

Association between Teaching Style in Online Physical Education with Needs Satisfaction, Motivation, Enjoyment, and Intention Physical Activity in Adolescent Students

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Received October 26, 2021; Revised November 25, 2021; Accepted December 10, 2021

Abstract

Background: The style of teaching in physical education classes is very important for students' participation in physical activity. However, the impact of teaching styles in online physical education classes during the COVID-19 pandemic is not well understood. The purpose of the current research was to investigate the associations between teaching style in online physical education with needs satisfaction, motivation, enjoyment, and intention to be physically active in adolescent students. Gender differences were also computed.

Methods: The current study applied a descriptive-correlation approach. The participants were 384 high-school students (192 boys and 192 girls) from Golestan province, Iran in 2020. Data was gathered using standard questionnaires. Correlation test and structural equation modeling were used to examine the associations among variables and Mann-Whitney U test was utilized to examine gender differences.

Results: Descriptive data demonstrated that boys and girls had almost identical age. Results demonstrated that perceived needs support was positively associated with psychological need satisfaction ($T=12.169$), motivation ($T=4.467$), enjoyment ($T=7.257$), and intention ($T=4.657$). Moreover, psychological need satisfaction was associated with motivation ($T=7.019$), enjoyment ($T=5.607$), and intention ($T=4.230$). Furthermore, motivation was associated with enjoyment ($T=6.967$) and intention ($T=7.128$). Finally, enjoyment was associated with intention to physical activity ($T=15.130$).

Conclusion: Perceived needs support is directly associated with motivating students to be physically active during online physical education.

Keywords: Perceived needs support, Basic needs, Motivation, Physical Activity, COVID-19

How to Cite: Salehian MH, Dana A, Neshati A, Hemayattalab A, Mokari Saei S. Association between Teaching Style in Online Physical Education with Needs Satisfaction, Motivation, Enjoyment, and Intention Physical Activity in Adolescent Students. Int. J. School. Health. 2022;9(1):2-8. doi: 10.30476/INTJSH.2022.93768.1197.

1. Introduction

Following the spread of the novel coronavirus disease (COVID-19), online education became popular in schools (1-2). Meanwhile, online education was a big problem for physical educators and parents as they tried to maintain students' regular activities. One of the lessons that faced a bigger challenge in schools was physical education. The nature of the physical education class is to perform physical activities and exercise in gyms or outdoors whereas at the time of coronavirus quarantine these activities were severely restricted and online classes were not able to properly motivate students to engage in physical activities. Research has shown that during the quarantine due to the corona virus, students' physical activity has decreased and their sedentary behaviors has increased (3-8). Several

studies have even revealed that the students' mental health is at risk and reduced physical activity was a key factor in reducing mental health (5, 9).

Physical education class is a very important environment for students to participate in physical activities and sports (10-12). However, online classes at the time of coronavirus quarantine have placed limitations on sports teachers to teach effectively and encourage students to engage in class activities. In the meantime, the teaching style of physical education teachers can be an effective factor in motivating and engaging students in class activities. In fact, research prior to the corona pandemic has demonstrated that teaching style based on satisfying students' psychological needs is a very important factor in increasing students' motivation to engage in physical

activity and sports (13-15). However, this issue has not yet been addressed in online physical education. In this research, we aimed to examine the association between the teaching style based on self-determination in online physical education with needs satisfaction, motivation, enjoyment, and intention to be physically active in adolescent students.

This research was based on the theory of self-determination, one of the most important theories in the field of people's participation in physical activity and sports (16-20). The theory of self-determination proposes three basic psychological needs (autonomy, competence, and relatedness) as facilitators of one's growth, integration, and well-being, if satisfied. Autonomy is a feel to make decisions freely and perform various activities and tasks independently. Competence comprises of a multi-dimensional, dynamic, and interactive concept influencing the ability to perform activities successfully. Relatedness refers to the desire to feel loved, connected to others, and meaningfully involved with the broader social world (16-20).

Several studies have demonstrated that the satisfaction of psychological needs has a positive association with the participation of school-students in physical activity (21-25). Moreover, there were significant positive relationships between the satisfaction of psychological needs with increasing motivation for engagement in physical activity in children and adolescents (25, 26). There are also several intervention studies revealing that self-determination-based exercise interventions enhances motivation and physical activity participations in school-students (21, 27). Moreover, it has been shown that self-determination-based interventions in the physical education context have resulted in higher participation in physical activity (13-15). However, as mentioned earlier, self-determination theory in the context of online physical education has not yet been investigated. Therefore, in this study, we examined the association between teaching based on supporting psychological needs in online physical education with needs satisfaction, motivation, enjoyment, and intention to physical activity in adolescent students. We hypothesized that there are direct associations between supporting psychological needs in online physical education with needs satisfaction, motivation, enjoyment, and intention to physical activity in adolescent students.

2. Methods

This study employed a descriptive-correlation

design. The present study was approved by University Ethical Committee with the Code of IR.IAU.AK.REC.1400.001). The parents and the students gave written consent.

2.1. Participants

The participants were 384 male and female students aged 15 to 17 years (mean age of 15.98 ± 0.60 years) in grades tenth and eleventh from regular high schools of Gonbad Kavous city, Golestan province, Iran, in 2020, who were chosen via convenience sampling method. The specified sample size was selected according to Cochran's Sample Size Formula is as follows (28): n is the sample size; z is the value for the chosen alpha level which we selected to be 1.96 for a 95% confidence level (0.25 in each tail); P is the estimated proportion of an attribute present in the population, which normally is 0.05; q is $1-p$; d is the acceptable margin of error for proportion being estimated, which normally is 0.05; N is the total number of samples which in this study was about 100000 students in high-school in Golestan province in 2020.

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)} = \frac{\frac{1.96^2 \times 0.5 \times 0.5}{0.05^2}}{1 + \frac{1}{100000} \left(\frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} - 1 \right)} = \frac{384.16}{1.00038416} = 384.012 \approx 384$$

2.2. Measures

2.2.1. Perceived Needs Support: Perceived needs support in online physical education class was assessed using a scale with 14 questions (23) scored on a Likert scale from strongly disagree (1) to strongly agree (7). The original scale has good reliability with a Cronbach's alpha coefficient of 0.91 (23). The validity of the Persian version of this scale was confirmed by (11) with a CVI of 1.00 and a CVR of 0.78. Herein, the reliability of this questionnaire was high with Cronbach's alpha coefficient of 0.89.

2.2.2. Psychological Needs Satisfaction: Basic psychological needs satisfaction in online physical education class was measured with the Sport Climate Questionnaire with 11 questions (23) scored on a Likert scale from strongly disagree (1) to strongly agree (7). The original questionnaire has a good reliability with Cronbach's alpha coefficient of 0.89 (23). The Persian

version of this questionnaire has good validity with a CVI of 0.88 and a CVR of 1.00 (12). In the present work, the reliability of this questionnaire was high with Cronbach's alpha coefficient of 0.88.

2.2.3. Motivation: Motivation in online physical education class was assessed using Intrinsic Motivation Scale with four questions (29) scored on a Likert scale from strongly disagree (1) to strongly agree (7). The reliability of its original form was high with Cronbach's alpha coefficient of 0.90 (29). The validity of the Persian version was confirmed in a previous study (11) with a CVI of 0.88 and a CVR of 0.78. Here, the reliability of this questionnaire was high with Cronbach's alpha coefficient of 0.94.

2.2.4. Enjoyment: Enjoyment in online physical education class was measured through a questionnaire (23) involving three questions assessed using a Likert scale from never (1) to always (5). In this study, nine experts confirmed the validity of the Persian version of this questionnaire (CVI=1.00, CVR=1.00). Herein, the Cronbach's alpha coefficient of this questionnaire was 0.85.

2-2-5. Intention to PA: The intention to physical activity was assessed using two questions (23) assessed using a Likert scale from strongly disagree (1) to strongly agree (7). The reliability of its original form was high with Cronbach's alpha coefficient of 0.87 (23). The validity of the Persian version of this questionnaire was confirmed in a past study with a CVI of 1.00 and a CVR of 1.00 (11). Here, the reliability of this questionnaire was high with Cronbach's alpha coefficient of 0.90.

2.3. Data Analysis

Data were analyzed using SPSS version 26 and Lisrel software. Descriptive analysis, including means and standard deviations, was employed to describe the

research variables. The reliability of the questionnaires was calculated with the Cronbach's alpha coefficient. Kolmogorov-Smirnov test was applied to measure the normality of data. Mann-Whitney U test was used to compute gender differences. Spearman correlation test was utilized to calculate the associations among research variables. Structural equation method was employed to examine associations among variables and test the research model. P-value was set at $P < 0.05$.

3. Results

3.1. Sample Description

Mean age of the participants was 15.98 ± 0.60 years. The results of descriptive statistics, including mean and standard deviation of research variables are demonstrated in Table 1. Descriptive results show that in general the level of students' perceptions of supporting basic psychological needs is lower than the average. Similarly, the satisfaction of these needs is below average. Motivation, enjoyment, and intention to be physically active are also low. The results of Kolmogorov-Smirnov tests revealed that all the variables were not normally distributed (basic needs support=0.01, basic needs satisfaction=0.005, motivation=0.009, enjoyment=0.041, intention=0.001). Results of Mann-Whitney U tests showed that there were no significant differences between boys and girls in all the variables of the study.

3.2. Bivariate Associations

Bivariate associations among research variables are exhibited in Table 2. Results showed that there were significant direct associations between perceived needs support with needs satisfaction, motivation, enjoyment, and intention (all $P < 0.05$). Moreover, there were significant direct associations between need satisfactions with motivation, enjoyment, and

Table 1: Median (IQR) of research variables across age and grade

| | 11 th grade boys | 12 th grade boys | 11 th grade girls | 12 th grade girls | Sig. |
|--------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------|
| Age (years old) | 15.00 (2.00) | 16.00 (2.00) | 15.00 (2.00) | 16.00 (2.00) | $P=0.568$ |
| Autonomy Support | 3.50 (2.00) | 3.50 (2.00) | 3.25 (2.00) | 3.25 (1.25) | $P=0.491$ |
| Competence Support | 2.50 (2.00) | 2.50 (1.75) | 2.25 (1.00) | 2.50 (1.25) | $P=0.853$ |
| Relatedness Support | 2.00 (1.25) | 2.00 (1.75) | 2.00 (1.50) | 2.00 (1.50) | $P=0.934$ |
| Autonomy Satisfaction | 3.50 (2.00) | 3.50 (1.75) | 3.75 (2.00) | 3.50 (1.25) | $P=0.749$ |
| Competence Satisfaction | 2.00 (1.50) | 2.00 (1.50) | 2.25 (1.50) | 2.25 (1.50) | $P=0.690$ |
| Relatedness Satisfaction | 1.50 (1.00) | 1.50 (1.25) | 1.50 (1.00) | 1.50 (0.75) | $P=0.904$ |
| Motivation | 2.50 (1.50) | 2.50 (1.50) | 2.50 (1.25) | 2.25 (1.00) | $P=0.604$ |
| Enjoyment | 2.00 (1.00) | 2.00 (1.25) | 2.00 (1.00) | 2.00 (1.25) | $P=0.905$ |
| Intention | 2.00 (1.25) | 2.00 (1.00) | 2.00 (1.75) | 2.00 (1.50) | $P=0.806$ |

Table 2: Results of bivariate associations between research variables

| | Median (IQR) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----------------------------|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---|
| 1. Autonomy Support | 3.25 (2.00) | - | | | | | | | | |
| 2. Competence Support | 2.50 (2.00) | r=0.564 P<0.001 | - | | | | | | | |
| 3. Relatedness Support | 2.00 (1.25) | r=0.439 P<0.001 | r=0.630 P<0.001 | - | | | | | | |
| 4. Autonomy Satisfaction | 3.50 (2.00) | r=0.679 P<0.001 | r=0.517 P<0.001 | r=0.468 P<0.001 | - | | | | | |
| 5. Competence Satisfaction | 2.25 (1.50) | r=0.558 P<0.001 | r=0.358 P<0.001 | r=0.901 P<0.001 | r=0.769 P<0.001 | - | | | | |
| 6. Relatedness Satisfaction | 1.50 (1.00) | r=0.155 P=0.041 | r=0.168 P=0.029 | r=0.293 P=0.009 | r=0.149 P=0.042 | r=0.176 P=0.029 | - | | | |
| 7. Motivation | 2.50 (1.50) | r=0.864 P<0.001 | r=0.640 P<0.001 | r=0.236 P=0.011 | r=0.809 P<0.001 | r=0.734 P<0.001 | r=0.769 P<0.001 | - | | |
| 8. Enjoyment | 2.00 (1.00) | r=0.739 P<0.001 | r=0.693 P<0.001 | r=0.314 P<0.001 | r=0.706 P<0.001 | r=0.690 P<0.001 | r=0.937 P<0.001 | r=0.796 P<0.001 | - | |
| 9. Intention | 2.00 (1.25) | r=0.924 P<0.001 | r=0.672 P<0.001 | r=0.587 P<0.001 | r=0.596 P<0.001 | r=0.571 P<0.001 | r=0.986 P<0.001 | r=0.928 P<0.001 | r=0.907 P<0.001 | - |

Table 3: Results of structural equation modelling

| | Path | β | SE | T-value |
|----|---|---------|-------|---------|
| 1 | Perceived needs support=>psychological needs satisfaction | 0.659 | 0.728 | 12.169 |
| 2 | Perceived needs support=>motivation | 0.269 | 0.192 | 4.467 |
| 3 | Perceived needs support=>enjoyment | 0.564 | 0.439 | 7.257 |
| 4 | Perceived needs support=>intention | 0.279 | 0.198 | 4.657 |
| 5 | Psychological needs satisfaction=>motivation | 0.541 | 0.427 | 7.019 |
| 6 | Psychological needs satisfaction=>enjoyment | 0.439 | 0.284 | 5.607 |
| 7 | Psychological needs satisfaction=>intention | 0.347 | 0.183 | 4.230 |
| 8 | Motivation=>enjoyment | 0.452 | 0.349 | 6.967 |
| 9 | Motivation=>intention | 0.540 | 0.424 | 7.128 |
| 10 | Enjoyment=>intention | 0.709 | 0.890 | 15.130 |

intention (all $P<0.05$). Additionally, we observed direct and significant associations between motivation with enjoyment and intention (all $P<0.05$). Finally, enjoyment was directly and significantly associated with intention ($P<0.001$).

3.3. Results of Structural Equation Modelling

The results of structural equation modelling are portrayed in Table 3 and Figure 1. Results demonstrated that perceived needs support significantly affected needs satisfaction, motivation, enjoyment, and intention (all $T>1.96$). In addition, psychological needs satisfaction significantly affected motivation, enjoyment, and intention ($T>1.96$). Furthermore, motivation significantly influenced enjoyment and intention ($T>1.96$). Lastly, enjoyment had positive effects on intention ($T>1.96$). Results of model fit are illustrated in Table 4, indicating that the research model has good fit.

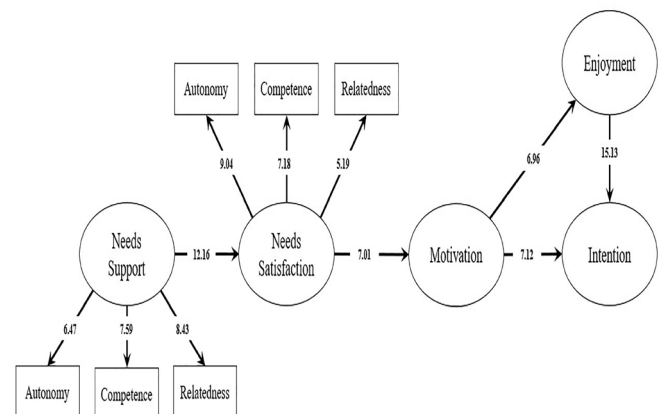


Figure 1: The figure shows the results of structural equation modelling in the form of T-values.

4. Discussion

This study was designed to investigate the associations between psychological needs support in the online physical education class with needs satisfaction,

Table 4: Results of model fit

| Index | Optimal Range | Obtained Value | Conclusion |
|---------------------|---------------|----------------|------------|
| RMSEA | <0.08 | 0.06 | Good fit |
| X ² / df | <3 | 2.59 | Good fit |
| RMR | Closer to 0 | 0.05 | Good fit |
| NFI | >0.9 | 0.95 | Good fit |
| CFI | >0.9 | 0.97 | Good fit |

motivation, enjoyment, and intention in adolescent students. Our results indicated that perceived needs support satisfied psychological needs in the online physical education class and increased the motivation, enjoyment, and intention of the students in the online physical education class. Moreover, motivation and enjoyment created in the online physical education class increased the intention to participate in physical activity and sport. The findings of this study confirmed our hypothesis and are in line with the results of previous studies prior to the COVID-19 pandemic (13-15, 23-27). Motivation is one of the important components for people's participation in physical activity and sports (16-20). According to the findings of the current work, if physical education teachers increase students' motivation in the online physical education class, it could be possible that students be more encouraged to enjoy the class and thus participate in physical activity and sports. In addition, based on our findings, promoting the teaching style based on needs support in the online physical education class results in the students feeling control over their activities and consequently contributes to a sense of competence and satisfaction. These processes in turn leads to autonomous engagement in physical activities in online physical education class and perhaps in the leisure time. Additionally, the absence of motivation in the online physical education class cannot result in positive feelings and competence.

The findings of this study found that the assumptions of the self-determination theory can also be applied to online education. Based on the self-determination theory (16-20), satisfaction of basic psychological needs can lead to the participation of individuals in physical activity and sports through the process of internalization (where behaviors that previously were shaped through external motivations are now manifested by internal sources). Internalization implies that behaviors are not fixed and can be flexible depending on the circumstances to which the person is exposed (16-20). For example, in the case of online physical education class, it can be stated that the emphasis of physical education teachers on a teaching style based on satisfying psychological needs, such as

autonomy, competence, and relatedness can increase students' motivation and intention to participate in physical activity and sport.

Previous studies have demonstrated that physical educators can generate higher motivation and strong persistence on physical activity by presenting guidelines and feedback that concentrate on self-directed learning. Providing the students with the right to choose their exercises in online physical education class can be another influential factor (21, 27). In an online physical education class, the students who understand the supportive behaviors of the teacher begin to internalize physical activity-related behaviors and can therefore increase their intention to participate in physical activity.

Our findings revealed no gender differences regarding perceived needs support, needs satisfaction, motivation, enjoyment, and intention to physical activity. The results are inconsistent with those of previous studies (11-12). A potential explanation behind these findings may be related to structural differences between the conditions of quarantine and that of regular life without quarantine. For example, in the time of regular life without quarantine, there may be socio-cultural limitations for the participation of girls in physical activity and sport inside and outside of school and it may affect their lower participation in physical activity compared with boys (11-12). On the other hand, online education is similar to both genders and presents them with similar opportunities in home. Therefore, lack of gender differences might be due to the similar conditions of online education for them.

The present study has some limitations that should be considered when discussing the results. First, this study employed a cross-sectional design which creates limitations for examining the causal influence of perceived needs support on the intention of adolescents in sport and physical activity. Second, lack of measuring the social-economic status of the students might be other limitation to this study. Future studies should focus on longitudinal measurements with an emphasis on the socio-economic status of students.

5. Conclusion

To summarize, the present study showed that the teaching style of physical education teachers should be based on satisfying the basic psychological needs of students within an online physical education class. This can result in increasing the motivation, enjoyment, and intention to participate in physical activity and sport. These findings may have significant practical implications for physical education teachers. For example, physical education teachers should encourage the perceptions of the students about their psychological needs in online physical education class, consequently making the students experience more control and competence to enhance their engagement in physical activity and sport.

Ethical Approval

Ethics Committee of Islamic Azad University of Aliabad Katoul with the code of IR.IAU.AK.REC.1400.001 approved the research protocol. The participants and their parents gave written informed consent.

Funding Support

The study received no grant from any institution, company or university.

Acknowledgments

We thank all students and their parents.

Conflicts of interest: None declared.

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