

Teaching Physical Education with Online Instruction on Students' Cognitive Engagement and Performance in Physical Education⁷⁹³

Melissa P. Dereza

Laguna State Polytechnic University

Abstract

This descriptive study aimed to determine the relationship between teaching physical education with online instruction on students' cognitive engagement and performance in physical education and to answer the research problems posed. It comprised the following to wit; level of online instruction, level of students' cognitive engagement, level of students' performance in physical education in terms of grades and the significant relationship between the online instruction and the students' cognitive engagement and students' performance in physical education.

On the other hand, descriptive method of research was utilized in this study. Questionnaire was formulated and given to one hundred fifty-two (152) respondents, who were selected purposively as the Grade 7-10 students under online distance learning at Sta. Catalina Integrated National High School. The researcher-made questionnaire is composed of two (2) parts: the level of online instruction and the level of students' cognitive engagement.

The findings revealed that the level of online instruction was interpreted as high in terms of: e-learning resources, physical environment, performance assessment, online lecture, and online assignments, and very high in terms of online monitoring. As to the level of students' cognitive engagement, it was also interpreted as high in terms of self-regulation, tasks orientation and collaboration. Moreover, the level of students' performance in physical education in terms of grades for the first and second quarters were both very satisfactory.

From the results, the researcher found out that there were lot of students as outstanding from the number of the respondents in Sta. Catalina Integrated National High School. It can imply that the students still learn and gain knowledge even without the proper physical activities through online distance learning.

The findings also indicated a significant relationship between online instruction with the students' cognitive engagement and no significant relationship between online instruction and the students' performance in physical education.

Keywords: Online Instruction, Cognitive Engagement, Physical Education

1. INTRODUCTION

Prior to COVID-19, quality PE programs exhibited certain characteristics designed to promote student learning outcomes. In March 2020, the COVID-19 pandemic forced the majority of school instruction, including physical education (PE) to be delivered remotely. The shift in teaching paradigm of teaching-learning process due to the on-going pandemic posed many challenges to the education sector, especially in physical education.

Apparently, Physical education centers on physical activity and is clearly distinct from general knowledge-based subjects. Therefore, online physical education classes require special preparation and operation to communicate and practice the values and goal of physical education. Currently, as online classes whether synchronous or asynchronous classes are occurring in around the world, there is a need to examine whether online physical education classes are conveying the values of physical education appropriately as this field requires physical activities, direct instruction and monitoring.

As such, to address the needs of students in physical education classes, education institutions implemented proactive policies for the continuance of education despite the closure. (Joaquin, Biana and Dacela, 2020) These include conducting classes remotely. Public secondary schools under the Department of Education implemented various modes of remote learning such as synchronous or real time online classes, asynchronous or delayed-time classes, modular, and blended distance learning.

With this, teachers are now being taught the use of various learning management systems (LMS) as part of their preparation for online classes, trainings were also held to equipped instructional leaders with skills for synchronous and asynchronous classes such as use of platforms for video communications, and video recording and editing.

However, despite these efforts, several arguments are associated with remote learning especially with online classes or e-learning. According to Bao (2020), the sudden change in remote learning caused challenges to teachers such as lack of online teaching experience, early preparation, or support from educational technology teams. On the other hand, students also experience various challenges as to accessibility and learning pedagogy among others. (Dhawan, 2020).

Given the above scenario, Physical education which has been traditionally considered as practical hands-on subject in every learning institution has changed dramatically on the delivery of instruction. Nevertheless, new paradigm shifts

enabling the students to learn under the given circumstance where health is of a paramount concern has been the focus of the present education system and likewise to find means and ways to address the problem.

1.1 Objectives of the Study

This study, entitled, Teaching Physical Education with Online Instruction on Students' Cognitive Engagement and Performance in Physical Education subject aims to answer the following research problems.

1. What is the level of online instruction in terms of:
 - 1.1 e-learning resources;
 - 1.2 physical environment;
 - 1.3 online monitoring;
 - 1.4 performance assessment;
 - 1.5 online lecture; and
 - 1.6 online assignments?
2. What is the level of students' cognitive engagement in terms of:
 - 2.1 self-regulation;
 - 2.2 tasks orientation; and
 - 2.3 collaboration?
3. What is the level of students' performance in Physical Education in terms of grades?
4. Is there a significant relationship between the online instruction on the students' cognitive engagement?
5. Is there a significant relationship between the online instruction on the students' academic performance in Physical Education?

2. METHODOLOGY

2.1 Research Design

This study used the quantitative/ descriptive survey method of research. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Wadsworth, 2017). The method involved range from the survey which described the status quo, the correlation study which investigated the relationship between variables, to developmental studies which seek changes over time (Key, 2017).

The researcher used this method to quantify the problem by way of generating numerical data or data that can be transformed into usable statistics. It is used to quantify defined variables and to generalize results from a larger sample population. The researcher proceeded with the descriptive survey research through the use and distribution of questionnaires to the respondents in Sta. Catalina Integrated National High School.

A questionnaire was a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from the respondents.

2.2 Population and Sampling Technique

Purposive sampling technique was used in this study where the respondents consist of Grade 7-10 students from Sta. Catalina Integrated National High School, Majayjay, Laguna. To get the desired sample, the researcher subjectively selected one hundred fifty-two (152) students under online distance learning approaches in PE.

2.3 Research Instrument

The research instrument used in this study was a survey questionnaire, to gather the data and information. The questionnaire for the strategical approach as perceived by the respondents is a researcher-made questionnaire using a five (5) point scale as follows to measure the level of online instruction and the level of students' cognitive engagement:

This study aimed to determine the relationship of online instruction on the cognitive engagement and performance of Grade 7-10 students in PE in Sta. Catalina Integrated National High School. The questionnaire-checklist that aims to draw out proper responses on the objectives of this study was constructed. This questionnaire-checklist was made by the researcher and were presented to, analyzed and checked by the research adviser and an expert to ensure the validity of responses it would elicit.

Point	Range	Remarks	Verbal Interpretation
5	4.21-5.00	Strongly Agree	Very High
4	3.41-4.20	Agree	High
3	2.61-3.40	Moderately Agree	Moderately High
2	1.81-2.60	Disagree	Low
1	1.00-1.80	Strongly Agree	Very Low

The researcher also gathered students' grades in Physical Education for the first and second quarters. This secondary data is another research instrument used in this study to measure the level of students' performance in Physical Education through a Likert five-point scale.

Point	Range	Remarks	Verbal Interpretation
5	90-100	Outstanding	Very High
4	85-89	Very Satisfactory	High
3	80-84	Satisfactory	Moderately High
2	75-79	Fairly Satisfactory	Low
1	74 and below	Did Not Meet Expectations	Very Low

2.4 Statistical Treatment

The statistical treatment of data was used to compute then analyze and interpret the data given by the respondents.

To determine the level of online instruction in terms of e-learning resources, physical environment, online monitoring, performance assessment, online lecture, and online assignments, the Mean and Standard Deviation was used.

To determine the level of students' cognitive engagement in terms of self-regulation, tasks orientation, and collaboration, the Mean and Standard Deviation was also used.

To determine the level of students' performance in physical education in terms of grades, the frequency, percentage, mean and standard deviation were used.

To determine the significant relationship between the online instruction on the students' cognitive engagement, Pearson Product Moment Correlation Coefficient was used.

To determine the significant relationship between the online instruction on the students' performance in Physical Education, Pearson Product Moment Correlation Coefficient was also used.

Google Forms and Data Matrix were used in tabulating and computing the statistics of the study. It was presented to the statistician for checking, computation and validation of the results.

3. RESULTS AND DISCUSSION

This chapter presents the data gathered which were statistically treated, presented, analyzed in tables and interpreted in relation to the problems and hypotheses specified in the study. The results were presented in the same sequence with the research questions posed for the study.

Level of Online Instruction

The level of online instruction, in this study, refers to e-learning resources, physical environment, online monitoring, performance assessment, online lecture, and online assignments.

The following table shows the statement, mean, standard deviation and verbal interpretation.

Mean score and Standard Deviation obtained from the points given by the respondents for each statement can be remarked as Strongly Agree, Agree, Moderately Agree, Disagree and Strongly Disagree.

Moreover, from the remarks given, the verbal interpretation can be determined as Very High, High, Moderately High, Low and Very Low.

The level of students' perception on the use of online instruction in terms of e-learning resources is analyzed and determined.

The table 1 shows the level of online instruction in terms of e-learning resources. It presents the statement, mean, standard deviation and verbal interpretation in terms of e-learning resources.

Table 1. Level of Online Instruction in terms of E-Learning Resources

Statement	Mean	SD	REMARKS	Verbal Interpretation
E-learning Resources are backed up with facts with the corresponding references to prevent compromising the quality of education received by the students in PE.	4.09	0.78	Agree	High
E-learning Resources are suitable and relevant for the students studying physical education in the remote learning setup.	4.02	0.79	Agree	High
Resources are published during the new normal setup with alignment to current events and are up-to-date.	4.00	0.91	Agree	High
E-Resources are in line with the needs of the students, and the practicality poses are in the current situation, especially in physical education.	4.01	0.89	Agree	High
E-Resources strike students' interests to engage them and enjoy the value of studying in PE.	4.09	0.88	Agree	High
Over-all	4.04	0.85		High

Table 1 illustrates the level of online instruction in terms of e-learning resources.

Among the statements above, "E-learning Resources are backed up with facts with the corresponding references to prevent compromising the quality of education received by the students in PE". While "E-Resources strike students' interests to engage them and enjoy the value of studying in PE" yielded the highest mean score ($M=4.09$, $SD=0.78$) and ($M=4.09$, $SD=0.88$) respectively, and were remarked as Agree. This is followed by "E-learning Resources are suitable and relevant for the students studying physical education in the remote learning setup" with a mean score ($M=4.02$, $SD=0.79$) and was also remarked as Agree.

On the other hand, the statement "Resources are published during the new normal setup with alignment to current events and are up-to-date" received the lowest mean score of responses with ($M=4.00$, $SD=0.79$) yet was also remarked Agree.

Overall, the level of online instruction in terms of e-learning resources attained a mean score of 4.04 and a standard deviation of 0.85, was "High" among the respondents.

Finding shows that the level of online instruction in terms of E-learning resources are varied, it may depend on the preferences of the respondents. There may be a difference on how they look with the materials and how they view it as a helpful resource in education.

Nikolic (2018) finds that such e-learning resources are used by a substantial number of students to aid learning, increasing productivity, and improving teaching. The availability of such targeted resources leads to an improved student experience.

The next table, Table 2 shows the level of online instruction in terms of physical environment. It presents the statement, mean, standard deviation and verbal interpretation.

Table 2. Level of Online Instruction in terms of Physical Environment

Statement	Mean	SD	Remarks	Verbal Interpretation
Students have a personal space at home to help them study effectively during physical education classes.	4.02	0.95	Agree	High
Students can apply the knowledge they have gained and experience even without the ambiance of a physical classroom.	3.90	0.90	Agree	High
Students can create a cooperative learning environment with a positive social and educational impact even with the new normal setup.	4.08	0.92	Agree	High
The students still encompass a positive culture of a school or class through google meet, zoom, etc.	4.01	0.96	Agree	High
Students' ability to learn and show improved achievement scores in digital setup and home environment are evident.	4.05	0.92	Agree	High
Over-all	4.01	0.93		High

Table 2 illustrates the level of online instruction in terms of physical environment.

Among the statements above, “Students can create a cooperative learning environment with a positive social and educational impact even with the new normal setup” yielded the highest mean score ($M=4.08$, $SD=0.92$) and was remarked as Agree. This is followed by “Students’ ability to learn and show improved achievement scores in digital setup and home environment are evident” with a mean score ($M=4.05$, $SD=0.92$) and was also remarked as Agree.

Meanwhile, the statement “Students can apply the knowledge they have gained and experience even without the ambiance of a physical classroom” received the lowest mean score of responses with ($M=3.90$, $SD=0.90$) yet was also remarked Agree.

Overall, the level of online instruction in terms of physical environment attained a mean score of 4.01 and a standard deviation of 0.93, and was “High” among the respondents.

Since pandemic began, learning of the students are not that good at all time especially due to their learning environment. They may find it difficult to learn because of the sudden transition that happened on the educational system. Student’s ability to adapt on a certain situation may affect on how they react with the online instruction in terms of physical environment.

Existing studies on the influence of the physical environment on learning primarily focus on campus environment, with a focus on formal education, but few studies paid attention to the physical environment of online education. The outbreak of COVID-19 has added new variables and attracted more attention to the physical environment of online education since many students are asked to participate in online education at home.

The next table, Table 3 shows the level of online instruction in terms of online monitoring. It presents the statement, mean, standard deviation and verbal interpretation.

The level of students’ perception on the use of online instruction in terms of online monitoring is analyzed and determined.

Table 3. Level of Online Instruction in terms of Online Monitoring

Statement	Mean	SD	Remarks	Verbal Interpretation
Students’ tasks performance in physical education classes is being monitored by teachers consistently.	4.18	0.91	Agree	High
There is monitoring on students’ progress in physical education classes.	4.20	0.82	Strongly Agree	Very High
Teachers assess the students’ performance thru online platforms like messenger and google meet.	4.14	0.92	Agree	High
Students are given direct instruction in doing performance tasks during online classes.	4.22	0.82	Strongly Agree	Very High
Students’ outputs are monitored and assessed accordingly using learning management system.	4.24	0.89	Strongly Agree	Very High
Over-all	4.20	0.93		Very High

Table 3 illustrates the level of online instruction in terms of online monitoring. Among the statements above, “Students’ outputs are monitored and assessed accordingly using learning management system” yielded the highest mean score ($M=4.24$, $SD=0.89$) and was remarked as Strongly Agree. This is followed by “Students are given direct instruction in doing performance tasks during online classes” with a mean score ($M=4.22$, $SD=0.82$) and was also remarked as Strongly Agree. While the statement “Teachers assess the students’ performance thru online platforms like zoom and google meet” received the lowest mean score of responses with ($M=4.14$, $SD=0.92$) yet was remarked Agree.

Overall, the level of online instruction in terms of online monitoring attained a mean score of 4.20 and a standard deviation of 0.93, and was “Very High” among the respondents.

Finding shows that the online instruction in terms of online monitoring is very high. It can imply that the teachers are highly engaged on monitoring their students which can help them boost their interest in learning.

In the process of physical education, a person not only satisfies the need for physical education, but also generates interests, motives, feelings, norms and rules of human behavior with the means of monitoring (Uher et.al, 2017).

The next table, Table 4 shows the level of online instruction in terms of performance assessment.

Table 4. Level of Online Instruction in terms of Performance Assessment

Statement	Mean	SD	Remarks	Verbal Interpretation
Students’ outputs are graded appropriately in synchronous classes in physical education.	4.21	0.86	Strongly Agree	Very High

Students' performance tasks are graded accordingly during online classes.	4.05	0.93	Agree	High 798
Students' performance progress in physical education is being assessed regularly by teachers, even with online instruction.	4.08	0.92	Agree	High
Students can perform to the best of their ability in physical education under online instruction.	4.01	0.96	Agree	High
Students can monitor their progress in physical education and can cope with remote instruction.	4.07	0.93	Agree	High
Over-all	4.09	0.92		High

Table 4 illustrates the level of online instruction in terms of performance assessment. Among the statements above, "Students' outputs are graded appropriately in synchronous classes in physical education" yielded the highest mean score ($M=4.21$, $SD=0.86$) and was remarked as Strongly Agree. This is followed by "Students' performance progress in physical education is being assessed regularly by teachers, even with online instruction" with a mean score ($M=4.08$, $SD=0.92$) and was remarked as Agree. On the other hand, the statement "Students can perform to the best of their ability in physical education under online instruction" received the lowest mean score of responses with ($M=4.01$, $SD=0.96$) yet was also remarked Agree.

Overall, the level of online instruction in terms of performance assessment attained a mean score of 4.09 and a standard deviation of 0.92, and was "High" among the respondents.

Finding shows that in terms of performance assessment, the level of online instruction is high. It maybe because students cannot see how teachers evaluate their performances due to the limited time of meeting. Capacity of the learners to show their skills in performances also became restricted due to the modalities they are using.

Online physical education classes, instituted nearly worldwide during the 2020 pandemic, were a wholly new experience for both teachers and students. The sudden shift to online classes left teachers unprepared and struggling with unfamiliar teaching methods, forcing them to resort to trial-and-error approaches. Inadequate online teaching strategies and low teacher and student readiness for online classes made the transition difficult (Do, 2020).

The next table, Table 5 shows the level of online instruction in terms of online lecture.

Table 5. Level of Online Instruction in terms of Online Lecture

Statement	Mean	SD	Remarks	Verbal Interpretation
Students study theoretical lessons and apply them during hands-on activities, even with online instruction.	4.09	0.85	Agree	High
Students can adapt to changes in physical education lecture setups and activities under online instruction.	4.07	0.84	Agree	High
Students can understand the lesson with the online lecture.	4.09	0.89	Agree	High
Students improve cognitive knowledge in physical education with the online lecture.	4.00	0.91	Agree	High
Students improve concept knowledge in physical education with the online lecture.	4.11	0.83	Agree	High
Over-all	4.07	0.86		High

Table 5 illustrates the level of online instruction in terms of online lecture. Among the statements above, "Students improve concept knowledge in physical education with the online lecture" yielded the highest mean score ($M=4.11$, $SD=0.83$) and was remarked as Agree. This is followed by "Students study theoretical lessons and apply them during hands-on activities, even with online instruction" and "Students can understand the lesson with the online lecture" with the mean score ($M=4.09$, $SD=0.85$) and ($M=4.09$, $SD=0.89$) respectively, and were also remarked as Agree. On the other hand, the statement "Students improve cognitive knowledge in physical education with the online lecture" received the lowest mean score of responses with ($M=4.00$, $SD=0.91$) yet was also remarked Agree.

Overall, the level of online instruction in terms of online lecture attained a mean score of 4.07 and a standard deviation of 0.86, and was "High" among the respondents.

Finding shows that the level of online instructions in terms of online lecture is high. It may imply that students learn in online modalities however, there is a huge difference on learning with face-to-face instructions. Students may experience difficulties on independency and learning with their own which can affect their perspectives with the online lecture. In addition, it is also hard to convey the meaningful activities of physical education just by using online modalities.

Difficulties in conveying the value of sports in online physical education classes remained in the modified technical practice. This value included maintaining health through physical activities, cultivating community consciousness through physical activities with friends, and developing sports etiquette through sports participation. Students engaged in online

physical education classes often cannot secure enough space to effectively take part in physical activity and also have limited access to supplies and equipment needed to follow online physical education classes (Park et. al, 2020).

The next table, Table 6 shows the level of online instruction in terms of online assignments.

Table 6. Level of Online Instruction in terms of Online Assignments

Statement	Mean	SD	Remarks	Verbal Interpretation
The teacher assesses the students' performance practical online assignment and utilization of interactive learning materials.	4.07	0.97	Agree	High
The teacher engages the student in an online coursework which fosters student participation.	3.97	0.90	Agree	High
The instructor interacts with the learners to work toward their goals and incorporate new knowledge, behaviors, and skills that add to their range of learning experiences thru providing constructive online assignment.	4.03	0.95	Agree	High
Teacher uses group assignments to strengthen virtual collaboration skills.	4.09	0.87	Agree	High
The instructors acknowledge students' efforts through recognition of their assignment and activities.	4.09	0.87	Agree	High
Over-all	4.05	0.92		High

Table 6 illustrates the level of online instruction in terms of online assignments. Among the statements above, "Teacher uses group assignments to strengthen virtual collaboration skills." and "The instructors acknowledge students' efforts through recognition of their assignment and activities." yielded the highest mean score ($M=4.09$, $SD=0.87$) and "The instructors acknowledge students' efforts through recognition of their assignment and activities" were remarked as Agree. "The teacher assesses the students' performance practical online assignment and utilization of interactive learning materials." with the mean score ($M=4.07$, $SD=0.97$) and was also remarked as Agree. "The instructor interacts with the learners to work toward their goals and incorporate new knowledge, behaviors, and skills that add to their range of learning experiences thru providing constructive online assignment." received ($M=4.03$, $SD=.95$) remarked as agree. On the other hand, the statement "The teacher engages the student in an online coursework which fosters student participation." received the lowest mean score of responses with ($M=3.97$, $SD=0.90$) yet was also remarked Agree.

Overall, the level of online instruction in terms of online assignments attained a mean score of 4.05 and a standard deviation of 0.92, and was "High" among the respondents.

The result of the study in terms of online assignments is high, it means that the teachers give assignment that could help the students however, insufficient time for assessing the learners' need is shown. It maybe because of the situation that they currently facing. Proper interaction with the students is really hard, teachers cannot also see the student's behavior within the screen of their laptop which may result to some miscommunications and non-interactive classes between the learners and the educators.

In terms of physical activity assignments, Blaine (2019) suggested to offer online group learning assignments to students and let them provide feedback during class. This, find its way, in becoming as a part of the new look of 21st century physical education: virtual, individualized progression through the content, one-on-one help from the teacher on the student's schedule, and students choosing activities for their fitness requirement that they can do at home or within their community during weekends and evenings.

Level of Students' Cognitive Engagement

The level of students' cognitive engagement in this study, refers to self-regulation, tasks orientations, and collaboration.

Table 7 shows the level of students' cognitive engagement in terms of self-regulation.

Table 7. Level of Students' Cognitive Engagement in terms of Self-Regulation

Statement	Mean	SD	Remarks	Verbal Interpretation
Students could understand and practice physical education activities even if delivered instructions are through e-learning platforms or modular instruction.	4.08	0.95	Agree	High

Students were able to accomplish every task with complete honesty.	3.93	0.88	Agree	High
Students are open to talking, expressing, and giving their opinions, ideas, and feelings whenever activities are made individually or by the group.	4.05	0.89	Agree	High
Students were motivated to learn how and what physical education may cater to everyone's welfare.	4.11	0.85	Agree	High
Students know their strengths and weaknesses in learning with remote instruction, thus making necessary adjustments to learn more.	4.04	0.95	Agree	High
Over-all	4.04	0.90		High

Table 7 illustrates the level of students' cognitive engagement in terms of self-regulation. Among the statements above, "Students were motivated to learn how and what physical education may cater to everyone's welfare" yielded the highest mean score ($M=4.11$, $SD=0.85$) and was remarked as Agree. This is followed by "Students could understand and practice physical education activities even if delivered instructions are through e-learning platforms or modular instruction" with the mean score ($M=4.08$, $SD=0.95$) and was also remarked as Agree.

Meanwhile, the statement "Students were able to accomplish every task with complete honesty" received the lowest mean score of responses with ($M=3.93$, $SD=0.88$) yet was also remarked Agree.

Overall, the level of students' cognitive engagement in terms of self-regulation attained a mean score of 4.04 and a standard deviation of 0.90, and was "High" among the respondents.

The result of the study reveals that student may face difficulties on regulating their own learnings. Their motivation may also decrease due to the lack of interaction with their peers, classmates and most especially with their teachers. Since respondents are from Junior High School, they still need guidance and support from the people around them.

Mandinach (2019) defined Self-Regulation as the ability to control one's body and self, to manage one's emotions, and to maintain focus and attention. Children are regulated by another person, typically a parent or a teacher. This outside regulator provides the rules for behavior and monitors the children while they learn how to apply these rules to themselves.

The next table, Table 8 shows the level of students' cognitive engagement in terms of tasks orientation.

Table 8. Level of Students' Cognitive Engagement in terms of Tasks Orientation

Statement	Mean	SD	Remarks	Verbal Interpretation
Students are focused on and devoted to completing specific tasks, especially those that contribute to their academic performance in the new normal.	4.20	0.84	Strongly Agree	Very High
Students are influenced by the perception of succeeding through the learning experience with remote instruction.	4.05	0.86	Agree	High
Students can submit and accomplish all learning tasks on time.	3.87	0.91	Agree	High
Students can complete and manage the learning process at a given time.	4.02	0.93	Agree	High
Students have the eagerness and initiative to finish the tasks assigned efficiently.	3.97	0.90	Agree	High
Over-all	4.02	0.89		High

Table 8 illustrates the level of students' cognitive engagement in terms of tasks orientations. Among the statements above, "Students are focused on and devoted to completing specific tasks, especially those that contribute to their academic performance in the new normal" yielded the highest mean score ($M=4.20$, $SD=0.84$) and was remarked as Strongly Agree. This is followed by "Students are influenced by the perception of succeeding through the learning experience with remote instruction" with the mean score ($M=4.05$, $SD=0.86$) and was remarked as Agree.

On the other hand, the statement "Students can submit and accomplish all learning tasks on time" received the lowest mean score of responses with ($M=3.87$, $SD=0.91$) yet was also remarked Agree.

Overall, the level of students' cognitive engagement in terms of tasks orientation attained a mean score of 4.02 and a standard deviation of 0.89, and was "High" among the respondents.

Learning environment of the students is a big factor on their education. Since they are not attending the actual classes, they tend to do other things than doing their assignment. There are more distractions that can limit them on managing their time and do their tasks more effectively. In addition, teacher cannot also see them during the asynchronous classes that resulted to a student's lower engagement in doing their school activities.

The present conceptualization of task orientation draws on older depictions of children's and adults' problem-solving and emotion-focused coping strategies (Lazarus, 2019), the nature of intrinsic motivation (Harter, 2018) and the distinction between mastery and helplessness orientations (Diener & Dweck, 2018). Our approach to task orientation also includes aspects of executive skills such as attention control and planning (Conners, 2017).

The next table, Table 9 shows the level of students' cognitive engagement in terms of collaboration. It presents the mean, standard deviation, remarks and verbal interpretation.

Table 9. Level of Students' Cognitive Engagement in terms of Collaboration

Statement	Mean	SD	Remarks	Verbal Interpretation
Students work in collaboration with other students with remote instruction.	4.01	0.90	Agree	High
Students develop and promote social interaction with other learners and a supportive eLearning community.	4.11	0.77	Agree	High
Students learn to share ideas, express opinions, and manage time with remote instruction.	4.09	0.96	Agree	High
Learners establish communication with others in a remote learning setup.	3.96	0.83	Agree	High
Students develop the initiative to work together to accomplish a task.	4.01	0.92	Agree	High
Over-all	4.04	0.88		High

Table 9 illustrates the level of students' cognitive engagement in terms of collaboration. Among the statements above, "Students develop and promote social interaction with other learners and a supportive eLearning community" yielded the highest mean score ($M=4.11$, $SD=0.07$) and was remarked as Agree. This is followed by "Students learn to share ideas, express opinions, and manage time with remote instruction" with the mean score ($M=4.09$, $SD=0.96$) and was also remarked as Agree. On the other hand, the statement "Learners establish communication with others in a remote learning setup" received the lowest mean score of responses with ($M=3.96$, $SD=0.83$) yet was also remarked Agree.

Overall, the level of students' cognitive engagement in terms of collaboration attained a mean score of 4.04 and a standard deviation of 0.88, and was "High" among the respondents.

Alike with other variables, student's level of cognitive engagement in terms of online collaboration was also affected by the new modality which they cannot positively adapt. They may find difficulties on conversing with other classmates especially for those students in lower years wherein they do not know each other personally. Groupings may also not that easy because there are some students that are introverted, social interaction is really challenging with the current online modalities.

Collaborative learning is a situation in which two or more people learn or attempt to learn something together. Unlike individual learning, people engaged in collaborative learning capitalize on one another's resources and skills such as, asking one another for information, evaluating one another's ideas, monitoring one another's work, etc. More specifically, Mene (2018) defined collaborative learning is based on the model that knowledge can be created within a population where members actively interact by sharing experiences and take on asymmetric roles.

Level of Students' Performance in Physical Education in terms of Grades

The level of students' performance in Physical Education in terms of grades for the first and second quarter is analyzed and determined.

Table 10 shows the level of students' performance in Physical Education in terms of grades. It presents the frequency, percentage, mean, standard deviation, and verbal interpretation.

Table 10. Level of Students' Performance in Physical Education in terms of Grades

Range	1 ST QUARTER		Verbal Interpretation	2 ND QUARTER		Verbal Interpretation
	Frequency (f)	Percentage (%)		Frequency (f)	Percentage (%)	
90-100	68	44.74	Outstanding	55	36.18	Outstanding
85-89	41	26.97	Very Satisfactory	41	26.97	Very Satisfactory
80-84	36	23.68	Satisfactory	49	32.24	Satisfactory

75-79	7	4.61	Fairly Satisfactory	7	4.61	Fairly Satisfactory
Below 75	0	0.00	Did Not Meet Expectations	0	0.00	Did Not Meet Expectations
Total	N=152	100 %		N=152	100 %	
Mean= 87.76 SD= 5.09 VI= VS			Mean= 87.03 SD= 5.18 VI= VS			

Table 10 presents the level of the students' performance in physical education.

As per the first quarter grades, out of one hundred fifty-two (152) respondents, sixty-eight (68) gained grades within 90-100 in physical education and was outstanding. This is seconded by those who had performed on a very satisfactory level with grades of 85-89, which makes up 26.97% of the total population equivalent to forty-one (41) respondents. On the other hand, only seven (7) students gained grades between 75-79 which was remarked to be fairly satisfactory.

As per the second quarter grades, fifty-five (55) or 36.81% of the total population gained grades of 90-100 which was outstanding. Forty-nine (49) or 32.24% of the respondents have performed on a satisfactory level. While seven (7) of the respondents gained grades between 75-79.

Overall, the students' performance in physical education for the first quarter was "Very Satisfactory" with the mean of 87.76 and a standard deviation of 5.09. Similarly, the performance of the students for the second quarter is also "Very Satisfactory" with the mean of 87.03 and standard deviation of 5.18.

Despite of the online learning modality and the various findings on the level of online instructions, student's level of academic performance in Physical Education is still very satisfactory. From the number of the respondents, there are lot of students that are outstanding. It can imply that the student still learns and gain knowledge even without the proper physical activities and through online distance learning.

The findings above mentioned is supported by Kohn (2019) suggests that increasing physical activity and physical fitness may improve academic performance and that time in the school day dedicated to recess, physical education class, and physical activity in the classroom may also facilitate academic performance.

Significant Relationship between Online Instruction and the Students' Cognitive Engagement

In this study, the significant relationship of online instruction with the students' cognitive engagement is analyzed and determined.

Table 11 shows that the significant relationship between online instruction and the students' cognitive engagement shows significant relationship.

Table 11. Significant Relationship between Online Instruction with the Students' Cognitive Engagement

Online Instruction	Cognitive Engagement	Computed r-value	Strength	Critical r-value	p-value	Analysis
E-Learning Resources	Self-Regulation	0.694	Strong	0.134	0.000	Significant
	Task Orientation	0.655	Strong	0.134	0.000	Significant
	Collaboration	0.694	Strong	0.134	0.000	Significant
	Self-Regulation	0.803	Very Strong	0.134	0.000	Significant
Physical Environment	Task Orientation	0.799	Very Strong	0.134	0.000	Significant
	Collaboration	0.805	Very Strong	0.134	0.000	Significant
	Self-Regulation	0.806	Very Strong	0.134	0.000	Significant
	Task Orientation	0.794	Strong	0.134	0.000	Significant
Online Monitoring	Collaboration	0.816	Very Strong	0.134	0.000	Significant
	Self-Regulation	0.824	Very Strong	0.134	0.000	Significant
Performance Assessment	Task Orientation	0.746	Strong	0.134	0.000	Significant
	Collaboration	0.777	Strong	0.134	0.000	Significant
	Self-Regulation	0.848	Very Strong	0.134	0.000	Significant
Online Lecture	Task Orientation	0.843	Very Strong	0.134	0.000	Significant

Online Assignments	Collaboration	0.857	Very Strong	0.134	0.000	Significant ⁸⁰³
	Self-Regulation	0.825	Very Strong	0.134	0.000	Significant
	Task Orientation	0.744	Strong	0.134	0.000	Significant
	Collaboration	0.849	Very Strong	0.134	0.000	Significant

Legend:

Range	Verbal Interpretation
0.80-1.00	Very Strong
0.60-0.79	Strong
0.40-0.59	Moderate
0.20-0.39	Weak
0.00-0.19	Very Weak

Table 11 presents the significant relationship between online instruction with the students' cognitive engagement. Specifically, it presents the relationship between the E-Learning Resources, Physical Environment, Online Monitoring, Performance Assessment, Online Lecture, and Online Assignments with the Self-Regulation, Task Orientation, and Collaboration of the students.

E-Learning Resources is observed to have a strong significant relationship with the Self-Regulation (0.694), Task Orientation (0.655), and Collaboration (0.694) of the students. This is evidenced by the computed *r* values that are greater than the critical value and computed *p*-values of 0.000 which are less than the significance alpha 0.05.

Similarly, Physical Environment is observed to have a very strong significant relationship with the Self-Regulation (0.803), Task Orientation (0.799), and Collaboration (0.805) of the students. This is also suggested by the computed *r* values that are greater than the critical value and computed *p*-values of 0.000.

Furthermore, Online Monitoring is also observed to have a very strong significant relationship with the Self-Regulation (0.806) and Collaboration (0.816) and a strong significant relationship with Task Orientation (0.794) of the students. The same can be said for the results of the tests.

In addition, Performance Assessment is observed to have a very strong significant relationship with the Self-Regulation (0.824) and a strong significant relationship with Task Orientation (0.746) and Collaboration (0.777) of the students. *P*-values for the tests were also <0.000.

The same is true for Online Lecture as it is also observed to have a very strong significant relationship with the Self-Regulation (0.848), Task Orientation (0.843), and Collaboration (0.857) of the students. As with the initial tests, the aforementioned also obtained *p*-values of 0.000.

Lastly, Online Assignments is observed to have very strong significant relationship with the Self-Regulation (0.825) and Collaboration (0.849) and a strong significant relationship with Task Orientation (0.744) of the students.

From the findings above, we can infer that at 0.05 level of significance, the null hypothesis "The online instruction has no significant relationship with the students' cognitive engagement" is rejected. Hence, it calls for the acceptance of the alternative which incites that there is a significant relationship between the two.

Significant Relationship between Online Instruction and the Students' Performance in Physical Education

In this study, the significant relationship between online instruction and the students' performance in physical education is analyzed and determined.

Table 12 shows that the significant relationship between online instruction and the students' performance in physical education shows no significant relationship.

Table 12. Significant Relationship between Online Instruction and the Students' Performance in Physical Education

Online Instruction	Performance	Computed <i>r</i> -value	Strength	Critical <i>r</i> -value	<i>p</i> -value	Analysis
E-Learning Resources	1 st Quarter	0.037	Very Weak	0.134	0.650	Not Significant
	2 nd Quarter	0.005	Very Weak	0.134	0.954	Not Significant
	1 st Quarter	0.058	Very Weak	0.134	0.479	Not Significant
	2 nd Quarter	0.089	Very Weak	0.134	0.277	Not Significant
Online Monitoring	1 st Quarter	0.013	Very Weak	0.134	0.873	Not Significant
	2 nd Quarter	0.066	Very Weak	0.134	0.417	Not Significant
Performance Assessment	1 st Quarter	0.026	Very Weak	0.134	0.754	Not Significant
	2 nd Quarter	0.130	Very Weak	0.134	0.112	Not Significant

Online Lecture	1 st Quarter	0.007	Very Weak	0.134	0.936	Not Significant
	2 nd Quarter	0.077	Very Weak	0.134	0.342	Not Significant
Online Assignments	1 st Quarter	0.006	Strong	0.134	0.940	Not Significant
	2 nd Quarter	0.088	Very Weak	0.134	0.283	Not Significant

Legend:

Range	Verbal Interpretation
0.80-1.00	Very Strong
0.60-0.79	Strong
0.40-0.59	Moderate
0.20-0.39	Weak
0.00-0.19	Very Weak

Table 12 presents the significant relationship between online instruction with the students' performance in physical education. Specifically, it presents the relationship between the E-Learning Resources, Physical Environment, Online Monitoring, Performance Assessment, Online Lecture, and the first and second quarter performance of the students.

E-Learning Resources is observed to have no significant relationship with the 1st quarter (0.037) and 2nd quarter (0.005) grades of the students. This is evidenced by the computed *r* values that are lesser than the critical value and computed *p*-values of 0.650 and 0.954 which are greater than the significance alpha 0.05.

Similarly, Physical Environment is observed to have no significant relationship with the 1st quarter (0.058) and 2nd quarter (0.089) grades of the students. This is also suggested by the computed *r* values that are lesser than the critical value and computed *p*-values of 0.478 and 0.277.

Furthermore, Online Monitoring is also observed to have no significant relationship with the 1st quarter (0.013) and 2nd quarter (0.066) grades of the students. The same can be said for the results of the tests.

In addition, Performance Assessment is observed to have no significant relationship with the 1st quarter (0.026) and 2nd quarter (0.130) grades of the students. *P*-values for the tests were also greater than 0.05.

The same is true for Online Lecture as it is also observed to have no significant relationship with the 1st quarter (0.007) and 2nd quarter (0.077) grades of the students. As with the initial tests, the aforementioned also obtained *p*-values of 0.936 and 0.342.

Lastly, Online Assignments is observed to have no significant relationship with the 1st quarter (0.006) and 2nd quarter (0.088) grades of the students.

From the findings above, it can be inferred that at 0.05 level of significance, the null hypothesis stating that "The online instruction has no significant relationship with the students' performance in physical education" is true. Hence, there is no significant relationship between the two.

4. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the foregoing findings, the following conclusions was drawn.

1. The hypothesis stating that "There is no significant relationship between the online instruction and the students' cognitive engagement" is rejected.
2. The hypothesis stating that "There is no significant relationship between the online instruction and the students' cognitive engagement" is accepted.

Based on the drawn conclusions resulted to the following recommendations:

1. It may be recommended that the teachers need to improve their online instructions to sustain the needs of the students in online learning modalities. As an educator, patience is a virtue, continual development may help increase the student's cognitive engagement not only in Physical education rather also with other subjects.
2. It is suggested that teachers may find a way to show their students how they monitor, evaluate and assess their works, so that students will not lead into misconceptions that their works are not being assessed properly by the teacher. Online exhibit and other related activities can help them show their skills and talents despite of not having a face-to-face class.
3. In addition, parents may be encouraged to guide their children in using e-learning accounts. It is to monitor the websites being browsed by their children and to help them in their studies in Physical Education using e-learning.
4. Moreover, teacher may also encourage the students to talk with each other, create collaborative activities that help them interact and give them time to recognize each other during the virtual classes.
5. Lastly, it may be recommended to help the students do their activities by providing extension programs and/or special classes for those who cannot follow the usual online discussion. Teacher can also let the students use home basis physical activities so that they can enjoy and learn in their houses without any hassle.

5. ACKNOWLEDGMENTS

The researcher wishes to express her profound gratitude to those who extended their invaluable assistance for the realization of this work most especially to: **Laguna State Polytechnic University**, her Alma Mater, for serving as guide to her success in facing all the challenges to attain her goal; **Hon. MARIO R. BRIONES, EdD**, University President, and also the chairman of the defense panel, for his priceless academic support and words of wisdom that serve as an inspiration to accomplish this piece of work; **Engr. MANUEL LUIS R. ALVAREZ**, Campus Director of LSPU-SCC, for extending his words of encouragement while this study is in the process of organization; **ROSARIO G. CATAPANG, PhD**, Associate Dean of the College of Teacher Education, for her untiring support, assistance, and suggestions; **JULIE ROSE P. MENDOZA, PhD**, GSAR Coordinator, and also her Technical Expert, for polishing the settings and format of this paper following norms of academic writing; **FREDDIE S. JAVIÑA, EdD**, for being an approachable and understanding adviser, for being patient in giving commendable suggestions, reviewing the manuscript, and encouraging the researcher all throughout the completion of this study; **DENNIS N. DARAN, PhD**, her Subject Specialist, for the shared knowledge and expertise for the development of the research work; **EVELYN A. Sunico, EdD**, her Research Statistician, for her kind assistance in the computations and interpretation of data for the successful completion of this work; **ALLAN M. BAUTISTA, EdD**, her External Panel Member, for sharing his knowledge and expertise in the field of Physical Education; **ZENAIDA O. VITASA, PhD**, her Language Critic, for polishing the language of this paper in accordance with norms of academic writing; **Grade 7-10 ODL students of Sta. Catalina Integrated National High School**, for taking time in answering the survey questionnaire; **The MAPEH Teachers of Sta. Catalina Integrated National High School**, for sharing their precious time in assisting the collection of the questionnaire; **NENITA B. EVASCO**, Principal III of Sta. Catalina Integrated National High School, for being supportive and understanding; **MARITEZ A. IBANEZ, CESO VI**, for the permission to conduct this study under her jurisdiction; **Her Co-teachers and friends** in the institution, for their untiring support, understanding and exerting efforts in giving pieces of advice not to stop and continue fighting to work and to finish this study; **Her Family**, for their unconditional love and understanding which served as her moral and spiritual strength; And Above All, the **Almighty God**, who has given her strength, wisdom, knowledge, patience, and understanding to accomplish the research work with a humble heart and renewed spirit of service.

6. REFERENCES

- Andersen, K. N. (2019). Assessing task-orientation potential in primary science textbooks: Toward a new approach. *Journal of Research in Science Teaching*, 57(4), 481–509. <https://doi.org/10.1002/tea.21599>
- Blaine, A.M. (2019). Interaction and presence in the virtual classroom: An analysis of the perceptions of students and teachers in online and blended Advanced Placement courses. *Comput. Educ.* 132, 31–43.
- Bertills, K., Granlund, M., & Augustine, L. (2019). Inclusive Teaching Skills and Student Engagement in Physical Education. *Frontiers in Education*, 4. <https://doi.org/10.3389/feduc.2019.00074>
- Borup, J., & Evmenova, A. S. (2019). The Effectiveness of Professional Development in Overcoming Obstacles to Effective Online Instruction in a College of Education. *Online Learning*, 23(2), 1–20. Retrieved from <https://eric.ed.gov/?id=EJ1218368>
- Bringman-Rodenbarger, L., & Hortsch, M. (2020). How students choose E-learning resources: The importance of ease, familiarity, and convenience. *FASEB BioAdvances*. <https://doi.org/10.1096/fba.2019-00094>
- Brown, J. M., Miller, W. R., & Lawendowski, L. A. (2019). The self-regulation questionnaire. In L. Vande Creek & T.L. Jackson (Eds.), *Innovations in clinical practice: A sourcebook* (pp.281-292). Sarasota, FL: Professional Resource Press/Professional Resource Exchange.
- Carpenter, S. K., Perkins, K., & Gentile, D. A. (2020). Assessing students' use of optional online lecture reviews. *Applied Cognitive Psychology*, 34(2), 318–329. <https://doi.org/10.1002/acp.3618>
- Cheng, L. S., & Lund, J. (2018). Assessment for Learning in Physical Education: The What, Why and How. *Journal of Physical Education, Recreation & Dance*, 89(8), 29–34. <https://doi.org/10.1080/07303084.2018.1503119>
- Choi, H. H., Van Merriënboer, J. J., & Paas, F. (2018). Effects of the physical environment on cognitive load and learning: Towards a new model of cognitive load. *Educational Psychology Review*, 26(2), 225–244. doi:10.1007/ s10648-014-9262-6

- Cleveland, B., & Fisher, K. (2019). The evaluation of physical learning environments: A critical review of the literature. *Learning Environments Research*, 17(1), 1–28. doi:10.1007/s10984-013-9149-3
- Conners, F. A. (2017). Attentional control and the simple view of reading. *Reading and Writing: An Interdisciplinary Journal*, 22, 591–613. <https://doi.org/10.1007/s11145-008-9126-x>
- Diener, C. I., & Dweck, C. S. (2018). An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure. *Journal of Personality and Social Psychology*, 36, 451–462. <https://doi.org/10.1037/0022-3514.36.5.451>.
- Do, J.W. (2020). An investigation of design constraints in the process of converting face-to-face course into online course. *J. Educ. Cult.*, 26, 153–173.
- Duma, M. A. N. (2017). Assessing the Utilization Level of E-Learning Resources among ODL Based Pre-Service Teacher Trainees. *Electronic Journal of E-Learning*, 15(5), 384–394. Retrieved from <https://eric.ed.gov/?id=EJ1157949>
- Edwards, R. (2020). Software and the hidden curriculum in digital education. *Pedagogy, Culture & Society*, 23(2), 265–279.
- Garrison, R. (2018). Theoretical challenges for distance education in the 21st century: A shift from structural to transactional issues. *International Review of Research in Open and Distributed Learning*, 1(1), 1–17.
- Harter, S. (2018). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivational and informational components. *Developmental Psychology*, 17, 300–312. <https://doi.org/10.1037//0012-1649.17.3.300>.
- Hartwig, T. B., del Pozo-Cruz, B., White, R. L., Sanders, T., Kirwan, M., Parker, P. D., Lonsdale, C. (2018). A monitoring system to provide feedback on student physical activity during physical education lessons. *Scandinavian Journal of Medicine & Science in Sports*, 29(9), 1305–1312. <https://doi.org/10.1111/sms.13438>
- Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The Difference Between Emergency Remote Teaching and Online Learning. Retrieved from er.educause.edu website: <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Kim, S.E.; Lee, Y.S.; Lee, J.Y. (2020) Differences in causes of activity limitation by sex and age. *J. Men's Health* 16, e18–e26.
- Kohn, H. (2019, October 30). Physical Activity, Fitness, and Physical Education: Effects on Academic Performance. Retrieved from Nih.gov website: <https://www.ncbi.nlm.nih.gov/books/NBK201501/>
- Kuzmina, M.V. & Lazareva, S.E. (2017). Problems of physical education in the educational institution and some ways of their solution. Acute problems and prospects of sports education in higher education institutions. Proceedings of the international scientific-practical conference. Volgograd, 35–37
- Laatikainen, T. E., Broberg, A., & Kytä, M. (2017). The physical environment of positive places: Exploring differences between age groups. *Preventive Medicine*, 95, S85–S91. <https://doi.org/10.1016/j.ypmed.2016.11.015>
- Lazarus, R. (2019). Emotion and adaptation. Oxford, UK: Oxford University Press.
- Lebeničnik, M., Pitt, I., & Starčič, A. (2019). Use of Online Learning Resources in the Development of Learning Environments at the Intersection of Formal and Informal Learning: The Student as Autonomous Designer. 5. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1128946.pdf>
- MacIntyre, P. D., & Vincze, L. (2017). Positive and negative emotions underlie motivation for L2 learning. *Studies in Second Language Learning and Teaching*, 7(1), 61–88. doi:10.14746/ssl.2017.7.1.4
- McTighe, S. T., Lyman, D. A. (2018). Guided design in environmental education. *Engineering Education*, 62, 907–908.
- Mene, C. (2018). Using just-in-time education to enhance the outcomes of care. In V. K. Saba (Ed.), *Nursing informatics 2000: One step beyond: The evolution of technology and nursing* (pp. 88–95). Auckland, New Zealand: Adis International.

- Mercier, K., Centeio, E., Garn, A., Erwin, H., Marttinen, R., & Foley, J. (2021). Physical Education Teachers' Experiences With Remote Instruction During the Initial Phase of the COVID-19 Pandemic. *Journal of Teaching in Physical Education*, 40(2), 337–342. <https://doi.org/10.1123/jtpe.2020-0272>
- Millis, R. (2018). Strategic note-taking for inclusive middle school science classrooms. *Remedial and Special Education*, 34(2), 78-90. Retrieved from: <https://doi-org.pearl.stkate.edu/10.1177/0741932511410862>
- Nikolic, S. (2018). Understanding How Students Use and Appreciate Online Resources in the Teaching Laboratory. *International Journal of Online and Biomedical Engineering (IJOE)*, 11(4), 8–13. Retrieved from <https://online-journals.org/index.php/i-joe/article/view/4562/0>
- Park, S.U.; Ahn, H.; So, W. Y. (2020) Developing a model of health behavior intentions and actual health behaviors of Korean male university students. *J. Men's Health* 16, e1–e9.
- Priego, A. (2020, April 3). Remote vs. Online Instruction. Retrieved from Instructional Resources website: <https://blog.citl.mun.ca/instructionalresources/remote-vs-online-instruction/>
- Richards, D. (2021). Remote Instruction. Retrieved July 7, 2021, from www.canyons.edu website: <https://www.canyons.edu/academics/onlineeducation/remotetraining.php>
- Rogers-Shaw, C., Carr-Chellman, D. J., & Choi, J. (2017). Universal Design for Learning: Guidelines for Accessible Online Instruction. *Adult Learning*, 29(1), 20–31. <https://doi.org/10.1177/1045159517735530>
- Sato, T., & Haegele, J. A. (2017). Physical educators' engagement in online adapted physical education graduate professional development. *Professional Development in Education*, 44(2), 272–286. <https://doi.org/10.1080/19415257.2017.1288651>
- Shadiev, R., Hwang, W. Y., & Liu, T. Y. (2018). A study of the use of wearable devices for healthy and enjoyable English as a Foreign language learning in authentic contexts. *Journal of Educational Technology & Society*, 21(4), 217–231.
- Smith, R. (2020). Online Instruction Definition and Meaning. Retrieved from Top Hat website: <https://tophat.com/glossary/o/online-instruction/>
- The Swedish Schools Inspectorate (2018). Physical Education Quality Report in Years, 7–9, [Kvalitetsgranskning av ämnet idrott och hälsa i årskurs 7-9]. Retrieved from Stockholm: <https://www.skolinspektionen.se/idrott-och-halsa>
- Tudor, L., Kyaw, B. M., Dunleavy, G., Smart, N. A., Semwal, M., Rotgans, J. I., Campbell, J. (2019). Digital Problem-Based Learning in Health Professions: Systematic Review and Meta-Analysis by the Digital Health Education Collaboration. *Journal of Medical Internet Research*, 21(2), e12945. <https://doi.org/10.2196/12945>
- Uher, I., Cimboláková, I., & Pivovarník, J. (2017). Physical activity and health. *Sport and Tourism Central European Scientific Journal*, 15(3), 67–74. PMID:25830559
- Vangrieken, K.; Meredith, C.; Packer, T.; Kyndt, E. (2017). Teacher communities as a context for professional development: A systematic review. *Teach. Teach. Educ.* 61, 47–59.
- Yang, J., Yu, H., & Chen, N. (2019). Using blended synchronous classroom approach to promote learning performance in rural area. *Computers & Education*, 141, 103619. <https://doi.org/10.1016/j.compedu.2019.103619>
- Yoon, K.J., Lee, G.S., Lee, C.H. (2018). A case study of using an online cafe in a physical education teacher learning community. *Korean J. Sport Pedagog.* 25, 21–40.