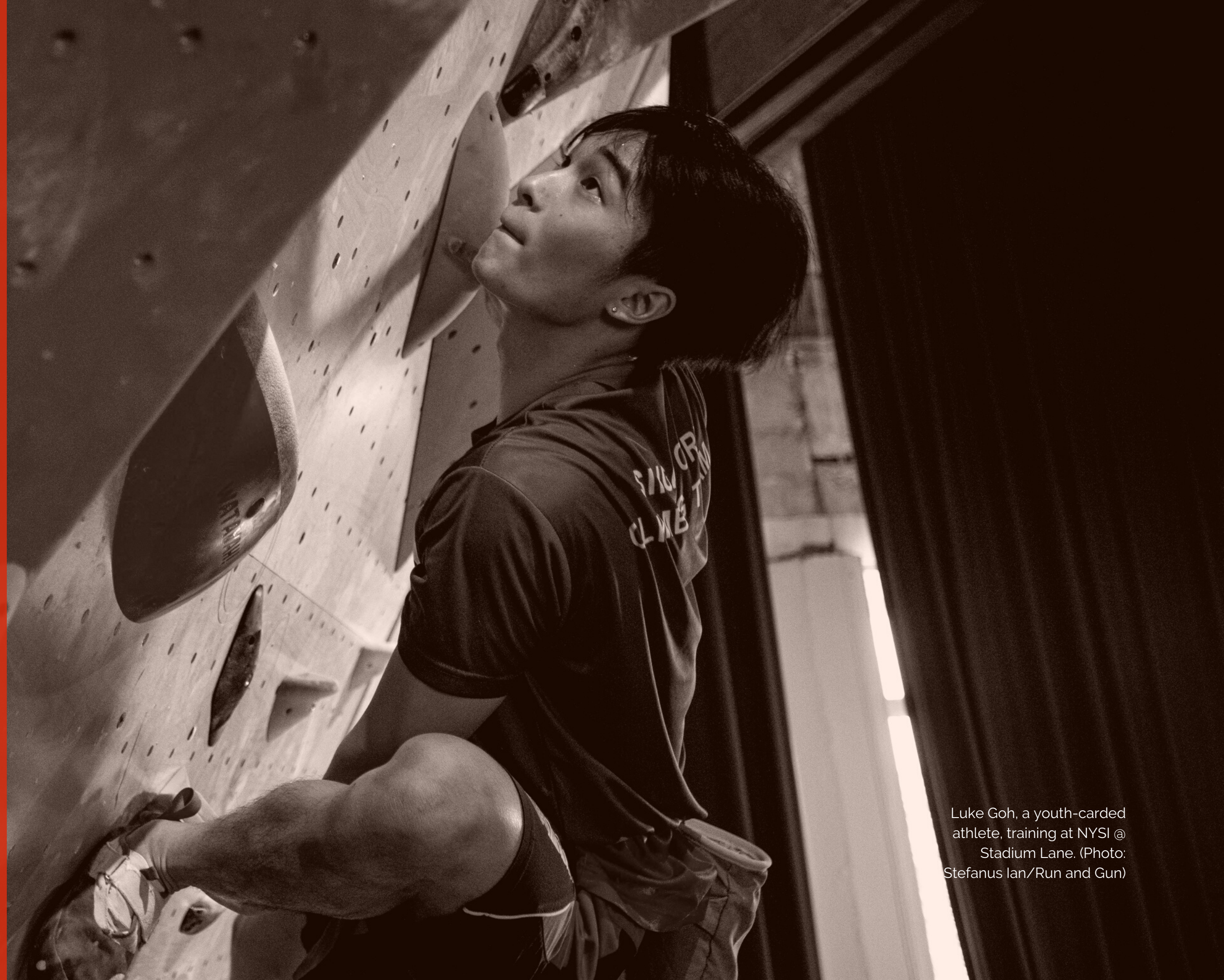


NYSI IMPACT

THEMES & HIGHLIGHTS
FY20-21



Luke Goh, a youth-carded athlete, training at NYSI @ Stadium Lane. (Photo: Stefanus Ian/Run and Gun)

ONE PANDEMIC PIVOT

THE NATIONAL YOUTH SPORTS INSTITUTE (NYSI) DID NOT ALLOW THE COVID-19 PANDEMIC TO DAMPEN OUR SPIRITS. INSTEAD, WE SEIZED THE OPPORTUNITY TO ACCELERATE THE DIGITALISATION PROCESS AND BUILD CAPABILITIES.

WE ALSO TOOK THE OPPORTUNITY TO FURTHER TRANSFORM OUR NEW FACILITY AT THE FORMER POLICE COAST GUARD HEADQUARTERS.

ONE.1 LEVERAGING TECHNOLOGY TO DELIVER OUR MISSION

To support close to 400 youth-carded athletes effectively even as the Covid-19 situation drastically reduced contact time with athletes, NYSI piloted the use of a cloud-based, commercial athlete management system (AMS) by Kinduct.

The AMS pilot with 20 water polo players in FY20 allowed NYSI staff to learn and roll out the system for 200 youth athletes in FY21. The platform's easy-to-use data visualisation tools have reduced the time needed to generate reports. Coaches get customised reports of their athletes in real-time and tailor the training accordingly.

NYSI also transitioned to a cloud-based project management tool (Monday.com) in FY20 to enhance internal communication. This has enabled our 40-strong staff to better manage tasks and projects effectively and efficiently while improving and scaling workflows.



"(Kinduct) helped me understand how my training programme is affecting the athletes and their adaption to the training load prescription."

- a youth coach's response in an anonymous survey

"NYSI is a steward of and critical partner in an athlete-centric Singapore high-performance sports ecosystem which develops athletes in realising their sporting aspirations and potential, thereby inspiring the Singapore spirit and uniting the nation."

- Dr Su Chun Wei, Director, NYSI



Dr Su Chun Wei, who took over as Director of NYSI in January 2021, giving the opening address at the virtual 2021 Youth Coaching Conference at NYSI @ 5D Stadium Lane.

ONE.2 BLENDING SUPPORT DELIVERY MODE TO OPTIMISE SUPPORT FOR ATHLETES AND COACHES

NYSI provided over 3,100 sport science support sessions, a number similar to FY19 and FY18 despite the national Circuit Breaker and safety management measures.

NYSI also reached out to over 1,000 youth coaches. 338 coaches completed the YC Online course and 255 participants took part in 28 YC Online blended-learning workshops. There were also 26 communities of practice workshops with 309 participants in total.

NYSI also piloted the Youth-to-Senior Transition Programme in FY20, engaging over 200 athletes over 56 sessions to support youth athletes in their sporting journeys.

NYSI relied on virtual platforms to deliver its support and workshops. In total, there were 212 workshops and support sessions that were conducted online. Both the fifth editions of NYSI's annual conferences – the Youth Coaching Conference and the Youth Athlete Development Conference – were also held online. The two online conferences combined saw about 400 participants take part.

ONE.3 BUILDING NYSI'S FUTURE CAPABILITIES AND CAPACITIES

NYSI pressed on with the development of our new facility at 5D Stadium Lane (5SL) in FY20. The larger indoor space allowed us to exercise innovative use of the space to create a seamless and conducive space for both our staff, athletes and coaches.

NYSI was able to transfer more testing equipment from the NYSI Hub in Singapore Sports School to 5SL to enhance support to athletes. NYSI also exploited the outdoor space, adding running tracks and a container to allow for outdoor training and testing.



Koh Ting Ting in action. She is the captain of the Singapore women's water polo team which is supported by NYSI. (Photo: SSA/Facebook)

TWO

NYSI @ 5D STADIUM LANE

With a budget of just about \$500,000, the 4,000 square metre building at 5D Stadium Lane was transformed into a facility that can support up to 6,500 high-performance youth athletes. The facility is four times larger than NYSI's previous space at Kallang Theatre.

The facility is strategically located on the edge of the Kallang Basin and easily accessed by youth-carded athletes training at the Singapore Sports Hub.





The spatial layout of the facility takes inspiration from high-performance setups like IMG Academy and the University of Oregon. With the gym at the centre of the facility, physiology and physiotherapy labs open up and connect directly into the gym to improve support for athletes.

The gym occupies the former canteen and officers' mess. Walls were knocked down to create a larger gym that can accommodate 20 athletes.

Rigs from the old gym at Kallang Theatre were brought over and reinstalled. Eight new stations with full racks of weights were added, together with two Assault bikes, two treadmills and one Wattbike.

The large shutters and door along the length of the gym allow for natural ventilation.

SPORT SCIENCE IMPACT

NUMBER OF SESSIONS (FY20)

3,101

(3.37% ABOVE TARGET)

SESSIONS BY DISCIPLINE

S&C

1,364

NUTRITION

490

PHYSIOLOGY

316

PHYSIOTHERAPY

784

PSYCHOLOGY

388

PERFORMANCE
ANALYTICS

340

"In a complex world, no single discipline can offer a solution. Our job is to go beyond single disciplines and find out what works for youth athletes."

- Matthew Wylde, Head of Sport Science

THREE.1

TRANS DISCIPLINARY APPROACH

In FY20, NYSI continued to actively take a transdisciplinary approach to sport science support. This approach has seen the NYSI sport scientists actively integrate the different sport science disciplines - physiology, strength and conditioning (S&C), nutrition, psychology, physiotherapy, performance analytics - to find solutions to real-world problems that our athletes face.

WUSHU

In response to the problem of wushu exponents dropping out due to injury, NYSI sport scientists from S&C, physiotherapy, and physiology collaborated to inject variety into the athletes' warm-up routine to prepare them better for the specific demands of their sport. The NYSI team implemented a series of exercises and a physical fitness assessment to improve the athletes' movement ability, physical, and psychological readiness to train.



NYSI sport scientists have injected variety into the warm-up routine of wushu athletes to reduce the risk of injury. (Photo: Les Tan/Red Sports)

SHOOTING

For the sport of shooting, the NYSI physiologists and psychologists teamed up to measure the effectiveness of a six-week mindfulness programme. Preliminary results showed that mindfulness led to a reduction in heart rate and less stress in some athletes.



(Photos: Singapore Sports School)

KAYAK

In another transdisciplinary approach, NYSI physiologists and performance analysts worked together to come up with a new training block. This conclusion came after the scientists looked at the analysts' stroke rate recommendation together with the physiologists' VO₂ and lactate threshold and other post-race variables. The new training block aimed to delay the onset of lactate production, improve efficiency and improve neuromuscular strength.



Singapore Sports School shooters (top) during practice. Yeo Min (bottom) is one of the youth-carded kayak sprint athletes that NYSI supports.

To take the transdisciplinary approach further, the NYSI Sport Science team leveraged the larger floor space to add a heat room, a resistance swim pool, a 70m running track, and a Dojo to its training infrastructure.

A 40-foot modified container with a 22-degree ramp and a warped wall was installed at the end of the pier to provide further training options based on the Athletics Skills Model. The container was also designed to function as a rest and hydration area. The container walls were made movable to allow for natural ventilation.

The entire facility is WiFi-enabled with touchscreen monitors at all training spaces. This opened up the opportunity for coaches and NYSI sport scientists to work collaboratively with real-time data.



Charmaine Lim (top left), NYSI Strength & Conditioning Specialist, and Dr Zac Leow, NYSI Sport Physiologist, overseeing athletes using the resistance swim pool and the pier for training at NYSI @ 5D Stadium Lane.



Charmaine Lim, NYSI S&C Specialist, overseeing a training session at the new NYSI @ 5D Stadium Lane.

THREE.2

STRENGTH & CONDITIONING

Joint Consensus Statement on S&C

In March 2021, NYSI issued a joint consensus statement with the Singapore Sport Institute on strength and conditioning (S&C) for youth athletes. The aim was to provide coaches with evidence-based guidelines to help their athletes reduce injury risks and acquire a competitive edge.

"It's a one-stop resource for anyone in the youth sports ecosystem who is dealing with a youth athlete to understand the role of S&C and its role in developing youth athletes," said Charmaine Lim, NYSI S&C Specialist.

The statement covers five areas:

- strength development
- speed development
- agility training
- plyometric training
- metabolic conditioning.



The SSP netball team (above) and SSP student-athlete Maximillian Ang in action. (Photos: Singapore Sports School)

THREE.3

SPORT PSYCHOLOGY

In FY20, the NYSI psychology team collaborated with the swimming and netball academies at Singapore Sports School to improve their training environments.

A progressive, four-year psychological skills training curriculum was developed which was tailored to the respective sports.

Working closely with the academy coaches, NYSI psychologists helped the student-athletes build self-awareness and increase resilience through adversity training.

The team will also use a personality profiling tool to enhance understanding of the coaches' personality and behaviour for the benefit of both the coaches and student-athletes.

NETBALL	SWIMMING
NO. OF SESSIONS	NO. OF SESSIONS
19	31

THREE.4 SPORT NUTRITION

Joint Consensus Statement on Supplements

In September 2020, NYSI issued a joint consensus statement with the Singapore Sport Institute (SSI) on the use of supplements.

Taking a food-first approach, the statement recommended that youth athletes under the age of 18 should not take supplements unless there was a medical reason to do so.

"During the adolescent years, growth and development are key, alongside adopting important nutrition habits. A food-first approach is important to facilitate these and supplements should only be considered in a planned and evidence-based manner. Just because a youth athlete can take supplements, it does not mean they should," said Dr Jamie Lye, NYSI Head of Sport Nutrition.

Body Positive Nutrition Curriculum

Youth athletes taking part in aesthetic sports like gymnastics and artistic swimming may face pressures regarding their body image and weight. To help them overcome these pressures, NYSI and SSI collaborated with an Australian expert, Fiona Sutherland, to develop a sports nutrition curriculum. Sutherland is the author of the "Body Positivity statement" released by Gymnastics Australia in 2019.

The curriculum, developed over six months, will cover what constitutes adequate and appropriate nutrition. The customised curriculum materials for coaches and athletes, consisting of lesson plans and slide decks for workshops, were completed in December 2020 and will be delivered by NYSI sport dietitians.



Dr Jamie Lye conducting a nutrition workshop for wushu athletes at NYSI (top). Youth athletes face pressure to maintain a certain weight to perform well in aesthetic sports. (Photo: Action Images/SNOC Facebook)

THREE.5

RESEARCH & DEVELOPMENT

NUMBER OF APPLIED RESEARCH PROJECTS WITH PUBLICATIONS

6

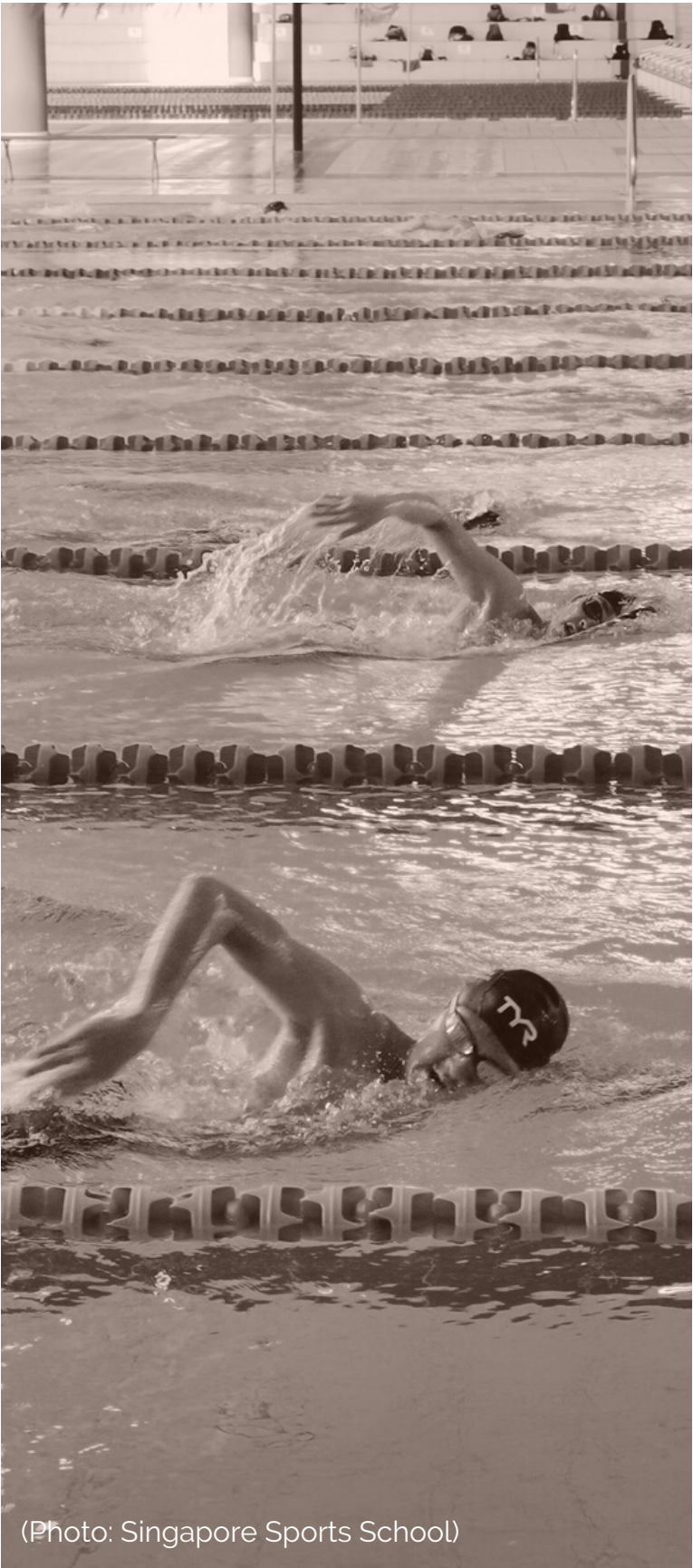
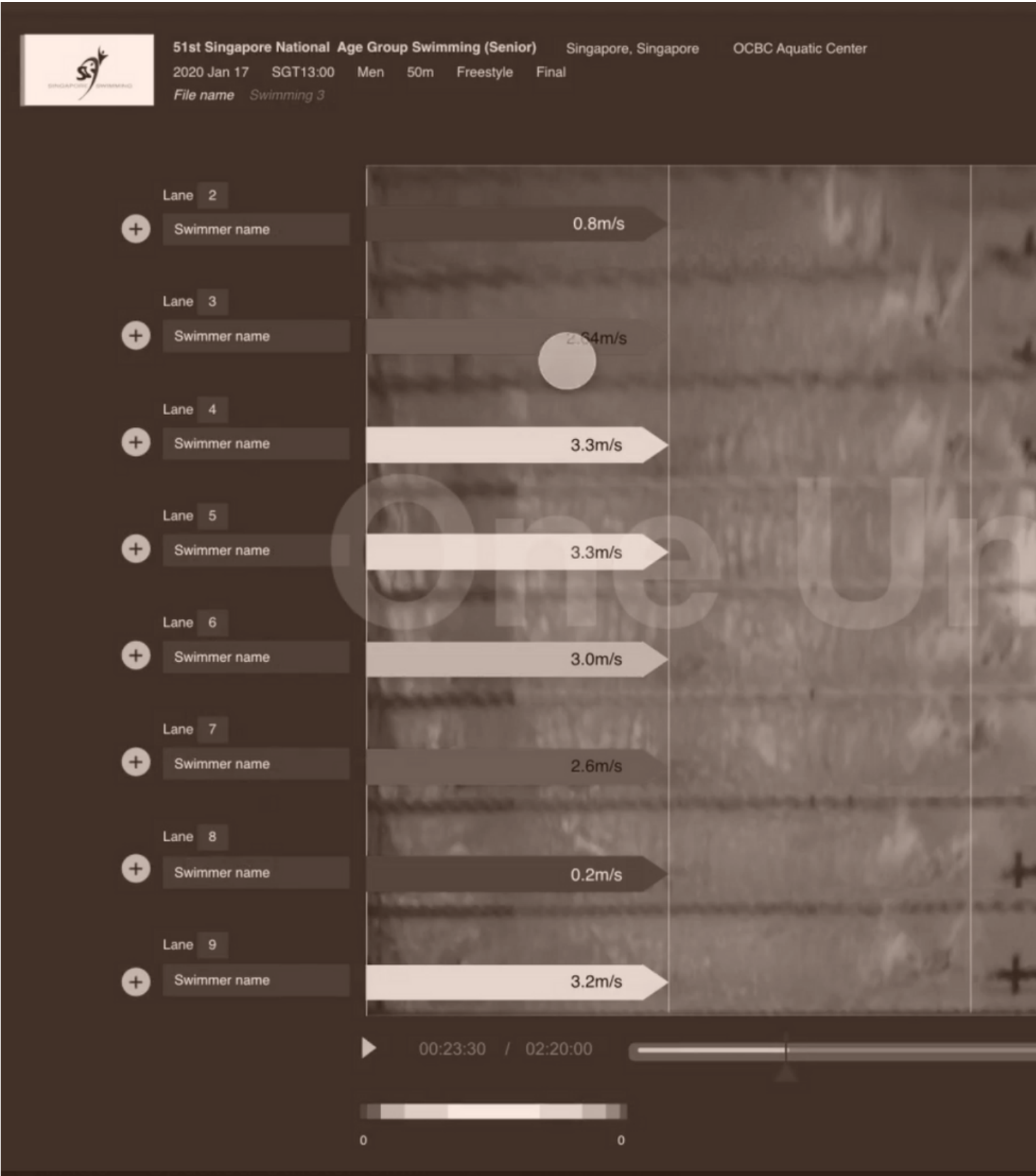
NYSI takes an applied sport science and transdisciplinary approach in our research and development projects.

LIVING LAB

In FY20, we piloted a Living Lab project in collaboration with Singapore Sports School. The project tested the usability of an automated performance analysis tool to provide swimming academy coaches with accurate data.

NYSI is planning other Living Lab projects that will involve the SSP football and netball academies.

In FY20, NYSI R&D published six research papers in sport performance, youth coaching, and technology development.



(Photo: Singapore Sports School)

NYSI tested the usability of an automated performance analysis tool for swimming at Singapore Sports School.

RESEARCH BYTES

The NYSI R&D team also ensured that coaches and practitioners continued to receive relevant and useful information through Research Bytes throughout the pandemic slowdown.

"Practitioners, administrators, coaches, and parents have subscribed to our NYSI Research Bytes. Our newsletters and videos provide bite-sized information based on the latest research to complement their daily work with athletes," said Dr Neha Malhotra, NYSI Research Coordinator.

RESEARCH BYTES

NUMBER OF SUBSCRIBERS

1,167

NUMBER OF NEWSLETTERS

3

NUMBER OF VIDEOS

13

NUMBER OF RESEARCH BYTES RELEASES (FY20)

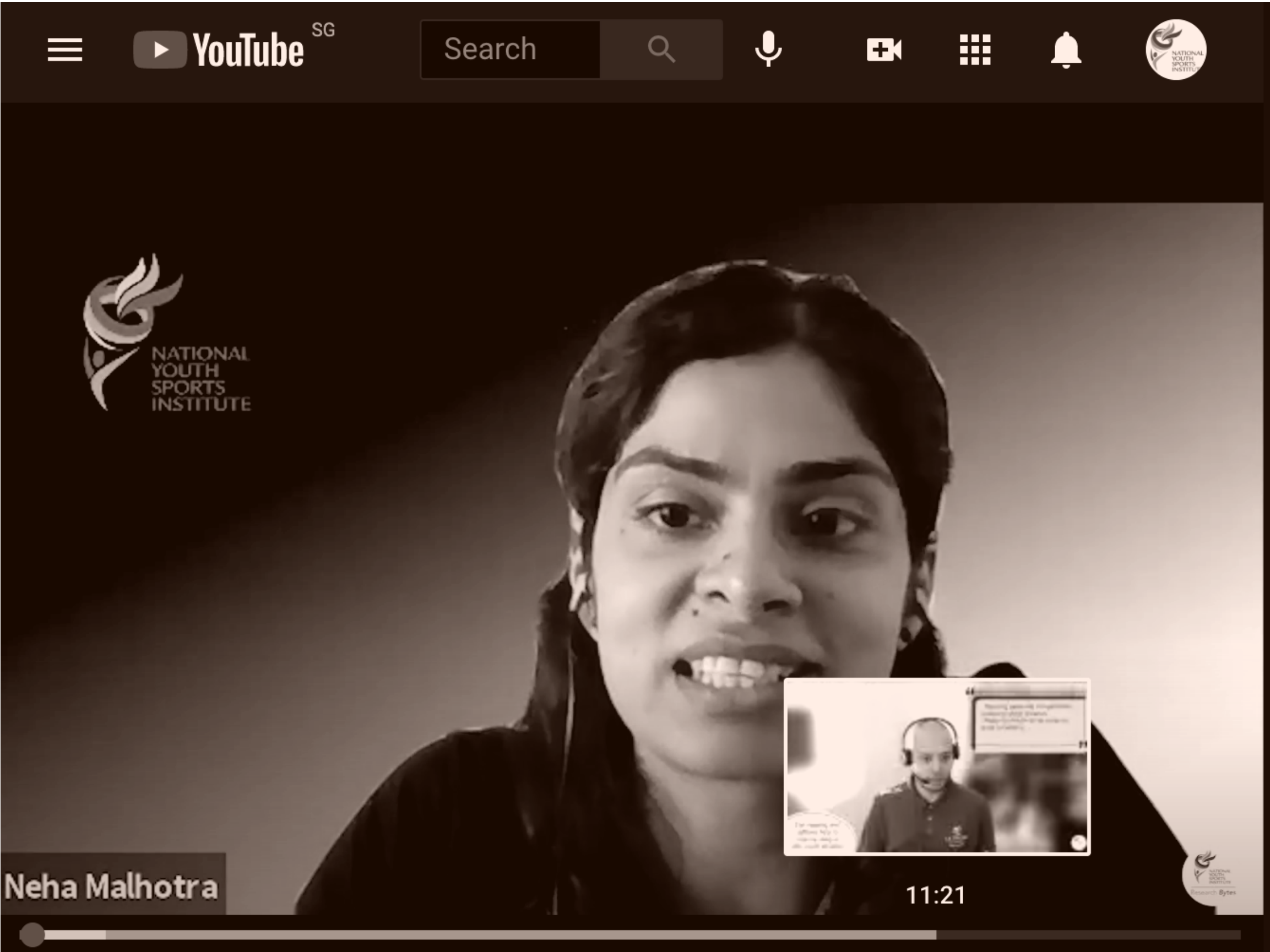
16

NEWSLETTER AVERAGE OPEN RATE

36%

VIDEO AVERAGE OPEN RATE

42%



Dr Neha Malhotra interviewing Dr Haresh Suppiah about his sleep research in an NYSI Research Bytes video.

RESEARCH FINDINGS

SLEEP CHARACTERISTICS OF ELITE YOUTH ATHLETES

An NYSI research (Suppiah et al., 2021), found that our national youth athletes reported 7.0 (SD=1.2) hours of sleep. 45.2% of the group had poor sleep quality (PSQI global > 5). Team sport athletes also reported significantly poorer sleep quality than individual-sport athletes.

These findings highlight the importance for practitioners to monitor sleep quantity, quality, and caffeine intake.

PERSPECTIVE OF PERFORMANCE ANALYSIS IN WOMEN'S SPORTS

This NYSI study (Loo et al., 2020) found that female athletes from Asian cultures welcomed group discussions, viewed information about development in a positive light, and were receptive to longer video reviews.

These findings highlight that, in order to optimise learning, coaches and analysts should acknowledge the culture of the group and the performance analysis session format.

ENERGY AVAILABILITY IN FEMALE ELITE YOUTH ATHLETES

There has been little research focused on energy availability in youth female athletes from non-aesthetic or endurance sports.

To redress this, NYSI conducted a study (Lye et al., 2020) and found that the prevalence of low energy availability in female youth athletes was 30.2%, regardless of sport and body mass index.

This study highlighted the importance of screening female youth athletes for low energy availability for optimal growth, health, and long-term athletic development.

REFERENCES

Suppiah, H.T., Swinbourne, R., Wee, J., Tay, V., & Gastin, P. (2021). Sleep Characteristics of elite youth Athletes: A clustering approach to optimise sleep support strategies. *International Journal of Sports Physiology and Performance*, 1(aop), 1-9.

Loo, J. K., Francis, J. W., & Bateman, M. (2020). Athletes' and coaches' perspectives of performance analysis in women's sports in Singapore. *International Journal of Performance Analysis in Sport*, 20(6), 960-981.

Lye, J., Ng, E. L., Quek, R., Lim, Z. Q., & Lim, J. (2020, September 8-10). Prevalence of low energy availability in female elite youth athletes from non-aesthetic/endurance sports in Singapore. The European Conference on the Social Sciences (ECSS). Sevilla, Spain.



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TALENT IDENTIFICATION & DEVELOPMENT IMPACT

JSA Selection Trials

The yearly Junior Sports Academy (JSA) selection trials were cancelled in 2020 because of the Covid-19 pandemic. NYSI used the downtime to support our 80 JSA coaches.

NYSI curated online workshops on appropriate youth athlete development and skill acquisition approaches for JSA coaches to enhance their delivery of JSA sports modules in the future.

**% OF JSA COACHES
WHO COMPLETED
SKILL ACQUISITION
WORKSHOPS**

34%

**% OF JSA COACHES
WHO COMPLETED
YC ONLINE COURSE**

78%

Dr Esther Chia
(centre), NYSI Head of
Talent Identification
and Development,
discussing the set up
for the JSA selection
trials in 2019.

YOUTH ATHLETE DEVELOPMENT CONFERENCE

The pandemic also meant that the 5th Youth Athlete Development Conference (YADC) had to be held online. The conference was the first strand of the Singapore Sport Science Symposium which was organised in collaboration with the Singapore Sport Institute.

"To give all youths a better chance to reach elite performance, we must continue to create an environment where youths on different pathways can find their way towards sporting success," said Mr Eric Chua, Parliamentary Secretary of the Ministry of Culture, Community and Youth, who was the guest-of-honour at the conference.

The conference attracted 399 participants who signed up to hear from 12 international and local speakers. The conference focused on the need for multiple athlete development pathways and the importance of building the right talent development environment.

NYSI also curated online content specifically for schools for the 2020 YADC Fringe Event. A total of 3,616 participants from Secondary 1 to JC1 across 41 schools watched interviews with past youth Olympic athletes and visited virtual booths to learn more about sport science, nutrition, strength and conditioning, and sports psychology.

YOUTH ATHLETE DEVELOPMENT CONFERENCE 2021

NO. OF PARTICIPANTS

399

YADC FRINGE EVENT

NO. OF PARTICIPANTS

3,616



Olympian Jesse Phillips was one of the 12 speakers at the 5th YADC.

PERFORMANCE PATHWAYS IMPACT

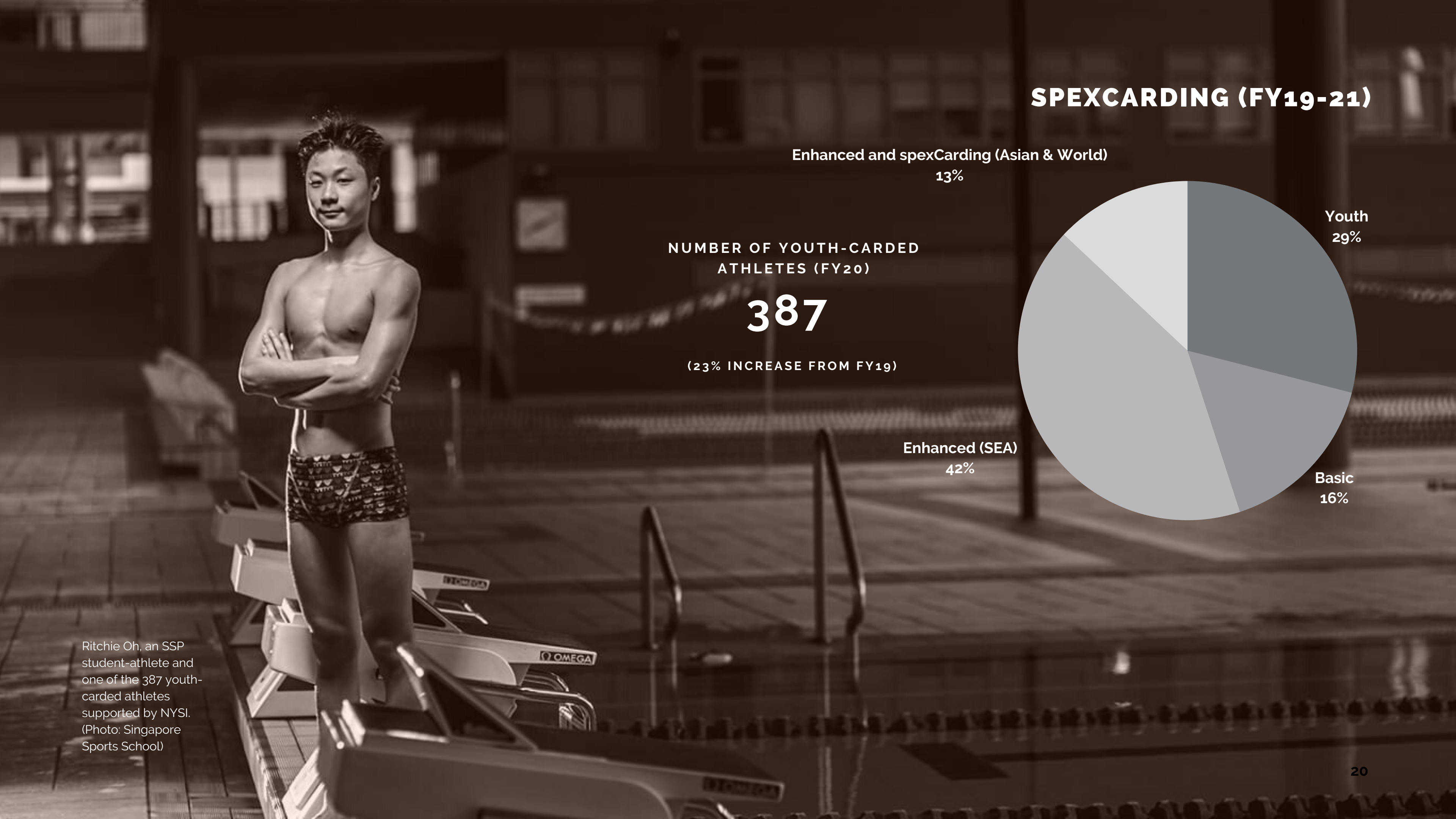
The youth carding system was rolled out in November 2018 as one of the 2015 Singapore Sports School review recommendations.

NYSI supported the first batch of 314 youth-carded athletes in FY19. In FY20, a more targeted tier, Youth+, was implemented to provide bespoke support for athletes with the potential to perform at the Asian and world-level.

Through the youth carding system, NYSI provides holistic support to athletes through sport science and the youth-to-senior transition programme.

"Youth-carded athletes supported by NYSI represent 29% of the high-performance sports system. The large base of youth athletes indicates a stable number that could progress into senior carding levels."

- Dr Low Chee Yong (right), Deputy Director, NYSI



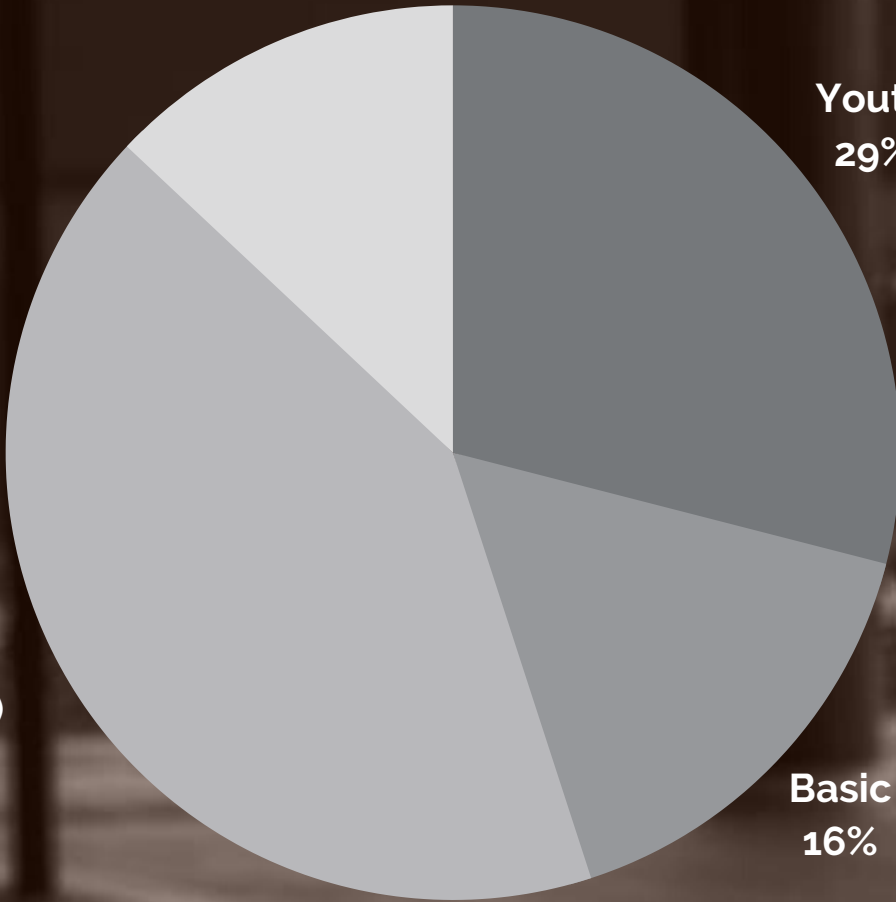
SPEXCARDING (FY19-21)

Enhanced and spexCarding (Asian & World)
13%

NUMBER OF YOUTH-CARDED
ATHLETES (FY20)

387

(23% INCREASE FROM FY19)



Ritchie Oh, an SSP student-athlete and one of the 387 youth-carded athletes supported by NYSI. (Photo: Singapore Sports School)

FIVE.1

TALENT OPTIMISATION PROGRAMME

The NYSI Talent Optimisation Programme (TOP) aims to retain youth athletes within our high-performance ecosystem.

NYSI, in collaboration with national sports associations, identifies athletes with the ability and desire to represent Singapore at major games.

In FY20, four athletes from four different sports started wrestling training in an attempt to qualify for the Southeast Asian Games.

TOP Athletes

- Reiner Leong (rugby)
- Alvin Leong (weightlifting)
- Natasha Kang (wushu)
- Mel Lee (sailing)



Reiner Leong (left) and Alvin Leong in action at the 2021 Singapore National Wrestling Championships.

The Wrestling Federation of Singapore has found the programme useful in looking for athletes from a variety of different sports.

"Before TOP, nobody would consider identifying these athletes with a sport like wrestling. The athletes have shown that the beneficial traits they have gained from their previous sports could be carried over to a multi-faceted sport like wrestling," said Gabriel Huang, Operations Manager of the Wrestling Federation of Singapore.

Former wushu exponent Natasha Kang has found the programme holistic.

"The training programmes and sport science support are both structured yet individualised. This allows us to progress sustainably at our own pace towards the goal," said Kang.

Natasha Kang in action at the 2021 Singapore National Wrestling Championships.

SIX

YOUTH COACHING IMPACT

NUMBER OF COACHES REACHED (FY20)

1,069

YC ONLINE

NO. OF COMPLETIONS

338

NO. OF BLENDED WORKSHOPS

27

NO. OF BLENDED WORKSHOP PARTICIPANTS

255



Lee Sai Meng, NYSI National Youth Head Coach (Water Polo), conducting a workshop at Stadium Lane in March 2020. The pandemic forced the remaining workshops in 2020 to move online.

YC ONLINE

NYSI continued its efforts to impact the youth coaching ecosystem. In FY20, 338 coaches completed YC Online, a self-paced, five-hour course to help youth coaches understand the unique characteristics of youth athletes. YC Online was launched in FY19.

To reinforce the learning, NYSI also conducted 27 blended-learning workshops throughout FY20, with 255 participants. Given the pandemic, these workshops were conducted online.

To promote best practices, NYSI conducted 26 communities of practice workshops. A total of 309 participants from swimming, water polo, and sailing took part in FY20.

NYSI finished FY20 with the 5th Youth Coaching Conference in Mar 2021. Held online for the first time, 167 participants attended the conference.

"Don't lose the person in pursuit of performance or achievement; performance can go hand in hand with development as long as it's person-oriented." - participant Chee Mun Leong, when asked about key takeaways in the post-conference survey

COMMUNITIES OF PRACTICE

NO. OF WORKSHOPS NO. OF PARTICIPANTS

26 309

YOUTH COACHING CONFERENCE 2021

NO. OF PARTICIPANTS

167



Prof. Clifford Mallett was one of the keynote speakers at the 5th YCC.

ATHLETE LIFE IMPACT

As youth athletes get older, they face higher training loads, greater academic demands, and increased performance expectations.

On top of these challenges, they are also transitioning from adolescence to young adulthood. This is a period with its own set of cognitive, social, psychological and physical developmental demands.

YOUTH-TO-SENIOR TRANSITION PROGRAMME

The NYSI Athlete Life and Psychology teams piloted a Youth-to-Senior Transition Programme after consulting coaches and performance pathways staff to support our youth athletes.

NUMBER OF
SESSIONS

56

NUMBER OF
ATHLETES

207

NUMBER OF
SPORTS

18



Jenny Lim, SSP T&F GM, speaking to her student-athletes during a youth-to-senior transition workshop by NYSI.

The team created a series of core workshops which were run in collaboration with the National Sports Associations for swimming, sailing, and water polo. The workshops were also rolled out to Singapore Sports School (SSP) student-athletes.

The aim of these workshops was to make youth athletes aware of the transition challenges and to equip them with coping strategies.

The youth athletes were also surveyed after the workshops to allow us to better understand their transition challenges. Athletes that expressed a need for further support were given extra help.

"Learning about the paths of the different athletes and knowing I was not the only one experiencing a long road" - Feedback from a youth athlete when asked what was most useful from the transition workshop



Chin Khen Theen, SSP Swimming Academy GM, conducting a youth-to-senior transition workshop for his student-athletes.

