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Research Article

Analysis of Gender and Subject Differences in Students' Perceptions of the Quality of Online Physical Education Instruction

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Abstract:

With the development of information technology and the influence of social public events, online education has become an important direction of education reform. Physical education teaching has also shifted from traditional offline classrooms to online platforms, forming a new mode of online physical education teaching. However, compared with offline teaching, online physical education teaching faces many challenges such as time and space separation, lack of practicality, delayed interaction, and difficulty in evaluation, and its teaching quality has been widely concerned. In this context, it is of great significance to explore the influencing factors and differences in the quality of online physical education teaching. Previous studies have focused on online teaching methods, technical support and overall satisfaction, with few analyses of differences based on students' gender and disciplines.
Keywords: Online Physical Education, Teaching Quality, Gender Differences, Discipline Differences

1. Introduction

Gender and subject background may affect students' motivation, self-regulation and course requirements, leading to different perceptions of teaching quality. To fill this research gap, this study systematically examined the differences in the perceived quality of online physical education teaching and related factors among students of different genders and disciplines using independent samples t-test and one-way ANOVA with a sample of undergraduate students, with the aim of providing empirical support for the improvement of teaching quality and the development of targeted teaching strategies.

2. Method

This study is based on questionnaire data on online physical education teaching quality collected from a university. The sample consists of 614 undergraduate students, including 318 males and 296 females, covering various disciplines such as engineering, agriculture, liberal arts, science, medicine, arts, and others (with 98, 84, 95, 100, 103, 107, and 27 students respectively). The questionnaire comprises seven dimensions: perception of online physical education teaching quality (e.g., overall evaluation of teaching effectiveness), teacher competence (professional ability and online teaching skills), student characteristics (learning attitude, self-discipline, etc.), online learning environment (platforms, devices, and technical support), educational content (course content and activity design), family support (family encouragement and resource support), and student learning outcomes (knowledge, skills, and behavioral changes). Data analysis was conducted using IBM SPSS 25 statistical software. For male and female samples, mean and standard deviation calculations were performed, and independent sample t-tests were used to compare mean differences between the two groups. For samples from different disciplines, one-way ANOVA was

conducted, and when the overall effect was significant, the LSD method was employed for post-hoc pairwise comparisons. The significance level was set at $\alpha = 0.05$.

3. Differences in Variables Between Genders

Table 1 presents the differences in scores across various dimensions between male and female students regarding online physical education teaching quality. It can be observed that male and female students show no significant differences ($p > .05$) in teacher competence, student characteristics, online learning environment, and family support. However, significant differences ($p < .05$) are found in perception of teaching quality, educational content, and student learning outcomes, with female students scoring significantly higher than male students. Table 1 presents the analysis of differences in variables by gender, using the independent sample t-test method. There were no significant differences in teacher ability, student characteristics, online learning environment, and family support between different genders ($P>0.05$). However, there were significant differences in the perception of online PE teaching quality, educational content, and student learning outcomes between different genders ($P<0.05$). Male students scored significantly lower than female students in the perception of online PE teaching quality, educational content, and student learning outcomes.**Discipline Differences Analysis**

Table 2 lists the comparison of scores across various dimensions among students from different disciplines. The analysis reveals that significant differences ($p < .05$) exist among students from different disciplines in perception of teaching quality, educational content, and student learning outcomes, while no significant differences were found in teacher competence, student characteristics, online learning environment, and family support. Table 2 presents the results of the discipline differences analysis using one-way ANOVA. No significant differences ($P>0.05$) were found among disciplines in teacher competence, student characteristics, online learning environment, and family support. Significant differences ($P<0.05$) were found in perception of online physical education teaching quality ($F=2.891$, $P<0.01$). Post-hoc comparisons using the LSD method indicated that engineering students scored significantly lower than liberal arts, science, and medicine students in their perception of online physical education teaching quality. Agriculture students scored significantly lower than science and medicine students, and arts students scored significantly lower than science and medicine students. Significant differences ($F=2.802$, $P<0.05$) were also found in educational content, with agriculture students scoring significantly lower than science students and arts students scoring significantly lower than engineering, liberal arts, science, and medicine students. Furthermore, significant differences ($F=2.479$, $P<0.05$) were found in student learning outcomes, with medicine students scoring significantly higher than engineering, agriculture, liberal arts, science, and arts students.

4. Discussions

The research results indicate that female students hold a more positive view of online physical education teaching compared to male students. This may be related to gender differences in learning attitudes and self-regulation abilities. Existing research suggests that in online learning environments caused by the pandemic, female students typically exhibit higher levels of self-discipline and participation. Females are more adept at proactively learning and asking questions in home settings, which may enhance their perception of course content and effectiveness when watching teaching demonstration videos and completing online assignments. In contrast, some male students may rely more on offline interactions and physical practices. The lack of sports facilities and face-to-face demonstrations in online environments may reduce their participation and lead to insufficient perception of learning outcomes. To address this, teachers can incorporate more interactive elements and motivational measures into online physical education course designs, such as group competitions, interactive games, or providing exercise records, to boost male students' participation and engagement.

Regarding disciplinary differences, the results show that students in engineering, agriculture, and arts disciplines have relatively lower perceptions and gains from online physical education courses. Possible reasons include the practical nature of these majors or differing student focuses. For instance, engineering and agriculture students may be accustomed to hands-on learning in physical environments, where abstract explanations and video demonstrations in online courses fail to meet their learning needs. Arts students may have weaker motivations for physical exercise or may prioritize activities related to their majors, resulting in less interest in physical education courses. In comparison, science and medicine students may possess stronger theoretical learning foundations and self-discipline. Their families may also place greater emphasis on health education, leading to

higher engagement and outcomes in online physical education courses. Additionally, differences in students' internet resource usage habits across disciplines may influence their evaluations. In light of these differences, educational administrators should consider the role of academic backgrounds. For example, for engineering, agriculture, and arts students, online practice demonstrations and family collaborative tasks can be enhanced to increase course immersion. For medicine students, challenging exercises can continue to be provided to maintain their learning motivation [1-10].

The study also offers several educational insights. Teaching designs should be more personalized and diverse, employing various teaching methods such as live streaming, video tutorials, and online discussions to enhance classroom interactivity. Practical components like online competitions and interactive games can stimulate student interest. Furthermore, a long-term evaluation mechanism should be established to monitor student learning outcomes through assignments, online exams, and classroom performance. Schools should provide technical training and equipment support for teachers and students with insufficient technological skills or resources to help them adapt better to online learning environments. Educators also need to shift their perspectives and explore blended teaching models that combine online and offline approaches, leveraging the flexibility of online modes and the practicality of offline modes. In summary, the results of this study indicate that in the context of pandemic conditions, teaching reforms should fully consider the needs of different groups to improve the quality of online physical education teaching[11-25].

Table 1. *Analysis of Differences in Variables by Gender*

	Gender	N	Mean	SD	t	P
Perceived Quality of online physical education Teaching	Male	318	3.331	0.611	-2.669	0.008
	Female	296	3.456	0.537		
Teacher competence	Male	318	3.298	0.603	-0.962	0.336
	Female	296	3.346	0.634		
Student characteristics	Male	318	3.386	0.756	-0.433	0.666
	Female	296	3.411	0.630		
Online learning environment	Male	318	3.149	0.765	-1.827	0.068
	Female	296	3.255	0.678		
Educational content	Male	318	3.261	0.690	-2.027	0.043
	Female	296	3.374	0.684		
Family support	Male	318	3.305	0.659	-1.933	0.054
	Female	296	3.408	0.655		
Student Learning outcome	Male	318	3.381	0.605	-2.015	0.044
	Female	296	3.471	0.494		

Table 2. *Discipline Differences in Variables Analysis*

		N	Mean	SD	F	P	LSD
Perceived Quality of online physical education Teaching	① Engineering	98	3.286	0.612	2.891	0.009	①<③、④、⑤，②<④、⑤,⑥<④、⑤
	② Agriculture	84	3.299	0.562			
	③ Liberal Arts	95	3.464	0.649			
	④ Science	100	3.489	0.517			
	⑤ Medicine	103	3.513	0.499			
	⑥ Arts	107	3.305	0.578			
	⑦ Others	27	3.319	0.642			
Teacher competence	① Engineering	98	3.218	0.606	1.176	0.317	
	② Agriculture	84	3.381	0.602			
	③ Liberal Arts	95	3.356	0.620			
	④ Science	100	3.363	0.685			
	⑤ Medicine	103	3.352	0.594			
	⑥ Arts	107	3.242	0.617			

	⑦ Others	27	3.424	0.517			
Student characteristics	① Engineering	98	3.350	0.585	0.783	0.583	
	② Agriculture	84	3.400	0.654			
	③ Liberal Arts	95	3.475	0.695			
	④ Science	100	3.428	0.714			
	⑤ Medicine	103	3.425	0.735			
	⑥ Arts	107	3.296	0.787			
	⑦ Others	27	3.490	0.632			
Online learning environment	① Engineering	98	3.073	0.708	1.835	0.090	
	② Agriculture	84	3.208	0.743			
	③ Liberal Arts	95	3.199	0.776			
	④ Science	100	3.157	0.719			
	⑤ Medicine	103	3.393	0.595			
	⑥ Arts	107	3.164	0.737			
	⑦ Others	27	3.206	0.899			
Educational content	① Engineering	98	3.316	0.682	2.802	0.011	②<④，⑥<①、③、④、⑤
	② Agriculture	84	3.243	0.779			
	③ Liberal Arts	95	3.402	0.641			
	④ Science	100	3.447	0.650			
	⑤ Medicine	103	3.382	0.707			
	⑥ Arts	107	3.110	0.628			
	⑦ Others	27	3.309	0.749			
Family support	① Engineering	98	3.392	0.563	0.544	0.775	
	② Agriculture	84	3.304	0.810			
	③ Liberal Arts	95	3.398	0.636			
	④ Science	100	3.399	0.682			
	⑤ Medicine	103	3.369	0.654			
	⑥ Arts	107	3.285	0.609			
	⑦ Others	27	3.280	0.693			
Student Learning outcome	① Engineering	98	3.318	0.539	2.479	0.022	⑤>①、②、③、④、⑥
	② Agriculture	84	3.359	0.643			
	③ Liberal Arts	95	3.407	0.547			
	④ Science	100	3.439	0.541			
	⑤ Medicine	103	3.594	0.478			
	⑥ Arts	107	3.412	0.542			
	⑦ Others	27	3.416	0.647			

4. Conclusions

Based on survey data from university students, this study analyzed the gender and discipline differences in online physical education teaching quality. The results indicate that female students significantly outperform male students in their perception of teaching quality, educational content, and learning outcomes evaluation. Significant differences were also found among different disciplines in perception of teaching quality, course content, and learning outcomes (with science and medicine students performing better, while engineering, agriculture, and arts students relatively lower). The study recommends that schools and teachers adopt differentiated strategies in online physical education teaching, such as strengthening guidance and motivation for male students and practice-oriented majors, flexibly utilizing technology to enhance teaching interactivity, and providing continuous technical support and training for teachers and students. Future research can

expand the sample scope to conduct cross-school and cross-regional comparisons or introduce interventions such as virtual reality technology or blended teaching models to verify the effectiveness of improvement strategies, thereby further enhancing the quality and effectiveness of online physical education teaching.

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- **Ethical approval:** The conducted research is not related to either human or animal use.
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