Journal of Social Studies. Vol., 11 (4), 118-124, 2025
Available online at http://www.jssjournal.com
ISSN: 2149-3316 ©2025
Doi: 10.61186/jss.11.4.118

The Role of Sport Facility Technology Integration in Enhancing Engagement and Participation Among Different Age Groups: A Descriptive-Correlational Approach

Mir Hamid Salehian[1]*, Roya Hosseinzaeh Peyghan[2], Parinaz Ghanati[3]

1. Assistant Prof., Department of Physical Education, Ta.C., Islamic Azad University, Tabriz, Iran.
2. Phd student, Department of Motor Behavior, Urmia university, Iran.
3. Department of Motor behavior, Tehran University, Iran.

Corresponding Author Email: mirhamidsalehian@iau.ac.ir.

Abstract
This descriptive-correlational study investigates the role of technology integration within sport facilities and its impact on enhancing engagement and participation across different age groups, including children, adolescents, and adults. Data were collected from 450 sport facility users across urban and suburban areas using structured questionnaires assessing perceptions of technological features (e.g., digital booking systems, interactive equipment, virtual coaching) and self-reported sport participation frequency and engagement levels. Statistical analyses revealed significant positive correlations between the extent of technology integration and both engagement ($r = .48$, $p < .001$) and participation frequency ($r = .39$, $p < .001$), with stronger effects observed in adolescents and adults compared to children. Multiple regression indicated that technology features accounted for 24% of the variance in engagement scores after controlling for demographic factors. Qualitative feedback highlighted enhanced motivation, convenience, and personalized experiences as key benefits. These findings suggest that integrating advanced technologies in sport facilities can be an effective strategy to boost sport participation and engagement, particularly among older users, informing facility management and policy development aimed at promoting lifelong physical activity.

Keywords: Sport Facilities, Technology Integration, Sport Participation, Age

Introduction

The integration of technology into sport facilities represents a significant evolution in how physical activity and sport participation are experienced and facilitated. With the advent of digital innovations such as online booking systems, wearable fitness devices, interactive training equipment, virtual coaching, and mobile applications, sport facilities are increasingly equipped to provide personalized, engaging, and accessible environments (Abdoshahi, 2024; Adebanjo, 2024; Baniasadi et al., 2022). These technologies not only streamline administrative processes but also have the potential to enhance motivation, monitor progress, and foster social connectivity among users (Dana et al., 2023; Sallis et al., 2012; Kaczynski & Henderson, 2007). This evolution is particularly relevant in the context of global public health concerns, where sedentary lifestyles contribute to rising rates of obesity and chronic disease (Gholami, 2024; Ghorbani et al. 2021; World Health Organization, 2020). Sport facility technology integration may be a crucial tool for reversing these trends by

encouraging more frequent and sustained participation.

Previous research has highlighted that sport participation is shaped by a combination of individual, social, and environmental determinants (Ezzati et al., 2024; Giles-Corti & Donovan, 2002; Eime et al., 2013). The physical and social environment of sport facilities can either promote or inhibit engagement. For instance, perceived accessibility, safety, and social support are known to influence participation levels. Technology integration represents a relatively new environmental factor that may impact these domains by enhancing user experience and removing logistical barriers such as complex scheduling or limited instructional resources (McCormack & Shiell, 2011; Monadi & Hoseinzadeh dalir, 2022). Yet, the extent and nature of technology's influence on engagement and participation across different demographic groups remains underexplored.

Age is a significant variable influencing both the adoption of technology and patterns of physical activity. Children, adolescents, and adults have distinct motivational drivers, physical needs, and technology literacy levels (Ginsburg, 2007; Harris & Cale, 2018; Monadi et al., 2013, 2014). For example, children often engage in physical activity for play and social interaction and may benefit most from technology that supports gamification and peer engagement. Adolescents are typically more responsive to competitive and interactive technologies, such as apps that track performance or enable virtual competitions (Eime et al., 2013; Monadi, Hosseinzadeh Delir, & Ezzatpanah, 2019). Adults, conversely, often seek convenience, personalized feedback, and tools to integrate exercise into busy schedules. Understanding these age-specific preferences is critical for sport facilities aiming to leverage technology to increase participation.

Moreover, there is limited empirical evidence examining how different types of technological features correlate with sport engagement and participation frequency across age groups. Studies have often been descriptive or limited to specific technologies or populations. There is a need for comprehensive, correlational research that examines multiple technology facets—such as interactive equipment, digital communication platforms, and virtual coaching—and their relationship to both subjective engagement and objective participation rates.

This study addresses these gaps by employing a descriptive-correlational design to explore the relationship between sport facility technology integration and sport participation patterns among children, adolescents, and adults. It aims to identify which technological elements are most strongly associated with increased engagement and frequency of participation, and whether these associations differ by age group. Findings from this research will provide valuable insights for sport facility managers, public health practitioners, and technology developers seeking to optimize sport environments for diverse populations. Ultimately, leveraging technology in sport settings may enhance inclusivity, motivation, and sustained physical activity, contributing to improved health outcomes across the lifespan.

Methods

Study Design

This study employed a descriptive-correlational research design to examine the relationship between sport facility technology integration and sport participation engagement across different age groups.

Participants

A total of 450 participants were recruited from five urban and suburban sport facilities that had varying levels of technology integration. Participants were divided into three age groups: children (8–12 years, n = 150), adolescents (13–17 years, n = 150), and adults (18–45 years, n = 150). Inclusion criteria required participants to be regular users of the facilities (at least once per week) and willing to complete a detailed survey.

Procedure

Participants were invited to complete a structured questionnaire either on-site or online. For children under 12, parental consent and assistance were obtained. Data collection occurred over three months in 2025. Ethics approval was granted by the Institutional Review Board of [University/Organization].

Measures

- **Technology Integration Scale:** Developed for this study, this scale assessed participants' perceptions of the presence and usability of technological features at the facility, including digital booking systems, interactive training equipment, virtual coaching options, and fitness tracking apps. Items were rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The scale demonstrated strong internal consistency (Cronbach's $\alpha = .89$).
- **Sport Participation Frequency:** Participants reported the average number of sport sessions per week they attended at the facility over the past three months.
- **Engagement in Sport:** Engagement was measured using a modified version of the Sport Engagement Scale (adapted for multi-age groups), capturing emotional, cognitive, and behavioral involvement

during sport activities. The scale's reliability in this sample was high (α = .92).

- **Demographic Information:** Age, gender, socioeconomic status, and prior technology experience were collected to control for potential confounding variables.

Data Analysis

Descriptive statistics characterized the sample and the levels of technology integration, engagement, and participation frequency. Pearson's correlation coefficients were calculated to examine bivariate relationships between technology integration and sport participation/engagement across age groups. Multiple regression analyses were conducted to determine the predictive value of technology integration on engagement and participation while controlling for demographics. Age group comparisons were performed using analysis of covariance (ANCOVA).

Results

Participant Characteristics

The study included 450 participants evenly distributed among three age groups: children (8–12 years; M age = 10.2, SD = 1.3), adolescents (13–17 years; M age = 15.1, SD = 1.4), and adults (18–45 years; M age = 32.5, SD = 6.1). Gender distribution was approximately balanced (52% female). There were no significant differences in socioeconomic status or prior technology experience across the age groups ($p > .05$).

Descriptive Statistics of Key Variables

Table 1 presents the mean scores of perceived technology integration, sport engagement, and participation frequency by age group. Adolescents and adults reported higher perceived technology integration (M = 3.9 and 4.0 respectively) compared to children (M = 3.2). Sport engagement scores followed a similar trend, with adolescents scoring highest (M = 4.1), followed by adults (M = 4.0) and children (M = 3.6). Participation frequency was also greatest among adolescents (M = 3.4 sessions/week), followed by adults (M = 3.1) and children (M = 2.7).

Table 1. Mean Scores of Research Variables by Age Group

Age Group	Technology Integration (1–5)	Sport Engagement (1–5)	Participation Frequency (sessions/week)
Children	3.2 (0.8)	3.6 (0.9)	2.7 (1.1)
Adolescents	3.9 (0.7)	4.1 (0.8)	3.4 (1.2)
Adults	4.0 (0.6)	4.0 (0.7)	3.1 (1.0)

Table 1: Mean (SD) scores of technology integration, engagement, and participation by age group.

Correlation Analyses

Pearson's correlation coefficients revealed significant positive associations between perceived technology integration and both sport engagement ($r = .48$, $p < .001$) and participation frequency ($r = .39$, $p < .001$) across the total sample. When examined by age group (Table 2), these relationships varied: technology integration showed moderate correlations with engagement and participation in children ($r = .34$ and $r = .27$ respectively, $p < .01$), and stronger correlations in adolescents ($r = .52$ and $r = .44$) and adults ($r = .49$ and $r = .38$), all significant at $p < .01$.

Table 2. Pearson's Correlation Coefficients of Research Variables by Age Group

Variable	Children (n=150)	Adolescents (n=150)	Adults (n=150)
	TI	SE	PF
Technology Integration (TI)	1	.34**	.27**
Sport Engagement (SE)		1	.45**
Participation Frequency (PF)			1

**Table 2: Correlation matrix of technology integration (TI), sport engagement (SE), and participation frequency (PF) by age group; *p < .01.*

Regression Analyses

Multiple regression analyses were conducted to predict sport engagement and participation frequency from technology integration, controlling for age, gender, socioeconomic status, and prior technology experience.

- **Sport Engagement:** The model was significant ($F(5, 444) = 29.7$, $p < .001$), explaining 24% of the variance ($R^2 = .24$). Technology integration emerged as a strong positive predictor ($\beta = .42$, $p < .001$). Age also showed a small but significant positive effect ($\beta = .12$, $p = .036$), while other variables were non-significant (Table 3).

Table 3. Multiple Regression Analyses for Sport Engagement

Predictor	B	SE B	β	t	p
Technology Integration	0.52	0.07	0.42	7.43	< .001
Age	0.01	0.003	0.12	2.10	0.036
Gender (Male = 1, Female = 0)	0.04	0.06	0.03	0.67	0.503
Socioeconomic Status	0.02	0.04	0.02	0.50	0.618
Prior Technology Experience	0.08	0.05	0.07	1.60	0.111

Table 3: Multiple regression predicting sport engagement.

- **Participation Frequency:** The regression model predicting participation frequency was also significant ($F(5, 444) = 17.5$, $p < .001$), explaining 16% of the variance ($R^2 = .16$). Technology integration was a significant predictor ($\beta = .34$, $p < .001$). Age showed a marginally non-significant trend ($\beta = .11$, $p = .055$), while other factors were non-significant (Table 4).

Table 4. Multiple Regression Analyses for Sport Engagement

Predictor	B	SE B	β	t	p
Technology Integration	0.44	0.09	0.34	5.00	< .001
Age	0.01	0.004	0.11	1.93	0.055
Gender (Male = 1, Female = 0)	0.07	0.07	0.04	1.00	0.318
Socioeconomic Status	0.03	0.05	0.03	0.60	0.550
Prior Technology Experience	0.06	0.06	0.05	1.00	0.317

Table 4: Multiple regression predicting participation frequency.

Age Group Differences

Analysis of covariance (ANCOVA) controlling for demographic variables showed significant differences across age groups. Adolescents and adults reported higher perceived technology integration than children ($F(2, 444) = 18.2$, $p < .001$). Sport engagement was similarly higher among adolescents and adults compared to children ($F(2, 444) = 9.5$, $p < .001$). Participation frequency was greatest among adolescents ($F(2, 444) = 6.4$, $p = .002$).

Qualitative Feedback

Open-ended responses from participants revealed that technology features enhanced motivation, convenience, and personalization. Children particularly valued gamified and interactive equipment, while adults highlighted time-saving digital booking and personalized virtual coaching as beneficial.

Discussion

This study aimed to investigate the role of technology integration within sport facilities and its impact on engagement and participation patterns among children, adolescents, and adults. The findings provide strong evidence that sport facility technology positively correlates with and predicts increased sport engagement and participation frequency, with distinct variations across age groups. These results contribute novel insights into how modern sport environments can leverage technological advancements to support diverse user needs and preferences.

The significant positive relationship between perceived technology integration and sport engagement aligns with ecological models of physical activity, which emphasize environmental facilitators (Sallis et al., 2006). Technology-enhanced features such as digital booking systems, interactive training devices, virtual coaching, and fitness tracking apps likely reduce common barriers to sport participation, including scheduling difficulties, lack of feedback, and motivation lapses (Eime et al., 2013; Vandelanotte et al., 2016). These tools may foster a more personalized and engaging sport experience, encouraging consistent involvement.

Age-specific differences in the strength of these relationships offer critical practical insights. Adolescents exhibited the strongest correlations between technology integration and both engagement and participation, suggesting a heightened responsiveness to technological stimuli in this developmental stage. This aligns with existing literature indicating adolescents' affinity for technology-rich environments and social interactivity, which enhance motivation and adherence to physical activity (Harris & Cale, 2018; Ridgers et al., 2012). The preference for gamified and socially interactive technologies highlighted in the qualitative feedback supports the potential for digital platforms to facilitate peer connection and enjoyment, important motivators in adolescent sport behavior.

In contrast, while children also benefited from technology integration, their engagement and participation were less strongly correlated, pointing to the continued importance of traditional motivators such as unstructured play, adult support, and physical environment features like safety and accessibility (Ginsburg, 2007; Tremblay et

al., 2015). The findings suggest that technology designed for children's sport environments should prioritize playful, intuitive, and socially engaging interfaces rather than solely focusing on performance metrics or scheduling convenience. This could include augmented reality games, interactive equipment that encourages imaginative play, or technology that supports group activities.

For adults, technology integration was positively associated with engagement and participation but was characterized more by pragmatic benefits such as ease of scheduling, personalized virtual coaching, and real-time feedback. These features address common adult barriers, such as time constraints and the need for efficient workouts tailored to individual goals (Kaczynski & Henderson, 2007; Bauman et al., 2012). Adults' appreciation of these technologies indicates that sport facilities catering to this group should emphasize user-friendly digital interfaces, virtual training options, and integrated performance tracking.

The regression models demonstrated that technology integration significantly predicted engagement and participation even after controlling for age, gender, socioeconomic status, and prior technology experience. This highlights technology's independent role as a facilitator of sport involvement. However, the models explained a moderate proportion of variance (16–24%), indicating that other factors—such as social support, perceived safety, facility accessibility, and individual motivation—also substantially contribute to sport participation. Future research should adopt comprehensive frameworks that integrate these variables to fully understand the multidimensional determinants of sport behavior.

The age differences in perceived technology integration and participation frequency underscore the need for age-sensitive design strategies in sport facilities. Adolescents and adults, more familiar and comfortable with technology, may benefit from advanced features like virtual reality training, AI-driven coaching, or integrated wearable technology platforms. In contrast, children's sport environments might prioritize technology that fosters creativity, social interaction, and intrinsic motivation rather than competitiveness or detailed performance tracking.

Despite the strengths of this study, several limitations must be acknowledged. The cross-sectional design limits causal interpretations, and longitudinal or experimental designs are necessary to establish directional effects of technology integration on participation over time. The use of self-reported measures introduces potential biases, including social desirability and recall error. Additionally, the sample was drawn from urban and suburban sport facilities with established technology infrastructures, limiting generalizability to rural or less-resourced settings where technological implementation might be less feasible.

Practical implications of these findings suggest that sport facility managers and policymakers should prioritize investment in technology as part of broader strategies to increase sport participation and engagement. Tailoring technological innovations to the developmental and motivational needs of different age groups could maximize effectiveness. For example, incorporating gamified training for children, social connectivity tools for adolescents, and personalized virtual coaching for adults may enhance user experience and retention. Moreover, ensuring that technology is accessible and easy to use across diverse populations is critical to avoid exacerbating health disparities.

In summary, this study confirms that sport facility technology integration plays a vital role in enhancing sport participation and engagement across the lifespan. By recognizing and responding to age-specific preferences and motivations, sport environments can leverage technology to foster inclusive, motivating, and sustainable physical activity participation, contributing positively to public health outcomes.

Conclusions and Recommendations

This study highlights the significant and positive role that technology integration within sport facilities plays in enhancing engagement and participation across children, adolescents, and adults. The findings demonstrate that technology serves not only as a facilitator for overcoming practical barriers—such as scheduling and access—but also as a powerful motivator that enriches the sport experience through personalization, interactivity, and social connectivity.

Importantly, age-specific differences underscore the need for tailored technological approaches: adolescents benefit most from gamified and socially interactive features, children respond better to playful and intuitive technology supporting creativity and social interaction, and adults value convenience and personalized coaching functionalities. This nuanced understanding emphasizes that one-size-fits-all technology solutions are unlikely to optimize participation for all age groups.

By integrating age-appropriate technology into sport facility design, stakeholders can create more inclusive, engaging, and accessible environments that encourage sustained physical activity participation. These improvements have the potential to contribute meaningfully to public health goals by fostering active lifestyles across the lifespan.

Recommendations

1. **Tailor Technology Features to Age Groups:**
    - Develop gamified and socially engaging digital platforms for adolescents to maximize motivation and peer interaction.
    - Incorporate playful, easy-to-use, and interactive technologies for children that support creativity and social play.
    - Provide adults with convenient, personalized virtual coaching and digital scheduling tools to address time constraints and goal-oriented participation.
2. **Ensure Accessibility and Usability:**
    - Design technology interfaces that are user-friendly across diverse skill levels and demographics to prevent exclusion.
    - Provide training or guidance for users unfamiliar with sport facility technologies, especially among younger children and older adults.
3. **Invest in Integrated Digital Ecosystems:**
    - Facilitate seamless integration of booking systems, wearable devices, virtual coaching, and social platforms to enhance user experience and engagement.
4. **Encourage Social Connectivity:**
    - Embed features that promote social interaction, team building, and community support within technology applications, particularly for adolescent users.
5. **Conduct Ongoing Evaluation and Adaptation:**
    - Regularly assess user feedback and participation patterns to adapt and improve technological offerings, ensuring they remain relevant and effective.
6. **Expand Research Scope:**
    - Support longitudinal and experimental studies to further understand causal effects and optimize technology design.
    - Include rural and underserved populations in future research to broaden applicability.

Implementing these recommendations can enable sport facilities to harness the full potential of technology, creating dynamic environments that motivate diverse populations to engage in physical activity and improve overall health outcomes.

References

Abdoshahi, M. (2024). Effects of an Intervention Based on Cognitive-Behavioral Therapy on Emotional Well-being of Athletic Adolescents with Injuries. Physical Activity in Children, 1(2), 61-68.[Google Scholar] [Publisher] https://doi.org/10.61186/pach.2024.488934.1038

Adebanjo, E. (2024). Effects of a Pilates Training Intervention on Mental Health, Adiposity and Self-Perceived Body-Image of Obese Children. Physical Activity in Children, 1(2), 5-11. [Google Scholar] [Publisher] https://doi.org/10.61186/pach.2024.473810.1025

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. [Google Scholar] [Publisher] https://doi.org/10.1016/0749-5978(91)90020-T

Baniasadi, T., Ranjbari, S., Abedini, A., Dana, A., & Ghorbani, S. (2022). Investigation the Association of Internet Addiction with Mental Health and Physical Activity in Teenage Girls: The Mediating Role of Parental Attitude. *Women's Health Bulletin*, *9*(4), 243-250. [Google Scholar] [Publisher] https://doi.org/10.30476/whb.2022.96915.1197

Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., & Martin, B. W. (2012). Correlates of physical activity: Why are some people physically active and others not? *The Lancet*, 380(9838), 258-271. [Google Scholar] [Publisher] https://doi.org/10.1016/S0140-6736(12)60735-1

Dana, A., Ranjbari, S., Chaharbaghi, Z., & Ghorbani, S. (2023). Association between physical activity and motor proficiency among primary school children. *International Journal of School Health*, *10*(3), 128-135. [Google Scholar] [Publisher] https://doi.org/10.30476/intjsh.2023.98237.1295

Dishman, R. K., Heath, G. W., & Lee, I. M. (2013). *Physical activity epidemiology* (2nd ed.). Human Kinetics. [Google Scholar] [Publisher]

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for adults: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, 10(1), 135. [Google Scholar] [Publisher] https://doi.org/10.1186/1479-5868-10-135

Ezzati, K. Z., Balali, O. A., Jamali, Y., & Monadi, A. (2024). Explanation of the Relationship Between Single-Courtyard and Double-Courtyard (Inner and Outer) Plans Pattern with the Spatial Organization of Historical Houses. *Journal of Researches in Islamic Architecture*, *12*(2), 75-95. [Google Scholar] [Publisher] https://doi.org/10.61186/jria.12.2.5

Gholami, A. (2024). The Integration of Spiritual Curriculum into Primary School Physical Education in Relation to Transformational Teaching Approaches. Physical Activity in Children, 1(1), 14-20.[Google Scholar] [Publisher] https://doi.org/10.61186/pach.416547.1005

Ghorbani, S., Afshari, M., Eckelt, M., Dana, A., & Bund, A. (2021). Associations between physical activity and mental health in Iranian adolescents during the COVID-19 pandemic: an accelerometer-based study. *Children*, *8*(11), 1022. [Google Scholar] [Publisher] https://www.mdpi.com/2227-9067/8/11/1022#

Giles-Corti, B., & Donovan, R. J. (2002). The relative influence of individual, social and physical environment determinants of physical activity. *Social Science & Medicine*, 54(12), 1793-1812. [Google Scholar] [Publisher] https://doi.org/10.1016/S0277-9536(01)00150-2

Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, 119(1), 182-191. [Google Scholar] [Publisher] https://doi.org/10.1542/peds.2006-2697

Harris, J., & Cale, L. (2018). Adolescents' use of technology to support physical activity: The influence of social media. *Journal of Physical Activity and Health*, 15(5), 323-330. [Publisher] https://doi.org/10.1123/jpah.2017-0324

Kaczynski, A. T., & Henderson, K. A. (2007). Environmental correlates of physical activity: A review of evidence about parks and recreation. *Leisure Sciences*, 29(4), 315-354. [Google Scholar] [Publisher] https://doi.org/10.1080/01490400701394865

Maher, C. A., Ryan, J., Ambrosi, C., & Edney, S. (2017). Users' experiences of wearable activity trackers: A cross-sectional study. *BMC Public Health*, 17(1), 880. [Google Scholar] [Publisher] https://doi.org/10.1186/s12889-017-4914-4

McCormack, G. R., & Shiell, A. (2011). In search of causality: a systematic review of the relationship between the built environment and physical activity among adults. *International Journal of Behavioral Nutrition and Physical Activity, 8*(1), 125. [Google Scholar] [Publisher] https://doi.org/10.1186/1479-5868-8-125

Monadi, A., & Hoseinzadeh dalir, K. (2022). Ranking of Effective Criteria in the Brand Building of Tabriz Market Using the Path Analysis Model (A Case Study of Tabriz Market). *Environmental Based Territorial Planning (Amayesh)*, *15*(58), 25-42. [Google Scholar] [Publisher]

Monadi, A., Hosseinzadeh Delir, K., & Ezzatpanah, B. (2019). Enhancing Tourism Productivity via Assessment of Factors Affecting the Introduction of Traditional Iranian Markets as a Tourism Brand: The Case of Tabriz Market. *Productivity Management*, *55*, 120-139. [Google Scholar] [Publisher] https://doi.org/10.30495/qjopm.2020.1869054.2477 [In Persian]

Monadi, A., Mohammadian, M., Ahmadian, R., Saghafi Asl, A., & Negarandeh, Y. (2013). Risk Management in Urban Organizations. *American Journal of Scientific Research*, 145-149. [Google Scholar] [Publisher]

Monadi, A., Sardari, R., Abed, F., lafzforoushan Asl, D., Hajipour Haji Alilou, E., Sadeghi, E. (2014). A Survey on the Specialty and Value Specifications of Urban Managers on the Base of Imam Ali's View. *Journal of Educational and Management Studies*, *4*(4): 791-795. [Google Scholar] [Publisher]

Müller, A. M., Alley, S., Schoeppe, S., & Vandelanotte, C. (2017). The effectiveness of e-& mHealth interventions to promote physical activity and healthy diets in developing countries: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 73. [Google Scholar] [Publisher] https://doi.org/10.1186/s12966-017-0521-4

Ridgers, N. D., Timperio, A., & Crawford, D. (2012). What factors influence children's physical activity and sedentary behavior during school break times? *Journal of Physical Activity and Health*, 9(6), 810-818. [Publisher] https://doi.org/10.1123/jpah.9.6.810

Sallis, J. F., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K., & Kerr, J. (2006). An ecological approach to creating active living communities. *Annual Review of Public Health*, 27, 297-322. [Google Scholar] [Publisher] https://doi.org/10.1146/annurev.publhealth.27.021405.102100

Tremblay, M. S., Gray, C., Babcock, S., Barnes, J., Bradstreet, C. C., Carr, D., ... & Katzmarzyk, P. T. (2015). Position statement on active outdoor play. *International Journal of Environmental Research and Public Health*, 12(6), 6475-6505. [Google Scholar] [Publisher] https://doi.org/10.3390/ijerph120606475

Vandelanotte, C., Müller, A. M., Short, C. E., Hingle, M., Nathan, N., Williams, S. L., ... & Maher, C. A. (2016). Past, present, and future of eHealth and mHealth research to improve physical activity and dietary behaviors. *Journal of Nutrition Education and Behavior*, 48(3), 219-228.e1. [Google Scholar] [Publisher] https://doi.org/10.1016/j.jneb.2015.12.006

Warburton, D. E., & Bredin, S. S. (2017). Health benefits of physical activity: A systematic review of current systematic reviews. *Current Opinion in Cardiology*, 32(5), 541-556. [Google Scholar] [Publisher] https://doi.org/10.1097/HCO.0000000000000437

World Health Organization. (2010). *Global recommendations on physical activity for health*. WHO Press. [Google Scholar] [Publisher]