wed movement | 2021 - Abu Dhabi

هيئـــة أبوظـــبي للطفـــولة المبكـــرة
Abu Dhabi Early Childhood Authority

BWG Final Report

THEME 2

21ST CENTURY LIFESTYLE

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With inputs from members of Breakthrough Working Group 2
7 October 2021

1. Overview/Summary:

Consuming cheap and readily available sugary drinks, overindulging of junk food and snacks that are high in sodium, refined sugar, and saturated fat, having less than recommended portions of fresh fruits and vegetables, spending too much time watching television and playing video games, and not getting enough or any exercise or quality sleep are all behaviors common in an obesogenic 21st century environment (Blair, 2012; Chia, 2012; Shah, 2018). These behaviors are part of the "wicked problem" of a 21st century lifestyle, resulting in childhood and adult obesity, unhealthy dietary habits, sedentary behaviors, and physical inactivity. According to the World Health Organization (2014), non-communicable diseases (NCDs) including cardiovascular diseases, type 2 diabetes, cancer and obstructive lung disease account for 70% of premature mortality among adults in the United Arab Emirates (UAE). Alarmingly, research has shown that a high proportion (70%) of risk factors for NCDs and mental health issues can start to develop during early childhood (Guariguta & Jayaseelan, 2019).

These are significant, diverse and complex challenges that are facing early childhood development in the 21st century, not only in Abu Dhabi and the UAE, but in many different parts of the world. In 2018, heads of states, health ministers, and global health leaders gathered in Astana under the leadership of WHO and UNICEF, 40 years after the Alma-Ata Global Conference on Primary Health Care in 1978, reasserted the call to address NCDs in children and adults and reaffirmed the need to address risk factors for NCDs through primary prevention, and promote people's health and well-being through primordial prevention through investing and encouraging a healthy lifestyle to achieve the Sustainable Development Goals (Jungo et al, 2020; WHO, 2019a).

We need to respond to these challenges by reimagining an energetic 21st century lifestyle around early childhood development. To center ourselves, we firmly believe that the child has to be the focus of all decisions made. The vision of our team is therefore to support the holistic development of health, active and happy children and our goal would be for all children to eat well, sleep well, play more and learn more.

Image 1

The image encapsulates BWG 2 team vision and goals for early childhood development in the 21st century lifestyle.

Proposed solutions would need to be effective and sustainable, and require everyone, everywhere, every time. “Everyone” requires the involvement of major stakeholders, from the government to families to education and health practitioners to the media, to embrace an integrated top-down and bottom-up approach. “Everywhere” demands that the messaging and recommendations will need to be coordinated and ubiquitous, present everywhere and available to everyone. “Every time” dictates that an energetic narrative will need to be aligned, affirmed, and amplified at every opportunity.

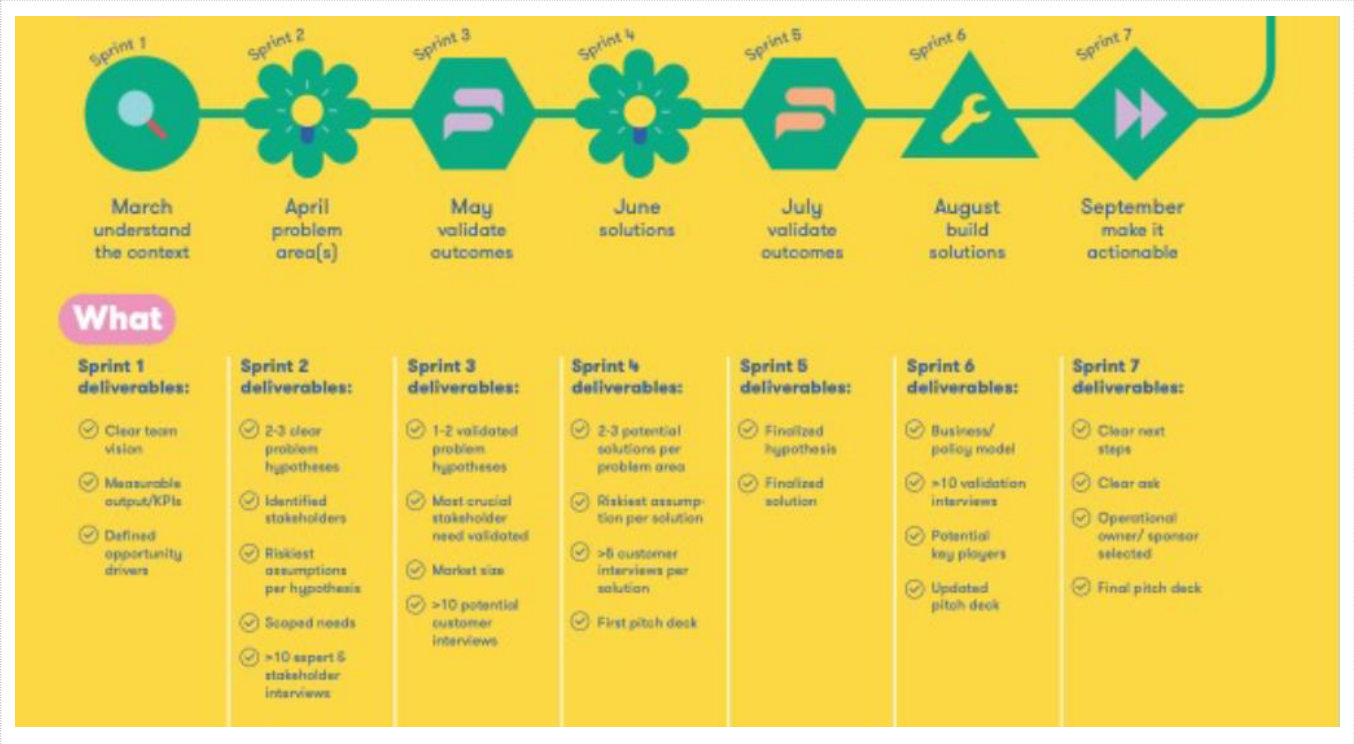
We propose seven recommendations for the short, middle, and long-term, with three immediate, easy to produce solutions, two impactful and on the ground mid-term recommendations, and two innovative and futuristic long-term ideas.

2. Team:

The Breakthrough Working Group (BWG) Theme 2 is made up of a panel of international and local experts. Leading the team is Professor Michael Chia, an international expert in paediatric exercise science and medicine. The team also includes Professor Syed Shah, whose research focuses on childhood obesity, physical and mental health, and screen time use in the UAE; Dr. Hossam Al Tatari, an acclaimed paediatrician with vast experience in the UAE; Cristian Fabbi, who brings his diverse and global experience in early childhood care and education; Dr. Chia Tet Fatt, an experienced researcher and entrepreneur in the fields of biomedical, bioengineering and microbiology; and Dr. Nawal Al Kaabi, a leading paediatric consultant with extensive expertise on paediatric infection diseases.

Rounding up the team is team technical consultant, Bernadine Sengalrayan, and team facilitator, Rowan Lamont.

3. Process:



In sprint 1, we worked to identify the overarching what, who and why. What is the purpose and vision of our work? Who, do we envision, being our primary stakeholders and having a vested interest in the 21st century lifestyle of infants, toddlers, and children? Why is our work important?

In sprint 2, we isolated three main stakeholders that would shape our work and recommendations. We also identified common threads and tensions in our discussions. This included the need to unpack our assumptions, balancing the need for impact and being mindful of bureaucratic limitations, and negotiating power structure without neglecting meaningful outcomes in our recommendations and outputs.

To ensure that our recommendations and output serve the intended stakeholders, and to extricate our assumptions and gain an accurate picture of their lived experiences, we conducted informal conversations with our stakeholders throughout sprint 2.

In sprint 3, the team was encouraged to ideate on problematising and validating our preliminary insights. We spilt ourselves into smaller teams within the BWG, each to focus on a singular problem area and prototype with simple experimental mock-ups. Our smaller groups would then explore the real-world impact of their prototypes to ascertain their viability in addressing the needs of our stakeholders.

In sprint 4, we zeroed in on our problem statements and brainstormed on preliminary possible solutions and recommendations. The team then worked to determine which of these solutions and recommendations are desirable, feasible and viable, our assumptions in arriving at these solutions and recommendations and the barriers that would limit success.

In sprint 5, we worked on refining our solutions and identifying key partners, activities, resources necessary to create and deliver these solutions. These solutions were further enriched with inputs and

feedback from BWG Chair Cecilia Vaca Jones. It was also important that we continue having conversations with stakeholders and the public to provide preliminary feedback on the value and impact of these proposed solutions.

In sprint 6, we finalised our seven solutions and recommendations for proof-of-concepts. The team validated these solutions, taking into account the feedback from our conversations and meetings with on-the-ground stakeholders, ECA management, and the Technical Committee. The team then started to put out together the layers and finalise the details for final pitch.

4. Key Insights:

Contextualizing early childhood development in the 21st century is multi-layered and complex. Children and youth in Abu Dhabi and around the world face unprecedented challenges. An increasingly digital world, fast growing urban environments, and a progressively obesogenic lifestyle has led to a chronic trend of childhood and adult obesity, unhealthy dietary habits, sedentary behaviours, and physical inactivity (Blair, 2012; Chia, 2012; Shah, 2018). These are “wicked problems”, ill-structured and challenging issues arising from environmental factors, lifestyle preferences and cultural practices common in contemporary lifestyles. These problems are not limited to a single causal explanation, often underpinned by broader social, economic, and environmental determinants (Egger & Dixon, 2014) which are further compounded by the current Covid-19 pandemic. Each of these issues are unique and yet interconnected. They require the involvement and collaboration of multiple stakeholders who have differing agendas and assorted organisational priorities. These problems lack simple, straightforward solutions, with every solution potentially having a knock-on effect on other problems and solutions. These solutions will require sustained evaluation to determine its effectiveness, or lack thereof.

Therefore, proposed solutions that are effective and sustainable must embrace a holistic view to early childhood development and will require us re-engineer a whole-of-society approach, addressing physical, economic and sociocultural environments (Table 1) to shift Abu Dhabi and the UAE from an obesogenic environment to an energetic one. As ‘child rearing’ is less of a sprint and more of a long-term, continuous walk or jog or endurance affair, we will need to proclaim “a decade of healthy early childhood” in order to have sustainable impact. This is in line with the vision and priorities of Abu Dhabi Early Childhood Authority’s Early Childhood Development 2035 strategy for the Emirate of Abu Dhabi (2020). Approaches to ‘solving’ early childhood development in the 21st century will require an integrated top-down and bottom-up approach that is coordinated, supported, and monitored for efficacy and effectiveness. It must allow for stakeholders to adapt and align, and for recommendations and education to take root.

Table 1 Environmental influences on food intake and physical activity

Type of environment	Physical environment		Economic environment		Sociocultural environment	
	Food	Activity	Food	Activity	Food	Activity
Macro	Food laws and regulation Food technology Low fat foods Food industry policies	Labour saving devices Cycleways and walkways Fitness industry policies Transport system	Food taxes and subsidies Cost of food technology Marketing costs Food prices	Cost of labour versus automation Investment in parks and recreational facilities Costs of petrol and cars Costs of cycleways	Traditional cuisine Migrant cuisines Consumer demand Food status	Attitudes to recreation National sports Participating versus watching culture Gadget status
Micro	Food in house Choices at school or work cafeterias Food in local shops Proximity of fast food outlets	Local recreation facilities Second cars Safe streets Household rules for watching TV and video	Family income Other household expenses Subsidised canteens Home grown foods	Gym or club fees Owning equipment Subsidised local events Costs of school sport	Family eating patterns Peer attitudes Pressure from food advertising Festivities	Peers' activities Family recreation School attitude to sports Safety fears

Table 1

We need to address the obesogenic environment by changing the narrative and transforming it to energetic environment with a combination of sustainable policy, programme, product, proof (incentives and dis-incentives). Source: Egger & Swinburn, 1997

We will need to make obesogenic habits such as prolonged sitting, eating of fried, high salt, high sugar, high fat junk foods and takeaways, having an irregular bedtime, excessive screen time, with little to no physical exercise **abnormal and unacceptable**. Instead, Team 2 proposes that it is imperative that we lay the foundation for an energetic 21st century environment in the UAE. Positive Eat-Sleep-Play-Learn habits, including but not limited to physical activity, outdoor recreational activities, healthy eating, limited screen time and good sleep habits, should be **normalised, recognised, and applauded**. We should also aim for our children to spend more time outside in nature for healthy mental and physical development, and to foster in them a relationship with nature so that they will grow to enjoy, preserve, and protect it.

There is a compelling need to change the narrative that an energetic and healthy lifestyle is one that is coveted and embraced by all segments of society, starting with parents and parents to be, children and youths. Transforming an obesogenic environment to an energetic one requires designing dynamic strategies and solutions. These are enacted and operationalized via our 7P framework; - philosophy, policy, programmes, products, practise, publicity and proof. These 7Ps encapsulate the broad and fine strokes needed to build an energetic early childhood environment in the Abu Dhabi for the 21st century.

Philosophy

We believe our intentions and proposed Eat-Sleep-Play-Learn solutions should be child-centred and include developing mindful parenting. Early childhood in Abu Dhabi should simulate a mangrove ecosystem, supporting children at every step of their development. This involves weaving the home, the school and the outdoors, three pivotal nurturing environments to support children as they eat, sleep, play and learn. These philosophies are the foundation of all our outputs and solutions.

Policy

Focusing on sustainable investment principles and policies to anchor a decade of wholesome early childhood. Policy, in turn is undergirded by seven principles.

1. Child and parent/caretaker are focused on Eat-Sleep-Play-Learn and incorporating positive Eat-Sleep-Play-Learn guidelines in their daily lives.
2. Involvement of multiple stakeholders (home, school, outdoors, medical institutions, early childhood facilities, private businesses, government agencies, media & social networks and academic researchers).
3. Employ top-down, bottom-up initiatives with resource support.
4. Inclusive and amelioration of inequality gaps - all who are in need to have access to opportunities.
5. Consider sustainable investment goals i.e. Environment, Society & Governance and having measurable process and indicators.
6. Must always involve Youth (Children be Children by Children) and Parents (Parents for Parents by Parents) in co-curating, co-constructing, contributing to policy, programs, product and proof.
7. Focus on promotive medicine & health education.

Policy also includes developing an integrated set of guidelines for Eat-Sleep-Play-Learn, benchmarked against international research and recommendations (e.g. WHO, 2019b), promoting policies that infuse nature and the outdoors, and empowering our youths to champion active play, nature and the outdoors. All these policies stand on the foundation of an ensured safe home environment for babies, toddlers and children.

Programs

It is important that we equip parents and caregivers with the necessary parenting skills to create a safe, caring, and nurturing environment to allow children to be children. These programs can also be partnered with youth advocacy groups to incentivise children and youth to get involved in their future.

Products

Innovative product should be designed and created with inputs from relevant stakeholders to spark the imagination of both parents and children. These include wearable devices, with a simple traffic light system, can be designed to aid parents to monitor their children's growth and development, and our explosion boxes that reveal guidelines on Eat-Sleep-Play-Learn that can be used for high-touch outreach.

Practice

We believe in promoting the use of evidence-informed guidelines and integrative new technologies. Feedback received from use can then be routed back as inputs to drive future UAE-centric solutions. We aim to also tie in region-wide initiatives that provides incentives for families to adopt energetic Eat-Sleep-Play-Learn habits.

Publicity

It is crucial that communication solutions are developed and are comprehensive and sustained. This is fundamental for the effective sharing of meaningful information and resources, as well as underline the importance of early childhood development in the UAE. The national media and local parent influencer networks can be tapped to profile important stories on parents, education, nutrition, sleep, exercise and national initiative around early childhood in Abu Dhabi and to promote Eat-Sleep-Play-Learn best practices.

Proof

Proof involves researching and monitoring of inputs and results from the implementation of programmes and the use of products. The data, big and small, which is received can feed into a funded and supported research agenda that incorporate multiple stakeholder perspectives (parents, youth, businesses, government agencies, academic researchers).

A transformation from an obesogenic to an energetic environment to support safe, sound, healthy and happy children will require multi-sectorial stakeholders support and both upstream and downstream.

5. Outputs/solutions:

BWG 2 proposes seven recommendations for the short, middle, and long-term, with three immediate, easy to produce solutions, two impactful and on the ground mid-term recommendations, and two innovative and futuristic long-term ideas.

Although we do use the term “solutions” to describe our outputs, we recognize these are suggestions or proposals as to the best course of action, rather than a definitive answer to solve the wicked problems of a 21st century lifestyle.

Solutions A – Future-Child Accelerator events

Context:

These differentiated Future-Child Accelerator (FA) events are tailored to involve different stakeholders. One for parents, one for youths and one for medical and educational practitioners. These FA events allow our three stakeholders groups to learn Eat-Sleep-Play-Learn solutions that are specific to each group. Stakeholders will also add flesh to these solutions through context-specific ideation of user-centric initiatives around suggested Eat-Sleep-Play-Learn solutions, building on the design-thinking process of WED and help to mesh top-down recommendations with ground-up initiatives. Successful initiatives are to be awarded with sponsorship grants as seed funding to further develop their ideas or to pilot Eat-Sleep-Play-Learn initiatives or programs. These FA events also serve as a second layer of validation of the team’s specific solutions and address specific questions put forward by Team 2 around Eat-Sleep-Play-Learn.

Audience:

Target audience are parents, youths, and medical and educational practitioners, with partnership with academia from Zayed University and the United Arab Emirates University. The audience corresponds to the targeted demography groups for the three proposed FA events.

Implementation Resources and Partners:

These events can be wholly anchored by ECA. ECA can tap existing partnership with the Abu Dhabi Investment Office and Hub71 to help refine ideas for these accelerator events. The Abu Dhabi Government Media Office can be tapped to provide the necessary media coverage to draw attention to the events.

There should be an invitation for relevant stakeholder groups and private local businesses to be sponsors for the event. Such sponsorship opportunities will not only provide prime exposure leading up to, throughout, and following the FA events, these sponsors will stand out as an enabler of innovation and creativity, and a supporter of holistic early childhood development.

Timeframe:

Short term: 6 months – 1 year

Impact:

This solution is easy to implement but with relatively low, deferred impact. But it is a low hanging fruit and will be relatively cheap to implement. There is also potential for high impact in terms of participation and community buy-in.

Scientific-based Evidence backing the Output:

- Sim, R. (2021, July 7). *New $250,000 programme to fund social enterprises by young people.* The Straits Times. https://www.straitstimes.com/singapore/new-250000-programme-to-fund-social-enterprises-by-young-people
- Iau, J. (2021, July 17). *$250k fund launched for young Singaporeans to start social initiatives.* The Straits Times. https://www.straitstimes.com/singapore/250k-fund-launched-for-young-singaporeans-to-start-social-initiatives
- Poncette, A., Rojas. P., Hofferbert, J, Valera Sosa, A., Balzer, F., & Braune, K. (2020). Hackathons as stepping stones in health care innovation: Case study with systematic recommendations. *J Med Internet Res, 22*(3). https://doi.org/10.2196/17004
- Roberts, N. C. (2000). Wicked problems and networks approaches to resolution. *International Public Management Review,* 1(1), 1–19.

Solutions B – Wearable smart solutions

Context:

These wearable smart solutions are aimed at capitalizing on advance technology to monitor children's physical activity. This includes biometrics, such as heart rate, body temperature, sleep time and quality; physical activity such as steps, distance, active minutes, and lux or light intensity which could be used to measure time spent outdoors.

Simple traffic light indicators, attuned to healthy 24-hour integrated guidelines (WHO, 2019b), can signal to parents if their children are meeting physical activity and quality sleep time recommendations for their age group.

Audience:

These devices are designed primarily for parents and caregivers to monitor children’s physical activity, sleep, and in turn limit extended periods of physical inactivity and sedentary screen time. These wearable devices are meant to provide parents with information to encourage their children to lead an energetic lifestyle.

Implementation Resources and Partners:

Implementation partners include the Department of Health, Abu Dhabi Public Health Center (ADPHC) and Malaffi (Health Information Exchange platform). These partners would be able to provide their expertise to help benchmark and implement indicators that are pegged to established 24-hour movement guidelines for children (WHO, 2019b).

There are also opportunities for corporate partnerships with wearable device providers such as Garmin, Fitbit, Whoop or Ōura Ring.

Timeframe:

Short term: 6 months – 2 years

Impact:

This solution is a feasible quick win with moderate impact. These tech-enabled solutions can help to address the challenge of scalability and outreaching to hard-to-reach communities. Furthermore, an agreement to anonymous user data mining, in exchange for wearables being distributed at no-costs to users, could provide rich data for research.

There are potential for future spin-off included AI health conversation bots that will further enhance end-user experience by providing a personal assessment of health behaviors of parents and children.

Limitations identified include the expense of the wearables, the need for ongoing tech support and data privacy issues.

Scientific-based Evidence backing the Output:

- Health Promotion Board. (n.d.). Retrieved July 26, 2021, from https://www.hpb.gov.sg/healthy-living/physical-activity/National-Steps-Challenge
- Chandrasekaran, R., Katthula, V., Moustakas, E. (2020). Patterns of use and key predictors for the use of wearable health care devices by US Adults: Insights from a national survey. *J Med Internet Res,* 22(10). https://doi.org/10.2196/22443
- Chew, L., Tavitian-Exley, I., Lim, N., & Ong, A. (2021). Can a multi-level intervention approach, combining behavioural disciplines, novel technology and incentives increase physical activity at population-level?. *BMC Public Health,* 21(1), 120. https://doi.org/10.1186/s12889-020-10092-x
- Dimitri, P. (2019). Child health technology: shaping the future of pediatrics and child health and improving NHS productivity. *Archives of Disease in Childhood, 104,* 184–188.
- Smuck, M., Odonkor, C.A., Wilt, J.K., Schmidt, N., & Swiernik, M. A. (2021). The emerging clinical role of wearables: Factors for successful implementation in healthcare. *npj Digital Medicine, 4*(45). https://doi.org/10.1038/s41746-021-00418-3
- World Health Organisation. (2019b). *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age.* World Health Organisation. https://www.who.int/publications/i/item/9789241550536

Solutions C – Eat-Sleep-Play-Learn education explosion boxes

Context:

Contextual physical resources that 'open up' to reveal Eat-Sleep-Play-Learn guidelines and energetic lifestyle habits on the panels of the box walls. The content within these boxes are to be in line with government supported guidelines on 24-hour physical activity, sedentary behavior, and sleep, and other early childhood recommendations. Such hand-on resources can be specially designed to be useful to reach families with lower literacies or classrooms serving children of determination.

Audience:

The targeted audience would depend on the theme of the boxes. This could include, but is not limited to, parents and caregivers, teachers and school leaders, school health staff, pediatricians and family doctors.

Implementation Resources and Partners:

These boxes would be produced by ECA while working with parents, stakeholders for children of determination and the media on themes of greatest relevance and impact and towards creating appropriate and relevant design and text. ECA can also work with Abu Dhabi Government Media Office to promote the uptake and use of these boxes. These boxes can be distributed at ECA events or as outreach material.

There is also the possibility of tying up with other Breakthrough Working Groups and relevant stakeholder groups for themed versions of boxes.

Timeframe:

Short term: Immediate – 1 year

Impact:

This is a simple, feasible, inexpensive physical output. The impact will depend on the proposals and the capacity of the themes to attract and engage parents and other stakeholders.

Scientific-based Evidence backing the Output:

- Dimitri, P. (2019). Child health technology: shaping the future of pediatrics and child health and improving NHS productivity. *Archives of Disease in Childhood, 104,* 184–188.
- Harbec, M. J., & Pagani, L. S. (2018). Associations between early family meal environment quality and later well-being in school-age children. *J Dev Behav Pediatr,* 39(2), 136–143. https://doi.org/10.1097/DBP.0000000000000520.
- World Health Organisation. (2019b). *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age.* World Health Organisation. https://www.who.int/publications/i/item/9789241550536

Solutions D – Care and Education buildings

Context:

These hybrid Care and Education (C&E) buildings are permanent learning or education buildings built in different suburban districts around Abu Dhabi and/or mobile, “travelling fair”-styled pods to reach targeted stakeholder groups such as hard-to-reach communities and children of determination and their families. Educating parents/caretakers is easier if you create a coherent environment whereby all early childhood actors/stakeholders promote the Eat-Sleep-Play-Learn approach.

These quick-build pod-like structures that can be build up and torn down and moved quickly to different districts. The C&E buildings can be uniquely built for the needs of each district, with multi-use classrooms, playground areas and water coolers zones. Local district business can be involved to provide healthy local food and snacks. As a signature of designing solutions that adhere to Environmental, Social, and Governance (ESG) principles, the mobile pods could be built from recycled materials or be a showcase for zero-waste recycling.

Image 2 & 3

These are example of portable modular buildings that provide hybrid spaces that are open for children and parents, where natural and artificial elements coexists and promote the Eat-Sleep-Play-Learn approach.

Audience:

The target audience for these C&E building is very broad with access to all early childhood stakeholders, including all children, parents, caregivers, teachers and schools.

Implementation Resources and Partners:

These C&E buildings will require an interlocker agency. Led by ECA with representatives from the Department of Health, the Department of Community Development and the Abu Dhabi Urban Planning Council, this interlocker agency helps to connect parents, youths, local districts councils, and private businesses such as Kinderly, GEMS or Aldar Academies to create multi-use, multi-generational activity spaces.

Timeframe:

Middle term: 1 – 3 years

Impact:

Implementation of these C&E buildings will be tricky as it will take time to design and build a prototype. The first prototype will likely not be the perfect and will require prototype iterations. But the team believes that this solution has a high impact as it is visible and provides open access to all stakeholders to visit and experience the space and learn about Eat-Sleep-Play-Learn guidelines.

Scientific-based Evidence backing the Output:

- Mauran, C. (2020, November 5). *The big lessons of learning pods, two months in*. Fatherly. https://www.fatherly.com/love-money/learning-pod-parents/
- Widdicombe, L. (2021, March 14). *Why learning pods might outlast the pandemic.* The New Yorker. https://www.newyorker.com/news/annals-of-education/why-learning-pods-might-outlast-the-pandemic
- Paci-Green, R., Pandey, B., Gryc, H., Ireland, N., Torres, J. & Young, M. (2020). Challenges and benefits of community-based safer school construction. *International Journal of Disaster Risk Reduction, 43*. https://doi.org/10.1016/j.ijdrr.2019.101384.

Solutions E – Nature biospheres

Context:

The creation of biospheres allows us to incorporate nature and engender children, as well as parents, youths, and the community-at-large to learn and experiment in the outdoors and to build capacity for future sustainability. Research has shown that a decrease in time spent in nature and the outdoors could have important implications for the health and well-being of children (Largo-Wight et al, 2018; Schutte et al, 2015). Tying in with the previous solution of the C&E buildings, this solution calls for the curation of various ecosystem learning pods with activities for children and parents to engage. These would include

- Mangrove,
- Tropical,
- Desert, and
- Freshwater.

A curated sensory experience (sight, smell, touch, etc.) of various nature ecosystems will allow children to explore and discover, contributing to development cognitive skills such as attention, observation, and

critical thinking, and motor learning through running, jumping, playing, and climbing. In addition, children learn to develop a relationship with, and a greater understanding of different aspects of natural environments found in Abu Dhabi, the UAE and around the world.

Audience:

Similar to solution D, the target audience for these biosphere is very broad, with access to all early childhood stakeholders, including all children, parents, caregivers, teachers and schools.

Implementation Resources and Partners:

These biospheres will similarly require an interlocker agency that is led by ECA with representatives from the relevant government and key stakeholder groups. The engagement of botany and ecological specialists will also be necessary in order to provide a realistic ecosystem experience.

Lessons and activities must be planned and written for participants to imbibe nature and nurture their developmental experience and learning activities. Encouraging further activities such as excursions and visits to actual ecological sites will spark further interest and confidence.

Timeframe:

Middle term: 2 – 5 years

Impact:

The potential of these biospheres are massive, especially in creating an indoor environment simulating an outdoor one, considering the hot summer months in the UAE.

However, there will be difficulties with implementation and will require tight design intent and specification control.

Scientific-based Evidence backing the Output:

- Höhler, S. (2018, June 20). *Ecospheres: Model and laboratory for earth's environment.* Technosphere Magazine. https://technosphere-magazine.hkw.de/p/Ecospheres-Model-and-Laboratory-for-Earths-Environment-qfrCXdpGUyenDt224wXyjV
- Brussoni, M., Ishikawa, T., Brunelle, S., & Herrington, S. (2017). Landscapes for play: Effects of an intervention to promote nature-based risky play in early childhood centres. *Journal of Environmental Psychology*, 54,139–50.
- Collado, S., Rosa, C. D., & Corraliza, J. A. (2020). The Effect of a Nature-Based Environmental Education Program on Children's Environmental Attitudes and Behaviors: A Randomized Experiment with Primary Schools. *Sustainability, 12,* 6817.
- Flouri, E., Midouhas, E., & Joshi, H. (2014). The role of urban neighbourhood green space in children's emotional and behavioural resilience. *Journal of Environmental Psychology, 40,*179–86. https://doi.org/10.1016/j.jenvp.2014.06.007.
- Largo-Wight, E., Guardino, C., Wludyka, P. S., Hall, K. W., Wight, J. T., & Merten, J. W. (2018). Nature contact at school: The impact of an outdoor classroom on children's well-being. *International*

Journal of Environmental Health Research, 28(6), 653–66. https://doi.org/10.1080/09603123.2018.1502415

- Schutte, A. R., Torquati, J. C., & Beattie, H. L. (2017). Impact of urban nature on executive functioning in early and middle childhood. *Environment and Behavior, 49*(1), 3–30. https://doi.org/10.1177/0013916515603095

Solutions F – Microbiome technology

Context:

The field of microbiome research is a topic of great scientific and public interest and has been touted as the 21st century lifestyle monitoring and intervention tool. A microbiome is a community of microorganisms (bacteria, fungi and viruses) that inhabit a particular environment, like our gut. Recent scientific papers and findings have shown that the gut microbiome serves more than aiding in digestion. It also serves in managing an array of systemic functions such as building a strong immune system, improving brain function, and promoting health functions. Microbiome profiles and markers can also be used to track exercise and routine, and provide real-time data and updates on daily sufficiency and performance response. In the future, even stress and disease-altered microbiome profiles can be captured before the event or disease actualisation happens.

As children have comparatively standard diets and regular routines than compared to adults, children's lifestyles are ideally suited for the microbiome study in aiding and monitoring children's health, nutrition and developmental well-being.

Audience:

Although the preliminary use of microbiome research will be primary aimed at understanding the health, nutrition and developmental profiles of babies and children, there are important research implications that could be relevant for all levels of society within the UAE and worldwide.

Implementation Resources and Partners:

There are a number of major players in the microbiome market. Team 2 member, Dr. Chia Tet Fatt is an expert in lactobacillus technology and has been successful in bringing microbiome technology from the lab into the food and beverage industry in Singapore.

Timeframe:

Long term: 7 – 10 years and beyond

Impact:

Microbiome research is futuristic 21st century frontier science with enormous potential as a lifestyle monitoring and intervention tool. In turn, there is potential here of being the world leaders in this innovative field of science, in particular understanding it in terms of children's health, nutrition and developmental well-being. Data collected can be subsequently used to bridge areas of research as microbiome data has broader implications in healthcare and biopharmaceutics. The team feels that this is a high impact and high value solution.

However, it will likely take a longer time, require sustained funding investment into research and development of microbiome technology and be harder to implement.

Scientific-based Evidence backing the Output:

- Allen, J. M., Mailing, L. J., Niemiro, G. M., Moore, R., Cook, M. D., White, B. A., et al. (2018). Exercise alters gut microbiota composition and function in lean and obese humans. *Medicine & Science in Sports & Exercise, 50*, 747–57. https://doi.org/10.1249/MSS.0000000000001495
- Hughes, R. L., Kable, M. E., Marco, M., & Keim, N. L. (2019). The role of the gut microbiome in predicting response to diet and the development of precision nutrition models. Part II: results. *Advances in Nutrition, 10*, 979–98. https://doi.org/10.1093/advances/nmz049
- Hughes, R. L., Marco, M. L., Hughes, J. P., Keim, N. L., & Kable, M. E. (2019). The role of the gut microbiome in predicting response to diet and the development of precision nutrition models—Part I: overview of current methods. *Advances in Nutrition, 10*, 953–78. https://doi.org/10.1093/advances/nmz022 24.
- Mika, A., & Fleshner, M. (2016). Early-life exercise may promote lasting brain and metabolic health through gut bacterial metabolites. *Immunology & Cell Biology, 94*, 151. https://doi.org/10.1038/icb.2015.113

Solutions G – Research and management unit

Context:

This unit is to receive and provide grant support, to commission and coordinate research, and to communicate findings to policy makers & practitioners. This could be tied up with universities and academia to create a feedback research loop with those with relevant expertise.

The unit will also oversee the 7P index, a holistic index for wholesome early childhood care & development for 21st lifestyle, with cognizance to Team 2's unique 7P framework. This UNESCO-adapted index matrix will not only help to measure the holistic wellness of early childhood in Abu Dhabi in the long run but also be incorporated into the baseline data analysis for all proposed ECA and WED programs in the near term.

Audience:

Similar to solution F, although the 7P index and all research conducted will be focused on children and their immediate families, research implications arising from the findings could be potentially relevant for all levels of society within the UAE and worldwide.

Implementation Resources and Partners:

Team 2 member, Cristian Fabbi has started with the ECA's Data and Strategy team on the 7P index and have recently finalized an agreed-upon ten indicators to track child holistic developments in the UAE.

The research unit will require expertise from local universities, Zayed University and the United Arab Emirates University, as well as international expertise in related fields.

Timeframe:

Long term: 3 – 10 years and beyond

Impact:

Implementation will take time and require high level influence and lobbying for access and funding. However, this data will provide important baseline information for all other research and provide visibility to the progress of ECA and WED programs. The research unit will also help to create and build a research culture in Abu Dhabi, making it a hub specializing in Early Childcare research and development. Thus, the impact of this solution is potentially high.

Scientific-based Evidence backing the Output:

- United Nations Educational, Scientific, and Cultural Organization. (2014*). Holistic early childhood development index.* https://en.unesco.org/ecce/holistic-development
- Umarov, A. (2018). *Holistic early childhood development indicators supporting young children through measurement UNESCO, ECCE*. https://documen.site/download/dralisherumarov_pdf

6. Annex:

Implementable Program/Product-type Conception Details

Solutions A – Future-Child Accelerator Events

- **Setup**: Preferably, these FA events could be conducted in-person in a physical space. However, it is also possible for the events to be held virtually, pending local health advisories.
- **Participants**:
  - The types of participants for each FA event should be demographically representatives of the specific stakeholder group the FA event is planned for. One for parents, one for youths and one for medical and educational practitioners.
  - 50 participants of each target audience group per event, spilt into teams of no more than 5 persons.
  - Each team should also include 1-2 technical advisors who will be able to answer questions, explain details and provide local contextual information to the teams. These technical advisors should include representatives from the ECA, relevant government agencies and partner stakeholder groups. For example, the technical advisors for FA events for parents could include representatives from the Department of Education and Knowledge, pediatricians, teachers and school leaders, early childcare providers such as Kinderly, and even local parent influencers such as Khalid AlAmeri.
  - Partnership with academia to ensure fidelity of implementation and documentation of process and proof of results is recommended.
- **Facilitators**: Trained facilitators with knowledge of innovation thinking and social entrepreneurship. Facilitators are expected to keep the group focused and help guide the discussions, create a comfortable and engaging experience, and keep participants on tracks to ensure the goals of the FA events are met.
- **Space/Time Description**: In-person events would require a large open venue with sufficient space for the groups to comfortably hold discussions. There should be tables, chairs, and whiteboards easels that participants can move between discussions.
- **Fundings/Sponsorship**:
  - The events should be free for participants and be highly promoted and publicized to generate buzz or excitement among stakeholder groups
  - Prize grants can be awarded to promising initiatives. The advantage of such incentives is two-fold. Firstly, prizes are important to increase event attendance and stimulate enthusiastic participation. Secondly, and more importantly, funding such initiatives on a small, grassroots scale will help to prototype and lead the ground-up efforts around Eat-Sleep-Play-Learn and an energetic 21st century lifestyle.
  - Recommended 3-tier grant award amount. 1st tier is US$100 000 (three awards), 2nd tier US$75 000 (two awards) and 3rd tier US$50 000 (five awards) over 18-24 months.

- There should be opportunity to scale up successful piloted initiatives, programs or products, with additional resource or grant support

Solutions B – Wearable smart solutions

- **Participants**: A pilot study can be undertaken to focus on parents of children aged 5-8 years. These parents are likely to be of the age groups who either already own or be willing to adopt such devices (Chandrasekaran et al, 2020). Children aged 5-8 years would also be more pliable to wear the devices on their own. If the pilot proves successful (high participation rate), these watches can be distributed to a wider network of parents within Abu Dhabi.
- **Objectives and Utility of Functionality within the Product**: The primary objective of these wearable for parents and caregivers to monitor children's physical activity. Basic device models should therefore be able to measure steps, active minutes, and sleep. This model could also provide vibration reminders for wearers to move during extended periods of inactivity. Advance devices models of could include additional feature to include heart rate, body temperature, sleep quality and lux measurements.
- **A description of the Functionality**: These devices are meant to be worn by the child or attached to a child's clothes. The activity and sleep tracked is measured against healthy 24-hour integrated guidelines on physical activity and quality sleep time (WHO, 2019b). Simple traffic light indications can signal to parents if their children are meeting physical activity, sedentary behavior and quality sleep time recommendations for their age group. 'Green' to indicate recommendations met. 'Orange' to indicate being close to meeting recommendations. 'Red' to indicate recommendations not attempted or far from being met. The gamification of these wearable devices with a traffic light system makes it is easy for children to understand and can motivate them to start moving to achieve target goals.

Solutions C – Eat-Sleep-Play-Learn education explosion boxes

- **Objectives and Utility of Functionality within the Product**:
  - An explosion box is essentially a folded-up cube box (see image 4). When the lid is removed, the box 'explodes' to reveal content on each panel of the box walls (see image 5). These boxes are an innovative design, contrasting from traditional pamphlets or booklets designs.
  - Suggested themes could include:
    - First 1000 days of a child – in terms of Eat-Sleep-Play-Learn guidelines;
    - Opportunities for social-wellbeing and emotional development;
    - Nutrition – reduce consumption of sugary drinks and increase consumption of fruits and vegetables; or
    - Traditional foods.

Image 4

An explosion box 'explodes' to reveal content within. Boxes could include comparably sized gifts for target audience. Source: Chaotically Yours

Image 5

The panels of the box open to reveal relevant content to specific audiences

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