

School Health Influences Technical Education Students' Learning Outcomes in Cambodia

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Abstract

School health may reflect inclusive environment supporting students to learn, grow and develop healthy habits overtime. In recent years, educators and specialists have highlighted an alert about the increasing problem of school health such as pandemic impact, food and nutrition, sanitation, and so on. A few studies explored the matters affecting students' learning outcomes. This correlational study examines the relationship between school health and students' learning outcomes to 408 technical education students. The linear regress was employed to examine the relationship between school health and students' learning outcomes ($\beta=.576$; $r^2=.33$; $t=7.48$; $F(1, 406) =201.62$; $P=.000$) meaning that they have strong relationship. The students' socio-economic status didn't predict learning outcomes ($r^2=.001$; $t=26.96$; $F(1, 406) =.531$; $P=.467$). To test hypotheses, independent sample t-test and one-way ANOVA were used. The paper suggests to focus on school health promotion programs such as school canteens and school health policies with well-trained health officers.

Key words: school health, learning outcome, technical education, general and technical high school.

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Introduction

Human resource development is a backbone for economic development ensuring the rigorous and sustainable growth even though without natural resources. Increasing recognition of educational roles meeting ever-changing needs and innovation can lead to transformational action based on school health and gender equality (Toh et al., 2017). Education produces competent human resources in response to the labor market needs enriching a knowledge-based economy in line with well-being of human (MoEYS, 2019a). In this regard, school health plays an important role in assisting academic activities by establishing supporting mechanisms consisting of constant renovation of school environment infrastructure, trash management, provision of tap and hygienic water, hygienic hand-washing stations, promotion of hygienic and nutritious food, and physical education activities and sports (MoEYS, 2023). Schools are the referral places for students to improve their health status and condition (Brener et al., 2017). Therefore, an integration of school health and academic activities might empower students to play more active roles in building peaceful and inclusive societies (APCEIU, 2022).

School health might comprise healthy eating and physical activities, school environment, quality school meals, health education, mental health and social services, teacher wellness program, and partnership with families and community members (American School Health Association, 2023). School health ranges from school health education, physical education, physical activity, school health policy, school-based health services, community involvement, and school health coordination (Brener et al., 2017). In addition, school health covers mental health services, oral health services, physical therapy, vision screenings, occupational therapy, and hearing services (Mays, 2020). School health promotes healthy behaviors consisting of practicing teeth brushing, promoting dietary habits increasing vegetable and fruit consumption available at school (Meroni & Velasco, 2023; Gargano et al., 2019; Oldroyd et al., 2008). Therefore, school health confines required components of health activities ensuring students, teachers, school management and administrators to be safe and healthy during their presence at school.

On the other hands, learning outcomes encompass enrollment and grade repetition rate, attendance rate, and test score on the national examination (McEwan, 2012). Learning outcomes might measure how much students can learn, memorize and transform what they studied into practical actions (Supena et al., 2021). Learning outcomes might be a result of

evaluation of quality instruction affected by school curriculum implementation, instructional methods, and learning modes (Lin et al., 2017; Jude & Paul, 2014). Teachers play a central role in determining learning outcomes (Afkar et al., 2023). Thus, learning outcomes cannot be achieved without active involvement of teachers.

Students can be provided with the right skills and competencies in hope of getting decent jobs to productively engage in the society (Toh et al., 2017). However, technical and vocational education and training (TVET) is difficult to attract students as they perceive blue-collar work with dangerous, difficult and dirty jobs affecting their health (MoEYS, 2019b). The perception of dirty jobs reflects from school health quality. Instructors are not aware of the relationship between school health and students' learning outcomes (Meroni & Velasco, 2023). There is an imbalance of school health qualities between the rural and urban areas in terms of service delivery, facilities and infrastructure and qualified health workers negatively impacting learning outcomes (WHO, 2021). The pandemic and school closure led to dramatic declines in students' well-being and educational development negatively affecting learning outcomes (Scott et al., 2023). In other words, poor school management being unable to manage school health effectively reflects poor learning outcomes (Asim et al., 2021). In addition, school health is an ultimate challenge for students, teachers and school management because they have limited interventions to assist students (Nguyen et al., 2020). School health might be an obstacle stagnating students' brains to academically grow (MoEYS, 2022). School health services were too limited to be accessed for students and teachers to avoid risky health behaviors (Tomokawa et al., 2018; Lynagh et al., 1997). The challenges of school health program are the discrepancies between actual and expected results in terms of policy implementation at school (Darlington et al., 2018). Therefore, the relationship between learning outcomes and school health should be explored (Meroni & Velasco, 2023).

The healthy food awareness-raising programs and healthcare activities have been promoted for all schools in Cambodia to ensure that students and education officers receive health care services from schools appropriately (MoEYS, 2006). In this regard, the results will be beneficial for stakeholders. Policy makers will be guided functionally to focus on school health promotion reflecting students' learning outcomes. The government will put concerted efforts in investing in school health promotion activities such as providing necessary capacity-building programs for school health officers along with supporting health facilities and equipment. The curriculum developers will be specifically guided on how to integrate school health activities into the school curriculum. The school management will be well aware of how to support

school health officers with necessary requirements. Students will be aware of how to live in a healthy lifestyle to avoid illnesses and diseases. Therefore, the role of each stakeholder will be adhesive for effective implementation.

School health plays an integral part in schooling sustainability to ensure that students and teachers have safe well-being including psychological health with appropriate school health infrastructure, school health management committee, tap water and sanitation promotion, nutritious food regulation and control, and school health education and dissemination (MoEYS, 2023). All learners are included and encouraged to finish upper-secondary education level with productive learning outcomes by accessing quality technical education with good health (MoEYS, 2019a). Therefore, the study on the relationship between school health and learning outcomes should be undertaken to raise challenges and recommendations for further actions (Cygan et al., 2020).

The research objective is to examine the relationship between school health and students' learning outcomes. Two research questions were raised as follows:

1. Is there a significant relationship between the school health and students' learning outcomes?
2. Does students' family socio-economic status reflect students' learning outcomes?

To support two research questions, five hypotheses were tested.

Hypothesis 1: There are different perceptions of school health between students' genders.

Hypothesis 2: There are different perceptions of school health among family socio-economic status.

Hypothesis 3: There are different perceptions of school health among students' age cohorts.

Hypothesis 4: There are different results of students' learning outcomes among selected trades.

Hypothesis 5: There are different learning outcomes among students' family status.

Literature Review

Much attention has been paid on school health to students in the school environment as a school is the first option for students to receive health service (Kelley & Silva-Padrón, 2023). Many theories and practices have been discussed to explore the relationship between school health and students' learning outcomes. However, the literature encapsulated a broad variety of school health and learning outcomes without specific theories and relationship. A lack of recent interventions suggest that existing theories and relationship may not remedy the emerging drawbacks. Therefore, the literature highlights three topics with different contexts and settings as follows:

School Health at Secondary Education Level

School health such as nutritious food, hygienic activities and healthy habits is necessary to ensure students learning without distraction as part of school guideline (Afkar et al., 2023). The successful school health programs can be a result of relevant policy and framework implementation (Cygan et al., 2020). Therefore, school health is one of the critical successes for students' academic lives following a set of health programs delivered (Sukamin & Sin, 2021).

School health might encompass school health policies, health education programs, health services such as psychological and mental health and safe environment (Tomokawa et al., 2018). Stolp et al. (2015) argue that school health develops healthy schools helping students to avoid chronic diseases and study in a friendly school environment. At secondary education level, school health emphasizes mental health and wellness, physical health, and healthy food and nutrition that can be stated in the policy and strategic plan (Kelley & Silva-Padrón, 2023).

Students' Learning Outcomes

Learning outcomes are the measures resulted from instructional quality delivered by teachers (Lin et al., 2017). The learning outcome comprises grade point average, student engagement rates and achievement test scores (Forrest et al., 2013). Learning outcomes might segregate three domains consisting of affective, cognitive and behavioral which are measured by practical actions, observation, tests, and self-reflection (Guo et al., 2020). The level of knowledge measured can be targeted in transforming information into the concept network reflecting learning outcomes (De Jong & Ferguson-Hessler, 1996). A combination of skills, knowledge and attitudes that students will achieve as a result of successful engagement at the end of the academic years underlines learning outcomes (Adam, 2006). Students' learning outcomes are

the capability of students to learn something new in their areas of interests and studies (Ayodele & Nasiru, 2021). Learning outcomes can be the results of examination, test and any forms of assessment to measure students' learning (Burrow et al., 2017). The outcomes can be achieved accordingly to their levels of intelligence and abilities in different passion of learning methods (Alonge & Okunade, 2013; Ayodele & Nasiru, 2021). Thus, the learning outcomes can be measured in different ways of assessments in terms of graduation and employment rates.

Students' learning outcomes encompass different components with different assessment models employing a variety of research approaches. The research setting and time should be paid attention because they might come out with different findings. Therefore, the study is unique in research methods and time.

Relationship between School Health and Students' Learning Outcomes

School health relatively affects students' learning outcomes in some ways. School health like feeding programs reflects learning outcomes like encouraging regular attendance and reducing drop-out rates (McEwan, 2012). School health like students' well-being reflects a positive impact on learning outcomes resulting in economic consequences in the society (Toftum et al., 2015; Mandell et al., 2013; Wargocki et al., 2014). In other words, learning outcomes are affected by school health consisting of learners' characteristics, traits and health condition (Kristen, 2011; Lin et al., 2017). School health consisting of healthy school habits, eating nutritious food and sanitation reflecting learning outcomes (Afkar et al., 2023). Healthy school policies enhance students' well-being reflecting their positive outcomes (Meroni & Velasco, 2023). Therefore, school health is one of the pushing factors influencing learning outcomes.

Kibriya and Jones (2021) exploring the effect of school health and safety on learning outcomes for 2,125 students in Tanzania found that school health is a predictor of students' learning outcomes. Kase et al. (2017) employing a literature review of 36 primary research studies in the United States to identify the school health program associated with learning outcomes revealed that school health interventions shaped students' learning outcomes. However, Ayodele and Nasiru (2021) examining the influence of teaching techniques on learning outcomes employing quasi-experimental design revealed a positive relationship for 100 students in Nigeria. Therefore, the aforementioned studies proposed positive association from school health to learning outcomes with different research methods and settings.

Burrow et al. (2017) employing a literature review approach for 33 relevant studies to investigate the effect of school health on students' academic achievements found that school

health with dietary intakes had positive relationship with academic achievements. Asada et al. (2017) identifying the stakeholder's perception on the relationship between school health and learning outcomes with a qualitative approach found that school health such as school food education and nutrition education had significant impacts on students' learning outcomes. School health such as healthy behaviors and fruit and vegetable consumption might reflect students' learning outcomes positively in some degrees (Nigg & Amato, 2015). Therefore, school health consisting of a variety of components has positive relationship with students' learning outcomes as graduation and employment rates.

The aforementioned empirical studies highlighted an array of relationship and association between school health and learning outcomes with different research approaches, participants, settings, and publication dates. Application of different theories tends to have different results. Therefore, the survey design with a correlational research approach to year-2 and year-3 students at general and high schools in Cambodia can be undertaken to review the relationship.

Research Method

The research method was used to answer two research questions in terms of variable relationship.

Data Collection

Researchers went directly to meet with 408 participants at general and technical high schools (GTHSs) through a school principal for questionnaire completion. Before filling out the questionnaire, researchers introduced and instructed the participants how to fill them out correctly. Data is collected by means of paper-based questionnaire for interpretation of research findings (Singh, 2006). The participants were put to sit at one meeting hall listening to researchers' instruction being from eight GTHSs within different seven provinces. The data were collected using random sampling technique.

Participant and Demographic Information

Technical education students are research participants as they are the main contributors to school health and learning outcomes. Appropriate selection of research participants is critical to get target points for generalizing the results and making accurate comparisons (Tavakoli, 2012). 408 participants (N=408) were accessed for questionnaire completion. The participants have to meet the certain criteria in order to be selected including 1) currently studying any trade at GTHSs; 2) the year-II and year-III students as they are mature to school health and learning outcomes; 3) having different family income status (very poor, poor and medium); and 4) willing to fill out the questionnaire voluntarily. Research participants are the target group that experiences and involves in the research phenomenon providing adequate required research information (Babbie, 2007). The research participants were accessed through a consent form voluntarily and can withdraw at any time (Robinson, 2016).

The participants are from diverse backgrounds such as sex, age, trade, grade/school year, school name and provinces, different family income status. For example, 227 participants (55.6%) were male as 181 participants (44.4%) were female. Upon completion of the questionnaire, the response rate was 100 percent as the school management was put them into one common hall for questionnaire completion. More than 70 percent of response rate for the questionnaire is very good (Caputi & Balnaves, 2001). The participants' ages range from 15 to 22 years old. For instance, 117 participants (28.7%) age 17 years old. 172 participants (42.2%) age 18 years old. 74 participants (18.1%) age 19 years old. Among ten trades instructionally delivered at GTHSs, the students major in six trades consisting of Agronomy, Electricity, Tourism, ICT, Animal Husbandry and Electronic filling out the paper-based questionnaire. For

example, 198 students (48.5%) majoring in Agronomy, 115 students (28.2%) majoring in electricity, and 42 students (10.5%) majoring in Tourism. The rest majors in other trades. Following the participant criteria, only year-II and year-III students were contacted for questionnaire completion. 71 year-II students (17.4%) and 337 year-III students (82.6%) filled out the questionnaire. Eight GTHSs namely Preah Norodom Sihamoni (20.1%), Saint Francois (24.8%), Preah Bat Preah Borom Neath Norodom Sihamoni (16.2%), Preah Reach Sam Phear (3.7%), Chea Sim Tbeing Mean Chey (3.7%), Hun Sen Peam Chikang (13.7%), Heng Samrin Tbong Khmum Community (7.6%) and ROTA (10.3%) locate in seven different provinces consisting of Kampot (23.5%), Takeo (24.8%), Kampong Chhnang (16.4%), Preah Vihear (3.9%), Kampng Cham (13.5%), Tbong Khmum (7.6%), and Kandal (10.3%). Three family statuses were identified consisting of very poor (2.2%), poor (21.6%), and average (76.2%).

Research Instrument

The paper-based questionnaire was used to collect data from participants as technical education students. The questionnaire was adapted from Perez-Jorge et al. (2016) to ensure the content validity. The content validity measures the extent to which an instrument is intended to measure representing the content area (Leedy & Ormrod, 2005). The questionnaire has two sections consisting of 1) for attributes of school health and students' learning outcomes and 2) demographic information. All attributes in section 1 are the five-point scale for participant rating for a total of 49 items. Among them, 34 items cover school health and 15 items cover students' learning outcomes. The scale ranges from 1 (strongly inappropriate), 2 (inappropriate), 3 (neutral), 4 (appropriate), and 5 (strongly appropriate). For example, item 1 is "I would like to be taught about health and healthy lifestyle habits". Item 2 is "I think that all the information about health is useful". Item 3 is "It is very important to have knowledge about first aid measures". Demographic information comprises sex, age, studying trade, school name, school year, etc.

Data Analysis

SPSS version 25.0 was used to analysis quantitative data grounded from participants' ideas. Cross-sectional survey design was employed to explore data at one point in time (Creswell, 2012). Specifically, a linear regression was used to answer two research questions. A linear regression shows a relationship between one variable and another variable in terms of strength and direction (Moore, 1996). Some hypotheses were also tested.

Results

The 49-item scale indicated a reliability Cronbach Alpha of $\alpha=.884$ (N=408). Particularly, the 34-item scale of school health attributes reported a reliability Cronbach Alpha of $\alpha=.833$. The 15-item scale of students' learning outcomes reported a reliability Cronbach Alpha of $\alpha=.839$. For the measurement instrument reliability, the test is internally consistent if Cronbach Alpha $\alpha >.70$ (Muijs, 2010). The internal reliability measures the different items consistently that $\alpha =.8$ indicates very good internal consistency (Robinson, 2016).

For Shapiro-Wilk test of normality, the data was normally distributed as $P=.059$ ($P>.05$) for school health attributes and $p=.126$ ($P>.05$) for student's learning outcome attributes. Students' learning outcomes had $M=3.607$ and $SD=.484$ whereas school health had $M=3.431$ and $SD=.406$. The independence of observation was checked by using the Durbin-Watson Statistics. Its value is 1.82 ranging from 1.5 and 2.5 meaning that the data is relatively normal for linear regression. The Durbin-Watson Statistics was used to detect autocorrelation in the residuals ranging from 0 to 4 that a value of 1.8 highlighting no evidence of autocorrelation (Vinod, 1973).

Research question 1: Is there a significant relationship between the school health and students' learning outcomes?

The linear regression indicated $r^2=.33$, $t=7.48$, $F(1, 406) =201.62$, $P=.000$. This means statistical significance of the regression model that $P<.05$. In addition, the correlation coefficient (R) was .576 which was greater than average weight. It is a good fit to data. Therefore, school health influences students' learning outcomes.

Research question 2: Does students' family socio-economic status reflect students' learning outcomes?

The linear regression indicated $r^2=.001$, $t=26.96$, $F(1, 406) =.531$, $P=.467$. This means that not statistical significance of the regression model that $P>.05$. In addition, the weight of R squared was too small to prove relationship. Therefore, students' family socio-economic status didn't predict students' learning outcomes.

Hypothesis 1: There are different perceptions of school health between students' genders.

Table 1. Independence Samples Test for Hypothesis 1

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
School Health	Equal variances assumed	.056	.813	.790	406	.430	.03212	.04064	-.04778	.11202
	Equal variances not assumed			.795	394.023	.427	.03212	.04040	-.04731	.11155

The result highlighted $t(406) = .790, P = .430 > .05$ meaning that we accept a null hypothesis as shown in **Table 1**. Hypothesis 1 was not supported that there is no different perception of school health between students' genders.

Hypothesis 2: There are different perceptions of school health among family socio-economic status.

Table 2. One-Way ANOVA for Hypothesis 2

ANOVA					
School Health					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.196	2	.098	.587	.556
Within Groups	67.451	405	.167		
Total	67.647	407			

We found not statistically significant differences among students' family status in terms of school health with $F(2, 405) = .587, P = .556 > .05$ as illustrated in **Table 2**. This means that Hypothesis 2 was not supported.

Hypothesis 3: There are different perceptions of school health among students' age cohort.

Table 3. One-Way ANOVA for Hypothesis 3

ANOVA
School Health

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.976	7	.139	.836	.558
Within Groups	66.671	400	.167		
Total	67.647	407			

We found that not statistically significant differences between students' age cohorts in terms of school health with $F(7,44) = .836, P = .558 > .05$ as shown in **Table 3**. It means that hypothesis 3 was not supportive.

Hypothesis 4: There are different results of students' learning outcomes among selected trades.

Table 4. One-Way ANOVA for hypothesis 4

ANOVA					
Students' Learning Outcome					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.215	5	.243	1.035	.397
Within Groups	94.415	402	.235		
Total	95.630	407			

We found not statistically significant differences between selected trades in terms of students' learning outcome with $F(5, 402) = 1.035, P = .397 > .05$ as shown in **Table 4**. It means that hypothesis 4 was not supportive.

Hypothesis 5: There are different learning outcomes among students' family status.

Table 5. One-Way ANOVA for Hypothesis 5

ANOVA					
Mean1					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.146	2	.073	.310	.734
Within Groups	95.484	405	.236		
Total	95.630	407			

We found not statistically significant differences among students' family status in terms of learning outcome with $F(2, 405) = .310, P = .734 > .05$ as shown in **Table 5**. It means that hypothesis 5 was not supportive.

Discussion and Conclusion

The results underscored the relationship between school health and students' learning outcomes. Students with good health reflect their effective learning outcomes (Kelley & Silva-Padrón, 2023). This might be due to some existing mechanism and frameworks have been implemented. For example, each school in Cambodia is required to have 1) school health promotion committee; 2) well-designed health infrastructure such as standardized health cabinet, green school environment, and clean schools; 3) tap water for utilities; 4) healthy food deliveries with sufficient nutrition and vitamins; and 5) healthy activity programs such as physical exercises, play grounds for sporting, and healthy reproduction awareness-raising activities (MoEYS, 2023). The policy on school health focuses on promoting health condition of students and education officers equipping them with necessary health skills to live in a healthy manner (MoEYS, 2006). The government has paid high attention to school health promotion by making supportive policies and action plans providing fundamental health services and tap water to students and education officers countrywide (MoEYS, 2022). Aligning with better school health programs, better learning outcomes highlighted an increasing pass rate for students of grade 12 examination. For example, a pass rate was 65.65% in 2021 and 72.33% in 2022. Therefore, the results were applicable for Cambodian context.

The relationship between school health and students' learning outcomes connects to many investigations of some empirical studies. Learning outcomes and school health are interconnected in terms of health service deliveries, and graduation and employment rates (Kelley & Silva- Padrón, 2023). School health like diet quality significantly influences positive learning outcomes with an increasing employment rate (Florence et al., 2008). Learning outcomes of students are affected by school health with school-based services (Mays, 2020). School health reflects academic achievements of students both in policies and practices increasing test scores and academic grades (Fobbs, 2015). Therefore, increasing access to the programs and activities of school health provides safe and supportive environment for students, teachers and school management (Mays, 2020).

The findings highlighted some limitations for consideration. The scope of the study focuses on eight general and technical high schools (GTHSs). In order to generalize the sample size, the future research should be enlarged to general high schools. The study particularly targeted technical education students for year 2 and year 3 only capturing one part of school health and

learning outcomes. The future research should be undertaken to engage their instructors as they are service deliverers and evaluator of students' learning outcomes. Finally, technical education students majoring in six trades only. This might be due to data collection availability during meeting with the participants in person at schools. The future research should be considered to enlarge more trades.

To improve learning outcomes, policy makers should make efforts in promoting the competencies of current teachers (Afkar et al., 2023). School canteen policy and guidelines should be formulated to ensure students are nutritious and healthy while eating in schools. School health officers should be equipped with appropriate school health skills adapting to the school context along with supporting facilities and equipment to manage school health problems effectively (Nguyen et al., 2020). The government should ensure the quality health service delivery to students ranging from capacity-building programs for school health officers to facility and equipment installation (Kelley & Silva-Padrón, 2023). Therefore, more efforts and investments in school health programs should be considered with equitable access from students, teachers and administrators (Florence et al., 2008).

Chronic physical and mental health matters negatively impact students' ability levels in succeeding their academic goals (Mays, 2020). However, the results might pave the way for strategic actions to support school health programs delivering quality services with competent health officers and sufficient equipment and facilities. If it can be done successfully, students' learning outcomes are increasing rapidly with reduced dropout and repetition rates. Therefore, enhanced policies and practices of school health might inspire students to have healthy lifestyles contributing to the healthy communities (Fobbs, 2015).

Conflict of Interest

Authors declared no conflict of interest.

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References

- Adam, S. (2006). An introduction to learning outcomes.
- Afkar, R., Béteille, T., Breeding, M. E., Linden, T., Mason, A. D., Mattoo, A., ... & Yarrow, N. (2023). *Fixing the foundation: Teachers and basic education in East Asia and Pacific*. The World Bank
- Alonge, R. A., & Okunade, H. F. (2013). Gender and residential differences in academic performance of social studies students of Ekiti State University, Ado-Ekiti. *Nigerian Journal of Social Studies*, 16(2), 265-275.
- American School Health Association. (2023). *What is school health* [Blog post]. Retrieved from <https://www.ashaweb.org/what-is-school-health/>
- Asada, Y., Hughes, A., & Chriqui, J. (2017). Insights on the intersection of health equity and school nutrition policy implementation: an exploratory qualitative secondary analysis. *Health Education & Behavior*, 44(5), 685-695.
- Asia-Pacific Center of Education for International Understanding (APCEIU). (2022). *Sustainable lifestyle challenge: A case from Norway* (EIU Best Practices Series No.62). Seoul, South Korea: Design Prism
- Asim, H. M., Vaz, A., Ahmed, A., & Sadiq, S. (2021). A review on outcome-based education and factors that impact student learning outcomes in tertiary education system. *International Education Studies*, 14(2), 1-11.
- Ayodele, A. A., & Nasiru, O. I. (2021). Effect of guided-discovery technique on colleges of education social studies students' learning outcome. *Journal of Education and Learning (EduLearn)*, 15(3), 390-396.
- Babbie, E. (2007). *The practice of social research* (7th ed.). Cengage Learning
- Brener, N. D., Demissie, Z., McManus, T., Shanklin, S., Queen, B., & Kann, L. (2017). *School health profiles 2016: Characteristics of health programs among secondary schools*. Atlanta: Centers for Disease Control and Prevention.
- Burrows, T., Goldman, S., Pursey, K., & Lim, R. (2017). Is there an association between dietary intake and academic achievement: A systematic review. *Journal of Human Nutrition and Dietetics*, 30, 117-140.
- Caputi, P., & Balnaves, M. (2001). Introduction to quantitative research methods: An investigative approach. *Introduction to Quantitative Research Methods*, 1-272.
- Creswell, J. W. (2012). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (4th ed.). Pearson
- Cygan, H., Tribbia, C., & Tully, J. (2020). School health policy implementation: Facilitators and challenges. *The Journal of School Nursing*, 36(5), 330-338.

- Darlington, E. J., Violon, N., & Jourdan, D. (2018). Implementation of health promotion programmes in schools: An approach to understand the influence of contextual factors on the process? *BMC Public Health*, *18*(1), 1-17.
- De Jong, T., & Ferguson-Hessler, M. G. M. (1996). Types and qualities of knowledge. Educational *Psychologist*, *31*(2), 105–113. https://doi.org/10.1207/s15326985ep3102_2
- Florence, M. D., Asbridge, M., & Veugelers, P. J. (2008). Diet quality and academic performance. *Journal of School Health*, *78*(4), 209-215.
- Fobbs, E. (2015). Promoting student achievement through improved health policy. Policy Update. Vol. 22, No. 11. *National Association of State Boards of Education*.
- Forrest, C. B., Bevans, K. B., Riley, A. W., Crespo, R., & Louis, T. A. (2013). Health and school outcomes during children's transition into adolescence. *Journal of Adolescent Health*, *52*(2), 186-194.
- Gargano, L., Mason, M. K., & Northridge, M. E. (2019). Advancing oral health equity through school-based oral health programs: An ecological model and review. *Frontiers in public health*, *7*, 359.
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International journal of educational research*, *102*, 101586.
- Jude, L. T., Kajura, M. A., & Birevu, M. P. (2014). Adoption of the SAMR model to assess ICT pedagogical adoption: A case of Makerere University. *International Journal of e-Education, e-Business, e-Management and e-Learning*, *4*(2), 106-115
- Kase, C., Hoover, S., Boyd, G., West, K. D., Dubenitz, J., Trivedi, P. A., ... & Stein, B. D. (2017). Educational outcomes associated with school behavioral health interventions: A review of the literature. *Journal of School Health*, *87*(7), 554-562.
- Kelley, B., & Silva-Padrón, G. (2023). Addressing health disparities through school-based health services. Policy Brief. *Education Commission of the States*.
- Kibriya, S., & Jones, G. (2021). The impact of a safe learning environment in schools on students' learning outcomes: Evidence from Tanzania. *Quality Assurance in Education*, *29*(1), 15-28.
- Kristen, E. R. (2011). Analytical evaluation of the health belief model and the vulnerable populations conceptual model applied to a medically underserved, rural population. *International Journal of Applied Science and Technology*, *1*(2), 15-21.
- Leedy, P. D., & Ormrod, J. E. (2005). *Practical research* (Vol. 108). Pearson
- Lin, M. H., Chen, H. C., & Liu, K. S. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7), 3553-3564
- Lynagh, M., Schofield, M. J., & Sanson-Fisher, R. W. (1997). School health promotion

- programs over the past decade: A review of the smoking, alcohol and solar protection literature. *Health Promotion International*, 12(1), 43-60.
- Mandell, M. J., Eliseeva, E. A., Davies, M. M., Spears, M., Lobscheid, A., Fisk, W. J., & Apte, M. G. (2013). Association of classroom ventilation with reduced illness absence: A prospective study in California elementary schools. *Indoor Air*, 23(6), 515-528
- Mays, A. (2020). Advancing student health and achievement through Medicaid: Lessons learned from state efforts to expand Medicaid-funded school health services. *Journal of School Health*, 90(12), 918-922.
- Meroni, C., & Velasco, V. (2023). School-based Interventions for migrant students in the framework of the health promoting whole-school approach: An umbrella review. *Sustainability*, 15(3), 1894.
- McEwan, P. (2012). The impact of Chile's school feeding program on education outcomes. *Economics of Educational Review*, 32(2013), 122-139
- MoEYS. (2006). *School health policy*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport
- MoEYS. (2019a). *Education strategic plan 2019-2023*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport
- MoEYS. (2019b). *Cambodia's education 2030 roadmap: Sustainable development-goal4*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport
- MoEYS. (2022). *National action plan on school health 2021-2030*. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport
- MoEYS. (2023). *Education congress: Concluding education, youth and sport achievements 2021-2022 take stocking for 2022-2023* [Khmer report]. Phnom Penh, Cambodia: Ministry of Education, Youth and Sport
- Moore, L. M. (1996). *The basic practice of statistics*.
- Muijs, D. (2010). *Doing quantitative research in education with SPSS*. Sage
- Nguyen, D. T., Wright, E. P., Pham, T. T., & Bunders, J. (2020). Role of school health officers in mental health care for secondary school students in Can Tho City, Vietnam. *School Mental Health*, 12, 801-811.
- Nigg, C. R., & Amato, K. (2015). The influence of health behaviors during childhood on adolescent health behaviors, health indicators, and academic outcomes among participants from Hawaii. *International journal of behavioral medicine*, 22, 452-460.
- Oldroyd, J., Burns, C., Lucas, P., Haikerwal, A., & Waters, E. (2008). The effectiveness of nutrition interventions on dietary outcomes by relative social disadvantage: A systematic review. *Journal of Epidemiology & Community Health*, 62(7), 573-579.
- Pérez-Jorge, D., Jorge-Estévez, M. D., Gutiérrez-Barroso, J., Rosa-Hormiga, M., &

- Marrero-Morales, M. S. (2016). Health education for high school students in Spain. *International Education Studies*, 9(10), 185-201.
- Robinson, M. A. (2016). Quantitative research principles and methods for human-focused research in engineering design. *Experimental design research: Approaches, perspectives, applications*, 41-64.
- Scott, J. J., Vernon, L., & Metse, A. P. (2023). The international framework for school health promotion: Supporting young people through and after the COVID-19 Pandemic. *Journal of School Health*, 93(10), 920-929.
- Singh, Y. K. (2006). *Fundamental of research methodology and statistics*. New Age International.
- Stolp, S., Wilkins, E., & Raine, K. D. (2015). Developing and sustaining a healthy school community: Essential elements identified by school health champions. *Health Education Journal*, 74(3), 299-311.
- Sukarmin, & Sin, I. (2021). School health as the mediator variable: Determinants of the principal instructional leadership behavior. *European Journal of Educational Research*, 10(3), 1275-1286.
- Supena, I., Darmuki, A., & Hariyadi, A. (2021). The influence of 4C (constructive, critical, creativity, collaborative) learning model on students' learning outcomes. *International Journal of Instruction*, 14(3), 873-892. <https://doi.org/10.29333/iji.2021.14351a>
- Tavakoli, H. (2012). *A dictionary of research methodology and statistics in applied linguistics*. Rahnama Press.
- Toftum, J., Kjeldsen, B. U., Wargocki, P., Menå, H. R., Hansen, E. M., & Clausen, G. (2015). Association between classroom ventilation mode and learning outcome in Danish schools. *Building and Environment*, 92, 494-503.
- Toh, S. H., Shaw, G., & Padilla, D. (2017). Global citizenship education: A guide for policymakers. *Seoul, Republic of Korea: Asia-Pacific Centre of Education for International Understanding*.
- Tomokawa, S., Kaewviset, S., Saito, J., Akiyama, T., Waikugul, J., Okada, K., ... & Jimba, M. (2018). Key factors for school health policy implementation in Thailand. *Health Education Research*, 33(2), 186-195.
- Vinod, H. D. (1973). "Generalization of the durbin-watson statistic for higher order autoregressive processes. *Communications in Statistics-Theory and Methods*, 2(2), 115-144.
- Wargocki, P., Foldbjerg, P., Eriksen, K. E., & Videbæk, L. E. (2014). Socio-economic consequences of improved indoor air quality in Danish primary schools. *Proceedings of Indoor Air, 2014*.
- World Health Organization [WHO]. (2021). *Health labor market analysis guidebook*. Geneva, Switzerland: World Health Organization