

The Effectiveness of Online Learning on Motivation to Learn Physical Education: Evidence from East Lombok Junior High Schools

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Abstract

This study investigated the effectiveness of online learning on students' learning motivation in Physical Education, Sports, and Health (PJOK) among eighth-grade students at SMP Islam NW Gayu during the COVID-19 pandemic. Employing a quantitative case study design, data were collected through validated questionnaires based on the Academic Motivation Scale (AMS), semi-structured interviews, and documentation. The sample consisted of 25 students with access to digital devices, selected purposively from a population of 48. Descriptive statistical analysis was used to determine the effectiveness levels of intrinsic and extrinsic motivation indicators. Results showed that online learning was moderately effective (52%) in sustaining students' motivation, with extrinsic motivation (56%) higher than intrinsic motivation (48%). Family support, teacher feedback, and peer interaction were identified as the main drivers of engagement. However, limited autonomy, technological barriers, and reduced social connectedness hindered intrinsic motivation and active participation. Emotional comfort and competence-related factors, such as self-efficacy in using digital tools, also influenced students' engagement. The findings align with Self-Determination Theory (SDT), suggesting that online physical education can foster learning motivation when autonomy, competence, and relatedness needs are fulfilled. Integrating hybrid learning, autonomy-supportive pedagogy, and continuous teacher development is recommended to enhance motivation and engagement in future online and blended PE programs.

Keywords: Online Learning, Physical Education, Learning Motivation.

Abstrak

Studi ini menyelidiki efektivitas pembelajaran daring terhadap motivasi belajar siswa dalam Pendidikan Jasmani, Olahraga, dan Kesehatan (PJOK) di antara siswa kelas delapan di SMP Islam NW Gayu selama pandemi COVID-19. Dengan menggunakan desain studi kasus kuantitatif, data dikumpulkan melalui kuesioner yang divalidasi berdasarkan Skala Motivasi Akademik (AMS), wawancara semi-terstruktur, dan dokumentasi. Sampel terdiri dari 25 siswa dengan akses ke perangkat digital, dipilih secara sengaja dari populasi 48. Analisis statistik deskriptif digunakan untuk menentukan tingkat efektivitas indikator motivasi intrinsik dan ekstrinsik. Hasil penelitian menunjukkan bahwa pembelajaran daring cukup efektif (52%) dalam mempertahankan motivasi siswa, dengan motivasi ekstrinsik (56%) lebih tinggi daripada motivasi intrinsik (48%). Dukungan keluarga, umpan balik guru, dan interaksi teman sebaya diidentifikasi sebagai pendorong utama keterlibatan. Namun, otonomi yang terbatas, hambatan teknologi, dan berkurangnya keterhubungan sosial menghambat motivasi intrinsik dan partisipasi aktif. Kenyamanan emosional dan faktor-faktor terkait kompetensi, seperti efikasi diri dalam menggunakan perangkat digital, juga memengaruhi keterlibatan siswa. Temuan ini sejalan dengan Self-Determination Theory (SDT), yang menunjukkan bahwa pendidikan jasmani daring dapat menumbuhkan motivasi belajar ketika kebutuhan otonomi, kompetensi, dan keterkaitan terpenuhi. Integrasi pembelajaran hibrida, pedagogi yang mendukung otonomi, dan pengembangan guru berkelanjutan direkomendasikan untuk meningkatkan motivasi dan keterlibatan dalam program pendidikan jasmani daring dan campuran di masa mendatang.

Kata Kunci: Pembelajaran Daring, Pendidikan Jasmani, Motivasi Belajar.

INTRODUCTION

The development of digital technology in the last decade has changed the educational

landscape globally, including the fields of physical education, sports, and health (PJOK). This transformation has been further accelerated by the COVID-19 pandemic, which demands a shift from face-to-face learning to online learning. During the pandemic, online learning has become the main solution to maintain the sustainability of the education process, but its implementation in the context of PJOK shows complex dynamics. On the one hand, online learning offers flexibility and accessibility; on the other hand, challenges arise related to decreased learning motivation, limited technological facilities, and decreased social interaction between students (Mu'arifin et al., 2022). In the context of physical education, these limitations are even more significant because these subjects require physical activity, direct guidance, and real-time feedback that are difficult to accommodate through online systems.

Learning motivation, as a key psychological factor that influences student engagement and success, is one of the aspects most affected by online learning. Based on the theory of Self-Determination (SDT), three basic psychological needs, namely autonomy, competence, and social connectedness, determine the level of intrinsic motivation of students (Hsu et al., 2022). In online learning, the need for autonomy can be met through the flexibility of time and learning methods, but the need for social connectedness and direct feedback is often unmet. This poses a risk of reduced intrinsic motivation and increased learning boredom (Mu'arifin et al., 2022). On the other hand, recent research shows that the integration between online and face-to-face learning (blended learning) can maintain students' autonomy, competence, and social connectedness in a more balanced manner (Fernández et al., 2021). Thus, the dynamics of the effectiveness of online learning on PJOK learning motivation need to be studied more deeply, especially in the context of junior high schools in areas with limited resources such as NW Gayu Islamic Junior High School.

Although the flexibility of time and space is an advantage of online learning, various studies show that students' motivation to learn tends to decline when the needs of autonomy, competence, and social connectedness are not met as stated by the Self-Determination Theory (Rahman et al., 2021). This challenge is more visible in schools in rural areas that face limited devices, internet access, and digital literacy (Gedvilienė et al., 2023; S. Hudson et al., 2022). These conditions have direct implications for student participation in synchronous learning, opportunities to obtain feedback, and meaningful learning experiences in PJOK subjects.

In addition, teacher readiness is a challenge. PJOK teachers need digital pedagogic skills to design, deliver, and evaluate online-based learning (Aguirre et al., 2022). This low readiness can reduce instructional effectiveness and cause a decrease in student motivation. Therefore, the common solution suggested by various studies is the implementation of blended learning strategies that combine limited face-to-face interaction with online activities, as well as improving teachers' digital competencies through virtual training and mentoring (S. Hudson et al., 2022; Tian et al., 2023). This approach is believed to be able to maintain student engagement and minimize access gaps between regions.

Several recent studies have shown that the effectiveness of online learning in PJOK can be improved through instructional design that considers the psychological and social aspects of students. According to Montilla et al. (2023), the application of pedagogies that support student autonomy such as providing activity choices, providing personalized feedback, and encouraging self-reflection has been shown to increase intrinsic motivation. In addition, the integration of gamification elements and real-time feedback based on Flow theory can trigger optimal conditions between challenges and abilities, thereby increasing student engagement in depth (Jo & Hwang, 2024). In rural contexts, the use of video-based media and lightweight applications such as WhatsApp or Google Classroom has been proven effective in maintaining the continuity of physical learning and communication between teachers and students (Whalley & Barbour, 2020).

Technology-based approaches such as Online Learning Literacy for PE Teachers (OLLPET) have also begun to be developed to improve the digital literacy of PJOK teachers

(Gedvilienė et al., 2023). This initiative emphasizes the importance of teachers' ability to use digital media, manage student activity data, and provide personalized guidance online. On the other hand, parental and community involvement is an important factor that strengthens the effectiveness of online learning, particularly in supporting a conducive learning environment at home (Vilchez et al., 2021). This support helps students maintain a learning routine and self-discipline, two important aspects of maintaining motivation to learn.

In addition, Control-Value and constructivist theories highlight the importance of task values and students' perception of control over learning activities as a key determinant of motivation (Sarfraz et al., 2022; Zeng et al., 2023). In the context of online PJOK, teachers are expected to be able to create meaningful, contextual, and challenging activities so that students feel in control of their learning process. Student involvement in the design of daily physical activities as well as self-reflection-based evaluations has also been shown to increase students' emotional and cognitive engagement with learning (Bureau et al., 2021; Chen et al., 2023). Thus, the effectiveness of online learning is determined not only by the technological infrastructure but also by the quality of instructional design and social support received by students.

Research in Indonesia on the effectiveness of online learning in PJOK subjects during the pandemic is still limited to descriptive aspects. Most studies highlight access and infrastructure constraints, but not many have empirically examined the relationship between the effectiveness of online learning and students' intrinsic and extrinsic motivations separately. In addition, although SDT and Flow theories have been widely used to explain motivation in the general context of online learning, their specific application in physical learning in junior high schools in rural areas is still minimal (Hsu et al., 2022; Mu'arifin et al., 2022). International studies also confirm that the success of online learning in the context of physical education is strongly influenced by socio-cultural factors and family support, but local research that systematically explores these dimensions is still rare (Broto & Sudardiyono, 2022; Laar et al., 2021).

Several recent studies emphasize that online learning motivation is not only influenced by technology, but also by social support and instructional design. Family support, teacher feedback, and peer interaction have been shown to increase extrinsic motivation (Lewis et al., 2023; Mertasari et al., 2023), while activity choice-based approaches and self-reflection can strengthen intrinsic motivation (Montilla et al., 2023). However, research in the context of PJOK at the junior high school level in rural Indonesia is still limited, especially in distinguishing the effects of online learning on students' intrinsic and extrinsic motivations empirically. Furthermore, several recent studies have identified the potential for the implementation of blended learning and virtual mentoring as adaptive strategies in resource-constrained areas (S. Hudson et al., 2022; Madzore, 2025). However, there is still a gap between this theoretical potential and practical application in the field, especially in the context of junior high schools in rural areas such as East Lombok.

Based on these gaps, the main purpose of this study is to analyze the effectiveness of online learning on students' learning motivation in the subject of Physical Education, Sports, and Health (PJOK) in grade VIII students of SMP Islam NW Gayu. This study aims to identify the level of effectiveness of online learning on the intrinsic and extrinsic motivation dimensions, as well as the supporting and inhibiting factors that influence it. The novelty of this research lies in its focus on rural schools with limited resources, the use of separate motivation indicators between intrinsic and extrinsic motivations, and the integration of SDT, Flow, and Control-Value theories to explain motivation dynamics in online PJOK learning. This research makes a relevant empirical contribution to the development of digital-based physical learning strategies that are more contextual and inclusive.

Conceptually, this research also provides an empirical basis to support the development of inclusive and contextual technology-based education policies. The scope of the study includes students of SMP Islam NW Gayu as a representation of junior high schools in areas with limited

resources, with a quantitative approach that utilizes questionnaire, interview, and documentation instruments. The results of the research are expected to be a practical reference for PJOK teachers in designing online learning strategies that are more effective and adaptive to student conditions. Theoretically, these findings also contribute to the development of the academic literature on the relationship between the effectiveness of online learning and learning motivation in physical education, particularly in the context of secondary education in developing countries (Gedvilienė et al., 2023; Hudson et al., 2025; Tolentino et al., 2024).

METHOD

Design and Research Approach

This study uses a quantitative approach with a case study design to examine the effectiveness of online learning on students' learning motivation in Physical Education, Sports, and Health (PJOK) subjects. The quantitative approach was chosen because it allows for objective measurement of learning motivation using standardized instruments and robust statistical validation (Rochmawati et al., 2021). The main materials of the research include a Google Form-based online questionnaire tool, semi-structured interview sheets, as well as supporting documents such as student attendance lists and records of online learning activities used for data triangulation.

The main instrument of the research is the Academic Motivation Scale (AMS) which consists of 28 statements with a five-point Likert scale. This scale has been shown to have high construct validity and reliability ($\alpha > 0.80$) in various online learning contexts (Rochmawati et al., 2021). In this study, several AMS items were adjusted to be relevant to the characteristics of physical activity in PJOK.

Research Subject

The research population includes all grade VIII students of SMP Islam NW Gayu for the 2022 school year, which totals 48 students (21 males and 27 females). Based on the conditions of access to online learning facilities, only 25 students (52%) have digital devices in the form of Android-based smartphones. Therefore, the sampling technique is carried out by purposive sampling, which is the selection of samples based on certain considerations that are in accordance with the research objectives (Sugiyono, 2021). The sample selection criteria include (1) students who have digital devices to access online learning; (2) students who actively attend online classes during the research period; and (3) students who are willing to become respondents through filling out questionnaires directly. This approach ensures that the data collected comes from participants who have real experience in participating in online PJOK learning.

Research Instruments

The main instrument in this study is a questionnaire (closed questionnaire) which is used to measure students' perception of the effectiveness of online learning and their level of motivation to learn. Each statement item is arranged on a Likert scale with five alternative answers, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). As a basis for measuring learning motivation in the context of online learning, this study adapts the items of the Academic Motivation Scale (AMS) developed by Vallerand and has been validated in various online education contexts. The AMS is a 28-point instrument with strong evidence of validity and reliability through confirmatory factor (CFA) and internal reliability analysis (Cronbach's Alpha) (Rochmawati et al., 2021). This instrument was chosen because it is proven to measure the three main dimensions of intrinsic, extrinsic, and amotivational motivation.

As a complement, specific indicators of extrinsic motivation such as family support, teacher feedback, and peer interaction are also included based on the latest research constructs (Mertasari et al., 2023; Lewis et al., 2023). For the specific context of PJOK online learning, the instrument items are adjusted to be relevant to physical activities, involvement in practicum assignments, and the comfort of learning in a home environment. Before use, the instrument was tested for feasibility through a content validity test involving two physical education experts and one educational

psychologist. Next, an internal reliability test was carried out using Cronbach's Alpha coefficient, and the results showed a $\alpha >$ value of 0.80 which indicated high internal consistency (Hair et al., 2021).

Experimental Set-up

The research was carried out at NW Gayu Islamic Junior High School, East Lombok, from April to June 2022, during the COVID-19 pandemic where the entire teaching and learning process was carried out online. The learning system implemented is asynchronous and synchronous by utilizing WhatsApp Group, Zoom Meeting, and Google Classroom as the main media. This model reflects the common practice of blended CSPAP-based delivery, which is the integration between online learning and self-paced physical activity monitored virtually (Apriyanto & S, 2021; Webster et al., 2021).

Data collection is carried out in three stages:

- Early stage: collection of demographic data and student technological readiness through teacher interviews and initial surveys.
- The main stage: filling out an online AMS questionnaire to measure learning motivation, supplemented by documentation of online learning activities (instruction videos, activity reports, and teacher feedback).
- Final stage: brief interviews with PJOK teachers and several students to obtain qualitative confirmation of quantitative results.

In addition, an autonomy-supportive pedagogy strategy is applied in the analysis to associate learning effectiveness with teacher teaching practices that foster student autonomy (Martini et al., 2023). This approach integrates the theory of Self-Determination (Ryan & Deci, 2000) to understand the dynamics between instructional effectiveness and learning motivation.

Statistical Analysis

The data analysis in this study uses descriptive statistics in the form of data reduction, tabulation, and percentages to assess the effectiveness of online learning as well as the dimensions of intrinsic and extrinsic motivation of students. The use of descriptive analysis was chosen because the purpose of the study focused on mapping the level of effectiveness and not on testing relationships or differences between groups. With a relatively small sample ($n = 25$) and variables that are categorical-interpretive (effective–ineffective), descriptive analysis is considered adequate and in accordance with the case study design.

In addition, advanced inferential analysis was not carried out because the study did not aim to build statistical generalizations, but rather to provide a contextual empirical picture of student motivation in the online learning environment in rural schools. The feasibility of percentage interpretation is supported by the guidelines of descriptive percentage analysis in educational research.

RESULTS AND DISCUSSION

The data were analyzed using descriptive statistics with percentage-based interpretation. The findings of the study are divided into several subsections related to intrinsic and extrinsic motivation indicators, as well as the contextual dimension of student learning motivation.

General Effectiveness of Online Learning

The overall effectiveness of online learning on student motivation at PJOK was measured by combining responses from motivation-related questionnaires.

Table 2. Overall Perception of the Effectiveness of Online Learning on Motivation

| Response Category | Frequency (n) | Percentage (%) | Effectiveness Classification |
|--------------------|---------------|----------------|------------------------------|
| Yes (Effective) | 13 | 52% | Moderately Effective |
| No (Not Effective) | 12 | 48% | — |

The results showed that 52% of students rated online learning as quite effective. This interpretation not only shows moderate positive perceptions but also reflects that almost half of the respondents did not feel significant benefits. This indicates the variability of students' experiences and leads to the need to assess the driving and inhibiting factors more separately to understand the causes of the imbalance. This is in line with Vilchez et al. (2021) and Broto & Sudardiyono (2022), who emphasize that family and school leadership support shapes perceptions of online sports success, while parental skepticism and lack of access often reduce perceptions of effectiveness.

Although the study did not use correlation tests due to the limitations of the design and sample size, the pattern of percentage differences between intrinsic and extrinsic motivations provides an early indication of relationship tendencies, which are then interpreted based on theories and supporting qualitative data.

Extrinsic Motivation

Extrinsic motivation is assessed through indicators such as family support, teacher feedback, and peer interaction.

Table 3. The Effectiveness of Online Learning on Extrinsic Motivation Indicators

| Response Category | Frequency (n) | Percentage (%) | Interpretation |
|-------------------|---------------|----------------|----------------------|
| Yes | 14 | 56% | Moderately Effective |
| No | 11 | 44% | — |

The majority (56%) of students report that extrinsic factors such as encouragement from teachers and family increase their motivation to participate. This percentage is higher than intrinsic motivation, indicating that students' motivation to learn during online learning is more driven by external factors than internal motivations. This difference reinforces previous findings that online learning tends to increase reliance on social support to maintain student engagement. This is in line with the findings of Mertasari et al. (2023) and Lewis et al. (2023), who found that parental validation and teacher feedback have a positive effect on student motivation in online learning. Similarly, He et al. (2023) and Wei-qin et al. (2022) note that teacher feedback acts as a reinforcement mechanism, which creates conditions that are considered successful. Interaction between friends through collaborative tasks and online discussion groups also strengthens external motivation (Erbilgin et al., 2023; Tang et al., 2021).

Intrinsic Motivation

Intrinsic motivation driven by internal interests, self-determination, and pleasure is evaluated through students' attitudes towards self-directed online learning.

Table 4. Intrinsic Motivation for Online Learning in Physical Education

| Response Category | Frequency (n) | Percentage (%) | Interpretation |
|-------------------|---------------|----------------|----------------------|
| Yes | 12 | 48% | Moderately Effective |
| No | 13 | 52% | — |

The student's intrinsic motivation level reached 48%, indicating moderate enthusiasm and internal involvement. This low number shows that online learning has not succeeded in creating meaningful learning experiences internally. The mismatch between physical movement-based PJOK activities and screen-based online learning is one of the main causes of low intrinsic interest. According to the Theory of Self-Determination (SDT) (L. Li, 2024; Luo et al., 2021), intrinsic motivation develops rapidly when autonomy, competence, and connectedness are met. However, isolation due to the pandemic limited linkage, leading to a decrease in motivation. A similar pattern is documented by Liu & Kim (2024) and Aditia et al. (2021), who found that online learners need teaching that supports autonomy, structured feedback, and social presence to maintain intrinsic interest.

Motivation Indicators

The analysis of motivational indicators provides a more nuanced understanding of how online learning affects students' engagement, perseverance, and emotional engagement in Physical Education during the COVID-19 regional quarantine. Although the overall results showed moderate effectiveness, a closer examination of specific motivational dimensions such as interests, attention, activities, comfort, perceived needs, and family influence revealed different patterns that reflect the psychological and sociocultural dynamics underlying online education. These indicators capture the multidimensional nature of learning motivation, which includes cognitive focus, emotional attachment, behavioral participation, and contextual support from families and learning environments. By assessing these variables, the study identifies areas where online Physical Education learning has successfully maintained student engagement and where it has faced significant challenges, especially in maintaining attention and active participation amid technological, pedagogical and environmental constraints.

Table 5. Interest and Involvement in Online Physical Education Classes

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 15 | 60% |
| No | 10 | 40% |

The 60% engagement rate indicates moderate enthusiasm but suggests that not all learners find online sports learning interesting. However, this interest is not always directly proportional to active engagement, as evidenced by only 16% of students actively participating (Table 7). These differences suggest that early interest cannot be maintained without effective teaching strategies and consistent teacher interaction. This is in line with Ismail et al. (2023), who note that emotional engagement and comfort directly shape students' attention and perseverance in online learning.

Table 6. Students' Attention During Online Learning

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 4 | 16% |
| No | 21 | 84% |

Attention levels are very low (16%), indicating significant challenges in maintaining online focus. These findings are a strong indicator that the structure of online learning has not been able to withstand the duration of students' focus, especially on subjects that require physical demonstration. This is also a critical reason why intrinsic motivation does not develop. A similar decline in attention engagement was observed in Clabaugh et al. (2021), where anxiety due to the pandemic and environmental disturbances reduced concentration and continuity.

Table 7. Student Participation in Online Learning Activities

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 4 | 16% |
| No | 21 | 84% |

Participation reflects the outcome of attention. Only 16% of students are actively engaged, likely due to limited resources and teacher interaction. Low participation reinforces the interpretation that although extrinsic motivation is quite high, behavioral engagement does not arise without adequate technological support and intensive feedback. Hudson et al. (2025) emphasize that

teacher attendance and structured feedback are essential in encouraging online engagement.

Table 8. Student Comfort Level During Online Learning

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 12 | 48% |
| No | 13 | 52% |

The comfort level of 48% indicates a diverse experience with learning conditions at home. Marcus et al. (2021) and Wu & Yu (2022) assert that emotional comfort predicts persistence and engagement in online contexts.

Tabel 9. Perception Of the Need and Relevance of Online Learning

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 23 | 92% |
| No | 2 | 8% |

The positive response of 92% underlined that students are aware of the importance of online learning during COVID-19, despite operational bottlenecks. This high number is an affirmation that students understand the urgency of online learning during the pandemic, but this urgency does not necessarily trigger an increase in intrinsic motivation or participation. This is in line with the findings of Laar et al. (2021), who reported that the perceived need can reduce negative attitudes towards online learning.

Table 10. Perception Of the Need and Relevance of Online Learning

| Response Category | Frequency (n) | Percentage (%) |
|-------------------|---------------|----------------|
| Yes | 20 | 80% |
| No | 5 | 20% |

The high approval rate, which is 80%, indicates that family involvement is a decisive motivating factor. The analysis showed that family support variables were closer to extrinsic than intrinsic motivation, so their impact was seen on the perception of general effectiveness but not on deep engagement, confirming the findings of Mertasari et al. (2023) and Akram & Li (2024), who found that social validation at home is essential for maintaining motivation in online education.

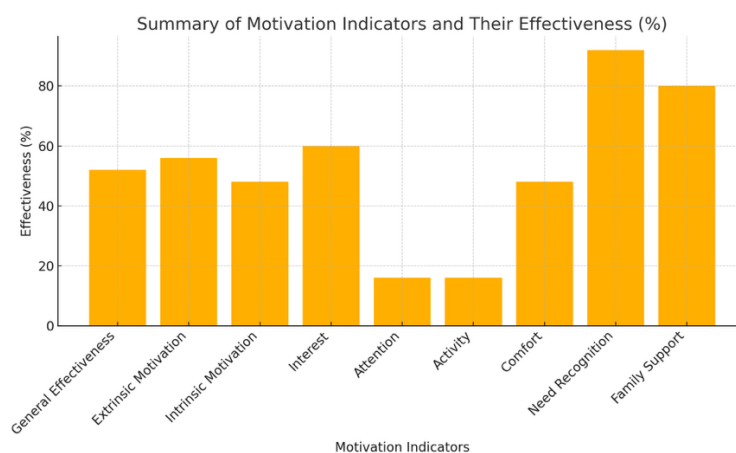


Figure 1. Summary of indicators related to motivation and effectiveness

The study found that online learning in physical education was quite effective in maintaining student motivation, with strong external (extrinsic) drives but weak internal (intrinsic) drives and attention involvement. External reinforcement through family and teacher support significantly affects motivation, consistent with Mertasari et al. (2023) and Akram & Li (2024). However, intrinsic motivation and sustained attention remain low due to limited interactivity and social connectedness, in line with Gazit (2023) and Jing et al. (2025). Socioeconomic constraints, as observed in Laar et al. (2021) and Mukhtar et al. (2020), exacerbate the problem by restricting access to devices and stable connections. Furthermore, teacher readiness and digital literacy gap (Irfan & Raheem, 2023; Naciri et al., 2021) limits the quality of pedagogy. Overall, these results emphasize that while online learning was a functional necessity during the COVID-19 lockdown, the effectiveness of motivation relied heavily on social, emotional, and technological support, not just instructional content.

This study examines the effectiveness of online learning on student learning motivation in Physical Education, Sports, and Health (PJOK) subjects during the COVID-19 pandemic. The results showed that online learning had a moderate effectiveness on students' learning motivation, both intrinsic and extrinsic. In general, the effectiveness of motivation is in the range of 48–56%, indicating that although online learning serves as an alternative solution during physical restrictions, its success is still limited by contextual and psychosocial factors. The main rationale behind these results lies in the socio-cultural conditions and technological readiness in the student environment. Most students face device and internet access constraints, which hinder active participation and fulfillment of practical and physical learning needs, especially in the context of PJOK. These findings show that online learning is not solely about the availability of technology, but how social systems, family support, and school climate play a role in facilitating learning motivation.

Extrinsic motivation in this study is seen to be relatively higher than intrinsic motivation. This shows that external support both from teachers, parents, and peers is still the main motor for the sustainability of online student learning activities. Family support, in the form of attention and supervision, contributes positively to student engagement. Meanwhile, intrinsic motivation that reflects a desire to learn due to internal impulses (curiosity, pleasure in learning, and personal autonomy) is still low. This condition shows that online learning is not yet fully able to create meaningful and autonomous learning experiences, especially in the context of physical activities that require direct interaction.

Rationally, this imbalance between intrinsic and extrinsic motivations can be explained through three aspects. First, the accessibility aspect, where digital inequality limits an equal learning experience for all students. Second, the pedagogical aspect, namely the limitations of teachers in designing interactive and relevant PJOK activities in online spaces. Third, the social-emotional aspect, namely the lack of social connectivity between students and between students and teachers, which has implications for a low sense of relatedness and engagement. These three aspects show that the effectiveness of online learning cannot be measured solely by the availability of platforms or devices, but also by how the online learning experience is managed in a human, contextual, and adaptive manner to the characteristics of the learner.

The findings of this study are strongly consistent with recent studies examining learning motivation in the context of online physical education. Vilchez et al. (2021) and Broto & Sudardiyono (2022) reported that the success of online learning in the field of PJOK is largely determined by the support of family, community, and school leadership. When such support is weak, for example due to limited facilities or parental skepticism of the effectiveness of online learning, students' motivation to learn tends to decrease. Similar findings were also obtained by Laar et al. (2021) and Mukhtar et al. (2020), who found that socio-economic disparities and home environmental conditions were the main obstacles to students' active participation.

However, there are studies that show a certain contrast. Gazit (2023) and Jing et al. (2025) show that when teachers provide emotional support and adaptive feedback, online learning can

foster high motivation and belonging in students. This emphasizes that technological limitations are not completely a barrier if the interpersonal relationship between teachers and students can be managed properly in a virtual space. In other words, in a stressful situation like a pandemic, the quality of human interaction becomes a factor that neutralizes technical barriers. This research is also consistent with the findings of Mertasari et al. (2023) and Lewis et al. (2023) who affirm that the relationship between family support and teachers plays an important role in maintaining extrinsic motivation during online learning. Validation and expectations from the home environment provide a psychological boost that helps students stay engaged, even if their intrinsic engagement declines. In this case, extrinsic motivation serves as a compensator for the loss of direct interaction in the classroom.

This data is in line with the findings of Clabaugh et al. (2021) who stated that stress and anxiety during online learning can decrease student attention and engagement. Wu & Yu (2022) added that positive emotions such as pleasure and pride increase engagement, while negative emotions decrease it significantly. Therefore, increasing motivation to learn online is not enough with cognitive strategies alone, but requires a comprehensive emotional and social approach.

In terms of pedagogical innovation, various cutting-edge studies support the results of this research and offer an approach to overcome the weaknesses of PJOK's online learning. Chen et al. (2023) show that blended learning, a combination of online and face-to-face learning, can strengthen motivation, especially by providing opportunities for students to experience meaningful physical interactions. This model has also been shown to increase autonomy, competence, and relatedness, the three main components in Self-Determination Theory. Furthermore, Frikha et al. (2024) and Tilga et al. (2021) emphasized that learning designs that support student autonomy through meaningful assignments and independent choices can increase intrinsic motivation and academic achievement.

In another dimension, Sağın et al. (2025) and Escriva-Boulley et al. (2021) highlight the importance of constructive feedback and a supportive classroom climate as determinants of sustained learning motivation. Quick and positive feedback from teachers not only strengthens extrinsic motivation but also fosters a sense of competence in students. Contradictions arise in the aspects of gamification use and reward systems. Pozo-Sánchez et al. (2020) and Teke & Sever (2023) found that game elements such as points, badges, or leaderboards can increase participation and learning pleasure, but overuse lowers intrinsic motivation due to the overjustification effect.

Furthermore, in the long term, online learning that is not balanced with a blended and collaborative approach can negatively impact students' physical and social development. Yang et al. (2021) found that unsupervised online physical activity tends to decrease the quality of students' movement and physical fitness. In contrast, a hybrid learning model that combines field practice with online reflection results in improved fitness, motivation, and social skills. Thus, the effectiveness of PJOK online learning can only be achieved if it is accompanied by a pedagogical strategy that pays attention to the physical, cognitive, and emotional dimensions simultaneously.

Theoretically, the findings of this study can be explained through the SDT proposed by (Ryan & Deci, 2000) and strengthened by the results of contemporary research such as Li et al. (2022) and Luo et al. (2021). SDT states that human motivation develops optimally when three basic psychological needs are met, namely autonomy, competence, and relatedness. In the context of PJOK online learning, these three aspects interact with each other to determine the quality of student motivation.

First, the autonomy aspect. In this study, students tended to have less space to manage their own learning process, especially in physical activities that require direct instruction from the teacher. The absence of freedom to choose and regulate physical activities has implications for low intrinsic motivation. The study of Frikha et al. (2024) and Tilga et al. (2021) proves that learning that provides autonomy through task choices and timing increases the sense of ownership of the learning process. Therefore, online PJOK learning should be designed with an autonomy-supportive

design approach, which gives students space for exploration and control over their own activities.

Second, the competence aspect. Research shows that students who receive quick and specific feedback feel more confident in their abilities. This is in line with the findings of Sağın et al. (2025) who show that a learning climate that provides recognition and positive feedback increases a sense of competence and satisfaction in learning. In the context of online PJOK, the use of real-time physiological feedback, such as heart rate monitoring or step tracking (Stöckel & Grimm, 2021), has been shown to strengthen feelings of competence and enrich students' learning experiences.

Third, the aspect of relatability or social connectedness. In online learning, social relationships tend to weaken due to limited direct interaction. However, the studies of Mertasari et al. (2023) and Akram & Li (2024) emphasize that social support from family, teachers, and peers can replace most of these interconnectedness functions. When students feel accepted and supported by their environment, they are better able to maintain motivation even in remote learning situations.

In addition to SDT, the ARCS Model (Attention, Relevance, Confidence, Satisfaction) framework also supports the interpretation of the results of this study. This model was developed by Keller to explain how instructional design can motivate learners through four main components. In the context of the research results that have been carried out, the Attention and Relevance aspects show weak results, in line with the low attention and activity of students. In contrast, Confidence and Satisfaction are mostly earned through external support and the meaning of the task assigned. Research by Teke & Sever (2023) and Katanosaka et al. (2023) shows that the application of ARCS principles in online learning design can increase learning engagement and satisfaction, especially when combined with gamification elements in a balanced manner.

The long-term context of these findings can also be explained through the cognitive-affective engagement theory. According to Lu et al. (2023), in asynchronous learning, cognitive engagement is a direct predictor of students' ongoing intentions, while intrinsic and extrinsic motivational factors influence learning outcomes indirectly through such engagement. This means that online learning that can activate reflective thinking and emotional involvement of students will be more effective in maintaining long-term motivation. Holistically, the research findings reinforce the view that learning motivation in PJOK online learning is the result of dynamic interaction between personal, social, and structural factors. Intrinsic motivation gives strength to sustainability and quality of learning, while extrinsic motivation serves as a support in crisis conditions such as pandemics. The integration of the two through an autonomous, collaborative, and emotionally responsive learning design is a prerequisite for the success of physical education in the digital era.

CONCLUSION

This study concludes that online learning in PJOK subjects during the COVID-19 pandemic has moderate effectiveness in maintaining students' learning motivation. Extrinsic motivation has been shown to be more dominant than intrinsic motivation, mainly due to the support of family and teachers. In contrast, intrinsic motivation and student attention and participation remain low due to limited physical interaction, technological barriers, and an inconsistent learning environment. Based on these findings, the effectiveness of online learning in PJOK depends on the balance between social support, learning design that supports autonomy, and the quality of teacher-student interaction. Thus, hybrid learning strategies, improving teachers' digital competencies, and strengthening family involvement are the main recommendations to increase student motivation and engagement in the context of online and blended learning.

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