ORIGINAL SCIENTIFIC PAPER

Analysis of the Association Between Health Literacy, Physical Literacy, and Scholastic Achievement; A Preliminary Cross-Sectional Study Among High-School Students From Southern Croatia

Marijana Geets-Kesić[1], Nevenka Maras[2], Barbara Gilić[1]

Affiliations: [1]University of Split, Faculty of Kinesiology, Split, Croatia, [2]University of Zagreb, Faculty of Teacher Education, Zagreb, Croatia

Correspondence: B. Gilić, University of Split, Faculty of Kinesiology, Teslina 6, 21000 Split, Croatia. E-mail: bargil@kifst.hr

Abstract

Theoretically, health literacy (HL) and physical literacy (PL) should be associated with overall education, but little is known about their association with scholastic achievement. The aim of this study was to investigate whether scholastic variables relate to HL and PL among high-school adolescents. We observed 268 high school students (202 females, 66 males) who were assessed on HL using the HLS-EU47 questionnaire and PL by PLAYself questionnaire. Scholastic variables included grade point average and excused and unexcused number of absences from school. Gender-stratified correlations, cluster analysis, and discriminant canonical analysis were calculated to establish the associations between study variables. The correlations between HL and scholastic variables were generally poor, while statistically significant correlations between grade point average and HL were noted only among girls (R=0.16, p<0.05). Cluster and discriminant analyses confirmed higher HL and PL among girls who were better at school. While associations between HL and PL with scholastic achievement were generally poor, our results point to the necessity of further investigation of a problem. Hence, specific types of knowledge should be explored as possible correlates of HL and PL in adolescence.

Keywords: *adolescents, health behavior, lifestyle, pedagogy, teachers*

@MJSSMontenegro
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Introduction

High school students are in a sensible life period (i.e., adolescence), where they adopt behaviors that determine their adult habits (de Bruin, 2012). What is more, high school students are still in compulsory education, which means that teachers and other education agents can influence their behavior and teach them how to adopt behaviors that are good for their health (Olujić & Maras, 2021). Several concepts have been considered influential in the sense of adopting positive health behaviors, including health literacy (HL) and physical literacy (PL) (Buja et al., 2020; Cairney et al., 2019).

The most common definition of HL is "HL entails people's knowledge, motivation, and competencies to access, understand, appraise and apply health information to make judg-

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ments and take decisions in everyday life concerning healthcare, disease prevention, and health promotion to maintain or improve quality of life during the life course" (Sørensen et al., 2012). Indeed, numerous studies identified the link between HL and health-related behaviors and outcomes. Namely, it was found that adolescents with high levels of HL displayed good nutritional habits, appropriate physical activity levels, not consuming alcohol and tobacco, and having a good health-related quality of life (Guo et al., 2021; Klinker et al., 2020; Qiao et al., 2021). Supportively, a recent study conducted on similar participants (i.e., high school students from Croatia) evidenced that students with better HL have a preferable lipid profile, which is an indicator of cardiovascular health (Kesic et al., 2022).

On the other side, PL can be defined as "the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life" (Martins et al., 2021). PL is mainly connected to health outcomes through fostering participation in physical activity, which is considered one of the most important habits that positively impact health status (Caldwell et al., 2020). Moreover, PL has directly been linked to several health indicators, such as cardiorespiratory fitness and health-related quality of life (Cairney et al., 2019; Cornish et al., 2020). Recent studies on high school students found that students with better PL have higher physical activity levels (Gilic et al., 2022) and better physical fitness (Gilic et al., 2022; Sunda et al., 2022).

As HL and PL can be taught (i.e., by high school teachers), it could be expected that scholastic achievement and other school-related variables would be connected to HL and PL. In other words, we can theorize that students with better grades and fewer school absences would have better developed PL and HL skills and better health habits. Indeed, studies evidenced that students with higher grades had higher diet quality (Whatnall et al., 2019) and physical activity levels (Nelson & Gordon-Larsen, 2006; Schmitz et al., 2002). Moreover, a study conducted on adolescents from Bosnia and Herzegovina evidenced that students who are better in school (i.e., have better grades) managed to preserve their physical activity levels during the COVID-19 pandemic, which indicates that they had good PL skills and that they were aware of the health benefits of physical activity (Sekulic et al., 2021). Finally, scholastic achievement and health habits have been considered positively associated in a recent study that emphasized the importance of including HL interventions in the education system which would lead to better health outcomes of students (de Albuquerque et al., 2022).

Both HL and PL are skills that can be learned and are susceptible to changes during the educational processes in school. Considering that HL and PL are linked to positive health behaviors and outcomes, it is important to investigate whether they relate to scholastic variables in order to emphasize the importance of including them in the school curriculum. However, studies that simultaneously investigated associations between HL, PL, and scholastic variables are lacking. Thus, the aim of this research was to determine whether HL and PL are related to scholastic variables (grade point average and school absences) in high school students. We hypothesize that students with higher grade point averages and fewer school absences will have higher HL and PL levels.

Materials and Methods

Participants and Study Design

In this cross-sectional preliminary study 268 high student (202 females, 66 males) from the Southern Croatia were involved. The average age was 16.8 ± 1.3 years. The study was part of a wider research project previously initiated and approved by The Ethical Board of the University of Split, Faculty of Kinesiology, on 23rd September 2021 (EBO: 2181-205-02-01-21-0011)

The study permitted the inclusion of participants who were attending the school during the school years 2020/2021, and 2021/2022, and who were successfully tested for all variables observed (HL, PL). Students (or parents/legal guardians for those younger than 18 years of age) were invited to sign their consent to participate in the study on a form, successive to ethical approval.

Variables and Measurement

The variables in this study included gender and age (in years), HL, PL and variables of scholastic achievement.

The Croatian version of the European Health Literacy Survey Questionnaire 47 (HLS-EU-Q47) was used to assess the HL level as it was previously demonstrated to be valid among Croatian adolescents (Geets Kesic et al., 2022). The questionnaire asked 47 questions, relating to an individual's capability to acquire, process and understand basic health information and related services, and so allowing them to make appropriate health decisions or to obtain, understand, appraise and act upon it/them. A general index of HL was constructed using a 4-point Likert scale, with responses from very difficult—1 to very easy—4. The score was calculated through the formula: index = (mean – 1) × (50/3). Scoring was made on a scale of 0-50 where 0 was considered the lowest score and 50 the highest. The scoring index was separated into four sections of HL: inadequate (from 0 to 25); problematic (26–33); sufficient (34–42); excellent (43–50).

PL was assessed using self-administered tool which is a part of the Physical Literacy Assessment of Youth (PLAYself). PLAYself consists of four subscales: (i) affective and cognitive domain of PL; (ii) environment; (iii) literacy, numeracy and PL in different settings; and (iv) physical fitness (Jefferies et al., 2021). Maximum score is 100 (for subscales and for the total score) which represents the highest self-perceived PL. PLAYself was previously validated on the sample of Croatian adolescents (Gilic et al., 2022). To carry out all questionnaires (HLS-EU-Q47 and PLAYself) the platform SurveyMonkey (SurveyMonkey Inc., San Mateo, CA, USA) was used.

Scholastic achievement was assessed by academic achievement (grade point average - GPA) and school absences (excused and unexcused number of absences form school). The Constitution of the Republic of Croatia states that everyone is entitled to free compulsory education. The Ministry of Science, Education and Sport regulated the education process with the Primary and Secondary School Education Act, and the Ordinance on the Manner, Procedures and Elements of the Evaluation of the Primary and Secondary School Students (Žiljak & Baketa, 2019). Croatian education system defines two categories of grading: conduct grading – 3-point descriptive scale (poor, good, exemplary) and grade point average (GPA). GPA is calculated as the arithmetic mean of all numerical grades and it forms a scale from one to five as: insufficient/failing grade (1.00-1.99), sufficient (2.00-2.49), good (2.50-3.49), very good (3.50-4.49) and excellent (4.50-5.00). Overall school absence was the number of absences in school hours in one year.

All scholastic data was collected from the class register book in the electronic format: e-Dnevnik. E-Dnevnik represents a joint between ICT and the traditional class register book as web application. It was developed in 2011/2012 by The

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Croatian Academic and Research Network (CARNet) and its partners as the pilot-project "e-Schools". The idea was to implement ICT in education system in order to enable simpler access to different school data. One of major services developed and implemented by this project was e-Dnevnik. The advantage of use of e-Dnevnik in school practice is its simplicity to keep students records, the monitoring of student progress, the possibility of analyzing collected statistical data and quick access to information about individual student or class. The ICT integrated in e-Dnevnik, easy gives to teacher or other school staff (e.g., pedagogue) GPA and calculated absence for the individual students or for the class (Vrkić Dimić & Vidov, 2019).

Statistical Analysis

All variables were checked for normality of the distributions by Kolmogorov-Smirnov test. As a result, parametric statistics were calculated, and descriptive statistics were reported by means and standard deviations.

The analyses were done in several phases. As a preliminary (first) phase Pearson's correlation coefficients were calculated. In the second phase participants were grouped into homogenous groups on the basis of scholastic variables by multivariate cluster analysis. Specifically, the Ward's method of clustering based on Euclidian distances was used. Each participant was consequently allocated to appropriate number of clusters (homogenous groups), which was used as categorical factor in the next phases. Analysis of variance was calculated to establish the characteristics of the formed clusters. Finally, discriminative canonical analysis (DISCRA) was calculated to evaluate the multivariate differences in HL and PL among established clusters. All analyses were gender-stratified.

Statistica ver. 13.5 (Tibco Inc, Palo Alto, California, USA) was used for all analyses, and p-level of 0.05 was applied.

Results

Table 1 presents descriptive statistics for study variables as well as correlations among variables for the total sample of subjects. PL and HL were weekly correlated (5% of the common variance), while GPA was poorly but significantly correlated with HL (less than 2% of the common variance).

Descriptive statistics and correlations among variables for boys are presented in Table 2. In brief, apart from significant correlations among scholastic variables, no other coefficient reached statistical significance.

Table 1. Descriptive statistics (Mean, SD – standard deviation) and Pearson's correlations among variables – total sample

	Mean	SD	Age	PL	HL	GPA	U_Absence
Age (years)	17.03	1.39					
PL (score)	68.04	11.26	-0.02				
HL (score)	38.07	6.53	0.14*	0.25*			
GPA (score)	4.08	0.57	0.17*	0.08	0.12*		
U_Absence (school hours)	2.89	1.69	0.21*	-0.07	0.00	-0.29*	
T_Absence (school hours)	69.70	47.11	0.03	-0.03	-0.08	-0.41*	0.32*

Note: PL – physical literacy, HL – health literacy, GPA – grade point average, U_Absence – number of unexcused absences, T_Absence - number of total hours of absence, * denotes significance of $p < 0.05$

Table 2. Descriptive statistics (Mean, SD – standard deviation) and Pearson's correlations among variables – subsample of boys

	Mean	SD	Age	PL	HL	GPA	U_Absence
Age (years)	17.15	1.29					
PL (score)	68.05	11.04	0.05				
HL (score)	37.98	6.51	0.02	0.08			
GPA (score)	3.84	0.62	0.18	-0.07	0.01		
U_Absence (school hours)	3.55	2.40	0.35*	-0.12	-0.02	-0.22	
T_Absence (school hours)	71.32	48.70	0.05	0.23	-0.02	-0.33*	0.29*

Note: PL – physical literacy, HL – health literacy, GPA – grade point average, U_Absence – number of unexcused absences, T_Absence - number of total hours of absence, * denotes significance of $p < 0.05$

Table 3. Descriptive statistics (Mean, SD – standard deviation) and Pearson's correlations among variables – subsample of girls

	Mean	SD	Age	PL	HL	GPA	U_Absence
Age (years)	16.99	1.42					
PL (score)	68.03	11.36	-0.05				
HL (score)	38.10	6.55	0.18*	0.31*			
GPA (score)	4.16	0.53	0.19*	0.15*	0.17*		
U_Absence (school hours)	1.67	1.31	0.15*	-0.05	0.01	-0.27*	
T_Absence (school hours)	69.16	46.69	0.03	-0.12	-0.10	-0.46*	0.37*

Note: PL – physical literacy, HL – health literacy, GPA – grade point average, U_Absence – number of unexcused absences, T_Absence - number of total hours of absence, * denotes significance of $p < 0.05$

When calculated for girls, HL and PL were weekly but significantly correlated with GPA (less than 3% of the common variance). Generally, girls with higher GPA had better PL and HL (Table 3).

Figure 1 presents the hierarchical tree clustering of the boys according to their scholastic achievement. As evident, two homogenous groups were formed (Cluster 1 and Cluster 2), each containing a similar number of participants. Additional ANOVA evidenced better scholastic achievement in boys grouped in Cluster 1 ($p < 0.05$).

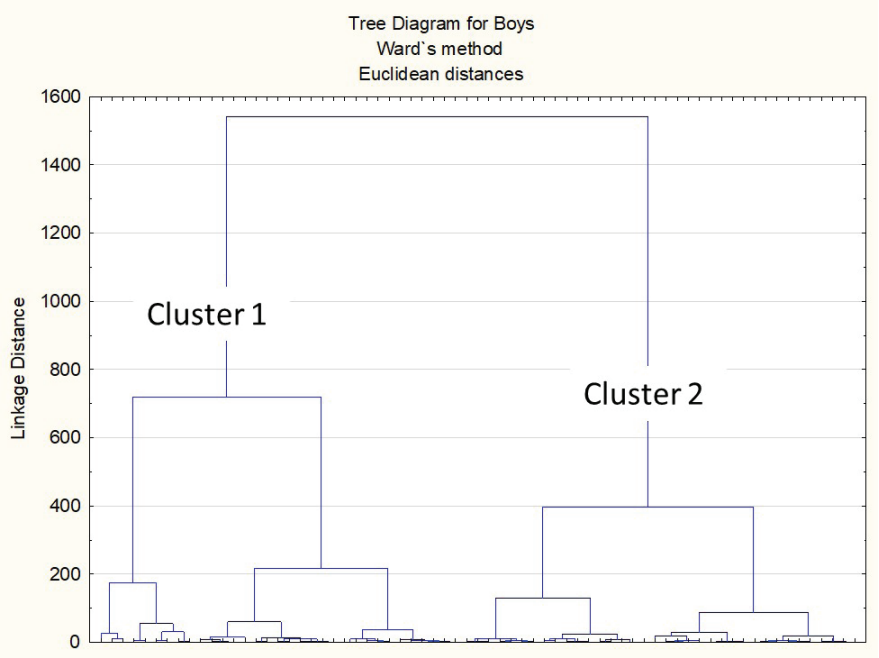

Figure 1. Multivariate clustering of boys based on scholastic variables.

Clustering of the girls on the basis of the scholastic variables is presented in Figure 2. In this subsample, three clusters were formed. ANOVA evidenced the best scholastic achievement in members of Cluster 1 ($p < 0.05$), with significant post-hoc differences between Cluster 1 and the remaining two clusters.

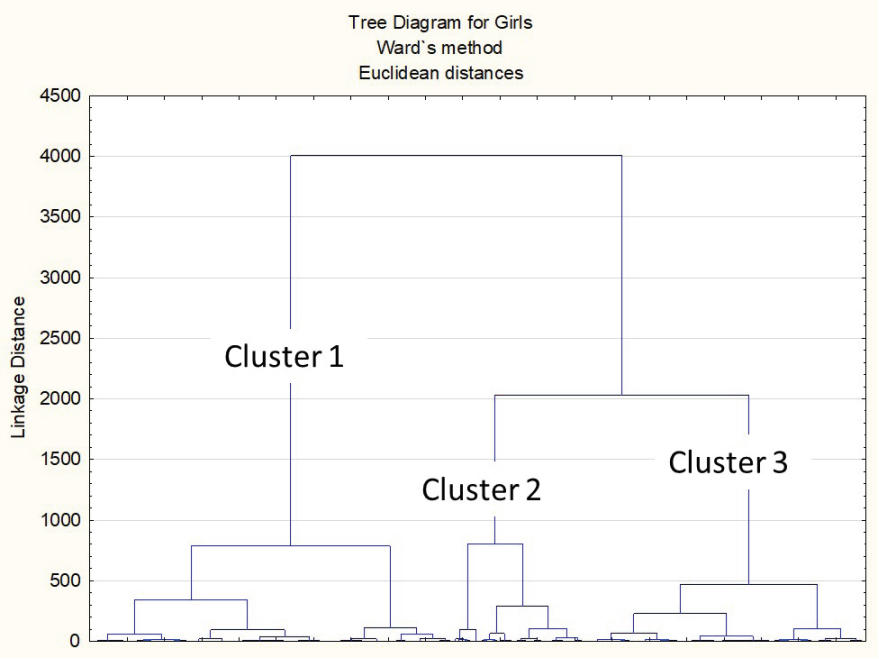

Figure 2. Multivariate clustering of girls based on scholastic variables.

DISCRA did not reveal significant differences between Clusters for boys (Table 4). However, DISCRA revealed multivariate differences amng Clusters formed on the basis of scholastic achievement in girls (Table 5). In brief, Root 1 reached statistical significance, evidencing the highest PL and HL in girls grouped in Cluster 1 (note that Cluster 1 consisted of girls who achieved the best scholastic achievement; please see previously).

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Table 4. Discriminant canonical analysis for boys – multivariate differences between clusters based on scholastic variables in health literacy (HL) and physical literacy (PL)

	Root 1
PL	0.65
HL	-0.55
Wilks Lambda	0.96
Canonical R	0.18
p-level	0.34
Centroid: Cluster 1	0.18
Centroid: Cluster 2	-0.16

Table 5. Discriminant canonical analysis for girls – multivariate differences among clusters based on scholastic variables in health literacy (HL) and physical literacy (PL)

	Root 1	Root 2
PL	0.71	-1.00
HL	0.93	-0.36
Wilks Lambda	0.94	0.98
Canonical R	0.20	0.10
p-level	0.03	0.13
Centroid: Cluster 1	0.26	0.01
Centroid: Cluster 2	-0.16	-0.10
Centroid: Cluster 3	-0.19	0.20

Discussion

The gender-stratified approach we applied herein was evidently appropriate. In brief, while scholastic factors were not significantly associated with PL and HL in boys, our analyses showed a significant association between these variables in girls. Although the correlation was generally low, the relative consistency of the associations (PL and HL were almost identically associated with scholastic factors in girls) deserves specific attention regarding study aims.

We initially hypothesized that scholastic factors would be positively associated with both observed types of literacy (PL and HL). Indeed, it was logical to expect that better scholastic achievement, despite the type of variable observed, would be an indicator of better HL and PL. To the best of our knowledge, this is one of the first investigations which directly observed mentioned relationships in southeastern Europe and almost certainly the first one on the territory of former Yugoslavia. However, previous studies in other regions support our findings (Nelson & Gordon-Larsen, 2006; Schmitz et al., 2002; Whatnall et al., 2019).

The positive association between scholastic achievement observed throughout school-grades (i.e., grade point average) with HL and PL is relatively straightforward. Namely, both PL and HL can be taught (de Albuquerque et al., 2022). Therefore, it is logical that students with better grades will have better knowledge incorporated in PL and HL questionnaires, either simply by better "general knowledge" obtained from various school subjects (i.e., biology, chemistry, physical education), or by specific learning about the topics evaluated in PL and HL questionnaires.

When it comes to a positive association between other scholastic variables we have observed (e.g., absences) with PL and HL, the explanation is relatively logical, although it doesn't seem so at first sight. Namely, scholastic factors are known to be intercorrelated. It means that students with better grades are less likely to be (frequently) absent from school. Although we didn't specifically discuss it in our study, previous research done in the territory of the former Yugoslavia consistently confirmed it (Idrizovic et al., 2015; Zubak et al., 2018). While the causality of the association between scholastic variables is not within this research's scope of this research, it will not be discussed in detail.

The findings that scholastic factors were correlated with PL and HL solely in girls is probably a result of several "mechanisms". First, the most logical explanation is related to the number of subjects and the fact that we observed three times more girls than boys. Simply statistically, the number of subjects increases the degrees of freedom and the probability and statistical significance (Huck, 2008). However, it seems that this was not the main mechanism of gender-specific associations since correlation coefficients in girls were somewhat higher than in boys (please see Results for details). Therefore, it is more likely the fact that we observed one specific educational program (vocational school, including future health professionals) resulted in (more) systematic development of all types of knowledge in girls than in boys. To support such a notion, we must mention that girls had better grades and better results in HL and PL than boys. This could imply that girls

with better grades are more aware of the importance of health and have better health information.

Despite the previous discussion, the fact that studied correlations between scholastic variables with PL did not reach statistical significance among boys deserves certain attention. Once again, the most probable reason is the specificity of the sample of participants involved in our research. Precisely, students attending vocational high schools, such as the one studied here, are known to have worse health habits (e.g., increased sedentary time and lower physical activity levels) than academic high school students (Štefan et al., 2020).

Furthermore, as authors were directly involved in working with similar students (the study's first author was a teacher, and the second author was a school principal), we can state that only a few students (particularly boys) were actively involved in sports. It is important since the sport is one of the main agents that promote physical activity levels among boys, and directly and indirectly influences health habits by fostering the development of PL (Sunda et al., 2022). Additionally, sport is the primary source of physical activity which is one of the paramount health promoting behaviours, and as such is also linked to HL (Buja et al., 2020). Thus, as boys included in our study didn't practice sports to a greater extent, it is somewhat logical that the association between scholastic variables and literacies (HL and PL) did not reach statistical significance. This result deserves special attention from the perspective of a school and especially school pedagogues.

Namely, regarding adolescents not participating in sports activities which is the primary source of developing both HL and PL, those literacies should be embedded in the school curriculum. Indeed, school-based health promotion practices and embedding HL curricula are key agents for flourishing HL in young people (Schulenkorf et al., 2021). Schools are identified as venues for promoting health and health education as schools can reach all school-aged children without regarding their economic or social background (St Leger, 2001).

Conclusion

Although our results showed relatively weak associations between scholastic achievement with HL and PL, it seems that the problem of the influence of education on HL and PL deserves attention. Namely, while correlations were significant for girls, lack of association in boys could direct future studies in evidencing correlations between specific types of knowledge with HL and PL.

The main study limitation comes from the fact that we studied one specific sample of participants, students from a vocational school in one region of Croatia. Therefore, specific biases could exist and consequently could influence the results. Therefore, adolescents from other regions and schools should be observed in future studies.

It is globally accepted that both HL and PL should be developed, especially in adolescence. Consequently, it is necessary to evaluate its correlates and implement and evaluate programs to improve PL and HL as determinants of health. Therefore, school authorities should be informed of results obtained herein, especially on the evident lack of associations between scholastic achievement, PL, and HL in high-school boys.

References

Buja, A., Rabensteiner, A., Sperotto, M., Grotto, G., Bertoncello, C., Cocchio, S., Baldovin, T., Contu, P., Lorini, C., & Baldo, V. (2020). Health Literacy and Physical Activity: A Systematic Review. *Journal of Physical Activity and Health*, *17*(12), 1259-1274. https://doi.org/10.1123/jpah.2020-0161

Cairney, J., Dudley, D., Kwan, M., Bulten, R., & Kriellaars, D. (2019). Physical Literacy, Physical Activity and Health: Toward an Evidence-Informed Conceptual Model. *Sports Medicine*, *49*(3), 371-383. https://doi.org/10.1007/s40279-019-01063-3

Caldwell, H. A. T., Di Cristofaro, N. A., Cairney, J., Bray, S. R., MacDonald, M. J., & Timmons, B. W. (2020). Physical Literacy, Physical Activity, and Health Indicators in School-Age Children. *International Journal of Environmental Research and Public Health*, *17*(15). https://doi.org/10.3390/ijerph17155367

Cornish, K., Fox, G., Fyfe, T., Koopmans, E., Pousette, A., & Pelletier, C. A. (2020). Understanding physical literacy in the context of health: a rapid scoping review. *BMC Public Health*, *20*(1), 1569. https://doi.org/10.1186/s12889-020-09583-8

de Albuquerque, J. V., Chen, Y., Moir, F., & Henning, M. (2022). School-based interventions to improve health literacy of senior high school students: a scoping review protocol. *JBI Evid enced Synthesis*, *20*(4), 1165-1173. https://doi.org/10.11124/jbies-21-00333

de Bruin, W. B. (2012). Judgment and decision making in adolescents. In *Judgment and decision making as a skill: Learning, development and evolution.* (pp. 85-111). Cambridge University Press.

Geets Kesic, M., Penjak, A., & Sekulic, D. (2022). Reliability and validity of the croatian version of the european health literacy survey questionnaire. *Montenegrin Journal of sports Science and Medicine, Abstracts from the 19th Annual Scientific Conference of Montenegrin Sports Academy "Sport, Physical Activity and Health: Contemporary perspectives": Dubrovnik, Croatia. 7-10 April 2022.*, *11*, 1.

Gilic, B., Malovic, P., Sunda, M., Maras, N., & Zenic, N. (2022). Adolescents with Higher Cognitive and Affective Domains of Physical Literacy Possess Better Physical Fitness: The Importance of Developing the Concept of Physical Literacy in High Schools. *Children (Basel)*, *9*(6). https://doi.org/10.3390/children9060796

Guo, S., Yu, X., Davis, E., Armstrong, R., & Naccarella, L. (2021). Health Literacy: An Interactive Outcome Among Secondary Students in Beijing. *Health Literacy Research and Practice*, *5*(1), e1-e14. https://doi.org/10.3928/24748307-20201117-01

Huck, S. W. (2008). *Reading Statistics and Research*. Pearson/Allyn & Bacon. https://books.google.si/books?id=y_pLAQAAIAAJ

Idrizovic, K., Zenic, N., Tahirajl, E., Rausavljevic, N., & Sekulic, D. (2015). Cigarette Smoking among 17-18 Year Old Adolescents - Prevalence and Association with Sociodemographic, Familial, Sport, and Scholastic. Factors. *Medicina Pracy*, *66*(2), 153-163. https://doi.org/10.13075/mp.5893.00104

Jefferies, P., Bremer, E., Kozera, T., Cairney, J., & Kriellaars, D. (2021). Psychometric properties and construct validity of PLAYself: A self-reported measure of physical literacy for children and youth. *Applied Physiology, Nutrition, and Metabolism*, *46*(6), 579-588.

Kesic, M. G., Savicevic, A. J., Peric, M., Gilic, B., & Zenic, N.

 DOI 10.26773/mjssm.230301

(2022). Specificity of the Associations between Indices of Cardiovascular Health with Health Literacy and Physical Literacy; A Cross-Sectional Study in Older Adolescents. *Medicina (Kaunas)*, *58*(10). https://doi.org/10.3390/medicina58101316

Klinker, C. D., Aaby, A., Ringgaard, L. W., Hjort, A. V., Hawkins, M., & Maindal, H. T. (2020). Health Literacy is Associated with Health Behaviors in Students from Vocational Education and Training Schools: A Danish Population-Based Survey. *International Journal of Environmental Research and Public Health*, *17*(2). https://doi.org/10.3390/ijerph17020671

Martins, J., Onofre, M., Mota, J., Murphy, C., Repond, R.-M., Vost, H., Cremosini, B., Svrdlim, A., Markovic, M., & Dudley, D. (2021). International approaches to the definition, philosophical tenets, and core elements of physical literacy: A scoping review. *PROSPECTS*, *50*(1-2), 13-30. https://doi.org/10.1007/s11125-020-09466-1

Nelson, M. C., & Gordon-Larsen, P. (2006). Physical activity and sedentary behavior patterns are associated with selected adolescent health risk behaviors. *Pediatrics*, *117*(4), 1281-1290. https://doi.org/10.1542/peds.2005-1692

Olujić, I., & Maras, N. (2021). Razlike u školskom uspjehu učenika osnovne škole s obzirom na pohađanje programa produženog boravka. *Nova prisutnost: časopis za intelektualna i duhovna pitanja*, *19*(2), 345-356.

Qiao, H., Wang, X., Qin, Z., Wang, N., Zhang, N., & Xu, F. (2021). The relationship between health literacy and health-related quality of life among school-aged children in regional China. *Health Quality and Life Outcomes*, *19*(1), 262. https://doi.org/10.1186/s12955-021-01895-6

Schmitz, K. H., Lytle, L. A., Phillips, G. A., Murray, D. M., Birnbaum, A. S., & Kubik, M. Y. (2002). Psychosocial correlates of physical activity and sedentary leisure habits in young adolescents: the Teens Eating for Energy and Nutrition at School study. *Preventive Medicine*, *34*(2), 266-278. https://doi.org/10.1006/pmed.2001.0982

Schulenkorf, T., Krah, V., Dadaczynski, K., & Okan, O. (2021). Addressing Health Literacy in Schools in Germany: Concept Analysis of the Mandatory Digital and Media Literacy School Curriculum. *Frontiers in Public Health*, *9*, 687389. https://doi.org/10.3389/fpubh.2021.687389

Sekulic, D., Ostojic, D., Decelis, A., Castro-Piñero, J., Jezdimirovic, T., Drid, P., Ostojic, L., & Gilic, B. (2021). The Impact of Scholastic Factors on Physical Activity Levels during the COVID-19 Lockdown: A Prospective Study on Adolescents from Bosnia and Herzegovina. *Children (Basel)*, *8*(10). https://doi.org/10.3390/children8100877

Sørensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J., Slonska, Z., & Brand, H. (2012). Health literacy and public health: a systematic review and integration of definitions and models. *BMC Public Health*, *12*, 80. https://doi.org/10.1186/1471-2458-12-80

St Leger, L. (2001). Schools, health literacy and public health: possibilities and challenges. *Health Promotion Int*, *16*(2), 197-205. https://doi.org/10.1093/heapro/16.2.197

Sunda, M., Gilic, B., Sekulic, D., Matic, R., Drid, P., Alexe, D. I., Cucui, G. G., & Lupu, G. S. (2022). Out-of-School Sports Participation Is Positively Associated with Physical Literacy, but What about Physical Education? A Cross-Sectional Gender-Stratified Analysis during the COVID-19 Pandemic among High-School Adolescents. *Children (Basel)*, *9*(5). https://doi.org/10.3390/children9050753

Štefan, L., Sorić, M., Devrnja, A., Petrić, V., & Mišigoj-Duraković, M. (2020). One-year changes in physical activity and sedentary behavior among adolescents: the Croatian Physical Activity in Adolescence Longitudinal Study (CRO-PALS). *International journal of adolescent medicine and health*, *32*(5).

Vrkić Dimić, J., & Vidov, S. (2019). E-dnevnik u školskoj praksi–mišljenja i iskustva nastavnika srednjih škola. *Acta Iadertina*, *16*(1), 0-0.

Whatnall, M. C., Patterson, A. J., Burrows, T. L., & Hutchesson, M. J. (2019). Higher diet quality in university students is associated with higher academic achievement: a cross-sectional study. *Journal of Human Nutrition and Diet*, *32*(3), 321-328. https://doi.org/10.1111/jhn.12632

Zubak, Z., Zenic, N., Ostojic, L., Zubak, I., & Pojskic, H. (2018). A Prospective Study on the Influence of Scholastic Factors on the Prevalence and Initiation of Illicit Drug Misuse in Adolescence. *International Journal of Environmental Research and Public Health*, *15*(5). https://doi.org/10.3390/ijerph15050874

Žiljak, T., & Baketa, N. (2019). Education Policy in Croatia. In Z. Petak & K. Kotarski (Eds.), *Policy-Making at the European Periphery: The Case of Croatia* (pp. 265-283). Springer International Publishing. https://doi.org/10.1007/978-3-319-73582-5_14