Additional file 3. Factors related to the implementation of real-world, school-based interventions

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| **Factors related to implementation** | |
| **Facilitators** | **Barriers** |
| **I. Community Level Factors**  *Prevention Theory and Research*  -Planning for diffusion/sustainability from the beginning10  -Detection of children with overweight, inactivity, and motor problems succeeded by monitoring system7  -Effective identification of children at risk7  *Funding*  -Teacher stipends for attendance at the trainings12  -Grant funding13  *Policy*  -Prepared lessons aligned with state education standard10  -Environmental influence (e.g., compliance with Provincial guidelines)4  -Attitude, subjective norm/beliefs among political stakeholders7 | **I. Community Level Factors** |
| **II. Provider Characteristics**  *Perceived Benefits of Innovation*  -Perceived benefits to implementing classroom physical activity20  -Classroom behaviour benefits20  -Attitude toward adaptations/changes in policies and practices7  -Observable results and perceived advantages7  -Outcome beliefs, feasibility, and perceived importance of participants7  -Perceived relative advantage of the intervention10,4  -Perceived enthusiasm of adolescents1  -Outcome expectation4,5  *Self-efficacy*  -Self-efficacy4,5  -Easy to implement19  *Skill Proficiency*  -Percentage of population with postsecondary education5  -Teaching experience5 | **II. Provider Characteristics**  *Perceived Need for Innovation*  -Perceived responsibility for parental information of school participants7  *Perceived Benefits of Innovation*  -Perceived barriers to implementing classroom physical activity20  -Lack of practical applications1  -Lack of incentives for adolescents1 |
| **III. Characteristics of the Innovation**  *Compatibility*  -Fitting the school context19  -Feasibility and compatibility of tasks with the regular task orientation7  -Aesthetically appealing19  -Intervention’s appeal to students19  -Well-defined program components7  -Materials resonated with the interests/resources of stakeholders10  -Layout and content of the materials1  -Extensive teacher manual to support implementation1  -Intervention simplicity17  -Low cost10  -Feasible and acceptable12  -Existing PE strategies to promote physical activity16  -Existing school wellness programs13  -Informative and sufficient website1  -Quality and frequency of information regarding sports7  *Adaptability*  -Adaptability17  -High perceived flexibility1,10,16,17,18  -Potential for tailoring1,7 | **III. Characteristics of the Innovation**  *Compatibility*  -Intervention material perceived too valuable to take home7  -Programme too complex for education level1  *Adaptability*  -Unbundled workbook, difficulties in copying the separate worksheets1 |
| **IV. Factors Relevant to the Prevention Delivery System: Organizational Capacity**  *Positive Work Climate*  -Organisational climate/support4,5  -Administrator climate20  *Organizational norms regarding change*  -School celebration assemblies16  -Launch event19  -Games and activities19  -Environmental influences3  *Integration of new programming*  -Easy to integrate in the lessons for younger groups7  -Compatibility to the regular biology, health education1  -Level of institutionalisation4,5  -Easy to integrate in organisations7  *Shared vision*  -Strong commitment/motivation to achieve goals among PE teachers/sport coordinators7  -Strong motivation/commitment to work with the programme1  -Sufficient collaboration between implementing teachers 1  -Organisational commitment/motivation to comply to shared goals7  -Visibility of the brand was important for school identity18  *Shared decision-making*  -Implementers included in planning and design5,10  -Involvement of students5  -Participation of all parties was crucial to developing materials10  *Coordination with other agencies*  -Clear protocols, tasks, and agreements among organisations7  -Clear hierarchical structures within organisations7  -Involvement and support of experts in sports, health, and education7  -Having intervention staff in the school5  -Multidisciplinary character of programme increased collaboration1  -Overall coordination of coordinator1  *Communication*  -Effective communication strategies between partners in sports7  -Close dialogue with programme managers5  -Clear/short communication between teachers, sections and teams1  *Formulation of tasks*  -Students as peer-support for one-another16  -Clear school-wide plan for implementation1  -Completing a School Wellness Investigation13  *Specific Staffing Considerations*  *Program champion*  -Program champion16  -Program promoters5  *Managerial/supervisory/administrative support*  -School management commitment6,19  -Supportive involvement of a school principal or administrator10,18  -Teachers encouraged/supported by school to trial intervention17  -Encouraged to hold classroom physical activity20  *Characteristics of the school***#**  -Availability of physical space19  -Schools with >50% students eligible for free/reduced-price lunch13  -Schools with more children signed up to the intervention13 | **IV. Factors Relevant to the Prevention Delivery System: Organizational Capacity**  *Integration of new programming*  -Incompatibility with existing health care monitoring instruments7  -Difficult to integrate in lessons for older groups7  -Competing priorities3,12,20  -Other priorities1  -Short planning time12  -Large variation in time teachers spent on the in-class interventions7  -Time 3,20  -Teacher workload (time)1  -Time pressure because of the timeline of the evaluation study7  *Coordination with other agencies*  -Complex hierarchical lines/financial structures between collaborating organisations7  -Complexity of collaboration between teachers, sections and teams1  -Teacher confusion regarding role of intervention employee within the school3  -Difficulties to involve parents1  -Lack of coordination hampered communication between organisations7  -The competing position of some care providers within one district7  *Communication*  -Lack of clearness about tasks7  -Incorrect indication of time needed for the lessons1  *Formulation of tasks*  -Need for more time to fine-tune organisational procedures7  -Information/clearness about tasks among the school staff7  -Changes in planning for implementation1  -A lack of valid and reliable screening instruments to detect children7  *Specific Staffing Considerations*  -Teacher attrition due to transfers, retirements, career changes1,8,12  -Lack of staff members19  -Turnover among politicians, sports coordinators, and PE teachers7  -Capacity of staff members16  -School directors protect the staff against overload7  -Perceived workload among school staff 7  -Referrals of overweight/obese children hampered by capacity issues7  *Leadership*  -Programme coordinator who is not implementing the programme1  *Program champion*  -Champion leaving19  *Managerial/supervisory/administrative support*  -Management buy-in19  *Characteristics of the school***#**  -School closings12  -School system attributes12  -Availability of gymnasia due to insurance/cleaning agreements7  -Space available16  -Lack of availability of materials and facilities1 |
| **V. Factors Related to the Prevention Support System**  *Training*  -Training4,5,10,18  -Tailored professional training/instructions for implementers7  -Trained to hold classroom physical activity20  -PE teachers participated in professional development5  *Technical Assistance*  -Support from the intervention team/a centralised help desk1,7  -Availability of intervention staff for training/technical assistance12  -Program staff who contact decision makers, answer questions, present at professional meetings, conduct training, ensure quality control10  -School- based coordinators to organise interdisciplinary planning12  -Availability of resources for classroom physical activity20  -Received materials for classroom physical activity19,20  -Access to technical assistance classroom physical activity20  -External support19  -Programme resources provided16 | **V. Factors Related to the Prevention Support System**  *Training*  -Teacher professional development19 |
| **Others#** | **Others#**  *Parent support and perceptions*  -Engagement of parents and families12  -Difficulties in reaching parents for information meetings and workshops7 |

\*Studies represented by the following superscripts: 1(van Nassau et al. 2016a), 2(van Nassau et al. 2016b), 3(Mâsse et al. 2012), 4(McKay et al. 2015), 5(Nielsen et al. 2018a), 6(Nielsen et al. 2018b), 7(de Meij et al. 2013), 8(Saunders et al. 2011), 9(Bice, Brown & Parry 2014), 10(Franks et al. 2007), 11(Hoelscher et al. 2004), 12(Wiecha et al. 2004), 13(Graziose et al. 2017), 14(Beck, Jensen & Hill 2015), 15(Totura et al. 2015), 16(Chalkley et al. 2018), 17(Ryde et al. 2018), 18(Storey et al. 2011), 19(Austin et al. 2011), 20(Carlson et al. 2017).#Other categories as per the classification proposed by Naylor et al, (14).