

# Effect of Conducting Intervention of College-based Web Cloud Platform Management Combined with Exercise on Mental Health and Physical Performance of College Students Major in Electronic Engineering

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**Abstract.** Objective. To explore the effect of conducting intervention of college-based web cloud platform management combined with exercise on mental health and physical performance of college students major in electronic engineering. Methods. 650 electronic engineering-major college students were chosen and randomly split into the control group and the experimental group by number table method, with 325 cases each. Students in the control group did the conventional physical exercise, and those in the experimental group were intervened by web cloud platform management combined with physical exercise, so as to investigate and compare their psychological status, physical performance, quality of life, sleep quality, etc. Results. In the between-group comparison, the experimental group obtained remarkably lower PSQI scores, lower HAD scores, higher MMSE scores, better GQOLI-74 scores, better psychological capital scale scores and better physical performance ( $P$  all  $< 0.05$ ). Conclusion. Applying web cloud platform management combined with exercise intervention to college students major in electronic engineering can effectively improve their psychological health and promote their physical performance, which is worthy of application and promotion.

**Keywords:** web cloud platform management; exercise; psychological health; physical performance

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Most college students in China, especially female students, do not exercise enough and have psychological problems including depression and anxiety due to interpersonal relation disharmony. Lack of exercise has had a serious impact on the daily life of college students. We are living in a society with rapid development of Internet technology, which provides a brand new way of living and learning for the college students, changing the previous tedious college life and also further broadening their perception[1-3]. Although students can obtain the knowledge they need and enrich their habits in the virtual world, which is very convenient, the network technology may cause serious impact on their personality, recognition and emotion with

various adverse factors including pornography, network virus and network information, hence importance should be attached to the network-based mental health and more exercise should be done to reduce such adverse effect[4-7]. This study explored the influence of college-based web cloud platform management combined with exercise intervention on mental health and physical performance of college students major in electronic engineering, as indicated below.

## MATERIALS AND METHODS

### General Information

650 college students major in electronic

engineering were chosen and randomly split into the control group and the experimental group by number table method, with 325 cases each.

## Methods

The control group attended school physical education classes and daily physical activity.

The college-based web cloud platform combined with exercise intervention were performed to the experimental group. Through the web cloud platform management, it was able to tell the students the advantages of physical exercise and the risk caused by excessive sitting, popularize the benefits of daily routine, and provide a communication platform for them. In addition, students were also organized to do exercise for a semester continuously. Professional PE teachers were selected to guide the students major in electronic engineering to do moderate-strength physical exercise, including basketball, football, running and body-building exercise. Each exercise should be kept for over 1 h, and evaluation and investigation should be conducted again before the end of the semester.

## Observation Indicators

The sleep quality before and after intervention was evaluated by the 21-point Pittsburgh Sleep Quality Index (PSQI)[8], the higher the worse.

The emotional state before and after intervention was evaluated by the 42-point Hospital Anxiety and Depression Scale (HAD)[9], the higher the more serious anxiety and depression.

The mental state was evaluated by referring to the 30-point Mini - Mental State Examination (MMSE) Scale[10], the higher the better.

The quality of life before and after intervention was evaluated by referring to the 100-point Generic Quality of Life Inventory-74 (GQOLI-74)[11], which was scored with four items, namely, social function, physical function, psychological function and material life, the higher the better.

The physical performance was evaluated by the National Student Physical Health Standard[12], which covered 50-meter dash, sit-and-reach, standing leap, vital lung capacity, etc.

The psychological capital status was evaluated by the Psychological Capital Scale[13], with higher scores indicating higher psychological capital levels.

## Statistical Processing

In this study, the data processing software was SPSS20.0, the picture drawing software was GraphPad Prism 7 (GraphPad Software, San Diego, USA), items included were enumeration data and measurement data, methods used were X<sup>2</sup> test, t-test and normality test, and differences were considered statistically significant at  $P < 0.05$ .

## RESULTS

### Comparison of General Information

No statistical differences were presented in the age, gender, BMI, smoking, drinking and place of residence ( $P > 0.05$ ), which was comparable. See Table 1.

Table 1  
General information

	Experimental group (n=325)	Control group (n=325)	$\chi^2$ or t	P
Age (years old)			0.586	0.558
	20.75±1.32	20.69±1.29		
Gender			0.154	0.695
Male	164 (50.46)	159 (48.92)		
Female	161 (49.54)	166 (51.08)		
BMI (kg/m <sup>2</sup> )			0.633	0.527
	21.27±1.59	21.19±1.63		
Smoking			0.025	0.875
Yes	155 (47.69)	153 (47.08)		
No	170 (52.31)	172 (52.92)		
Drinking			0.055	0.814
Yes	160 (49.23)	163 (50.15)		
No	165 (50.77)	162 (49.85)		
Place of residence			0.056	0.813
Urban area	177 (54.46)	180 (55.38)		

Rural area	148 (45.56)	145 (44.62)
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**Comparison of Psqi Scores**  
No obvious between-group differences were seen in the PSQI scores before intervention ( $P>0.05$ ), and the PSQI scores of experimental

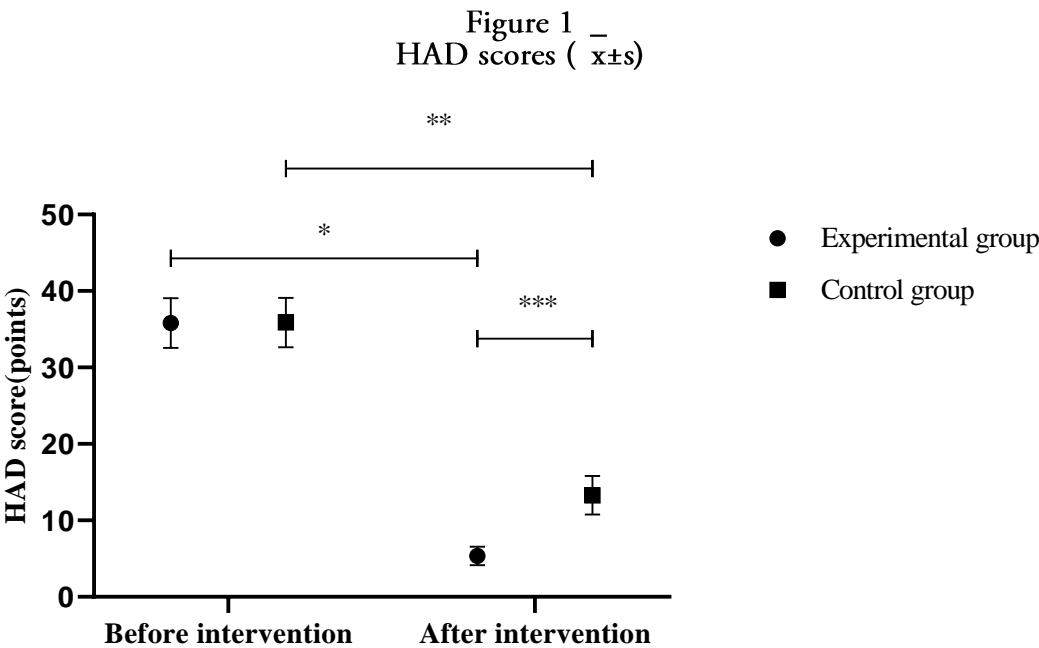
group were significantly higher than those of the control group after intervention ( $P<0.05$ ), see Table 2.

Table 2  
PSQI scores (  $\bar{x}\pm s$ )

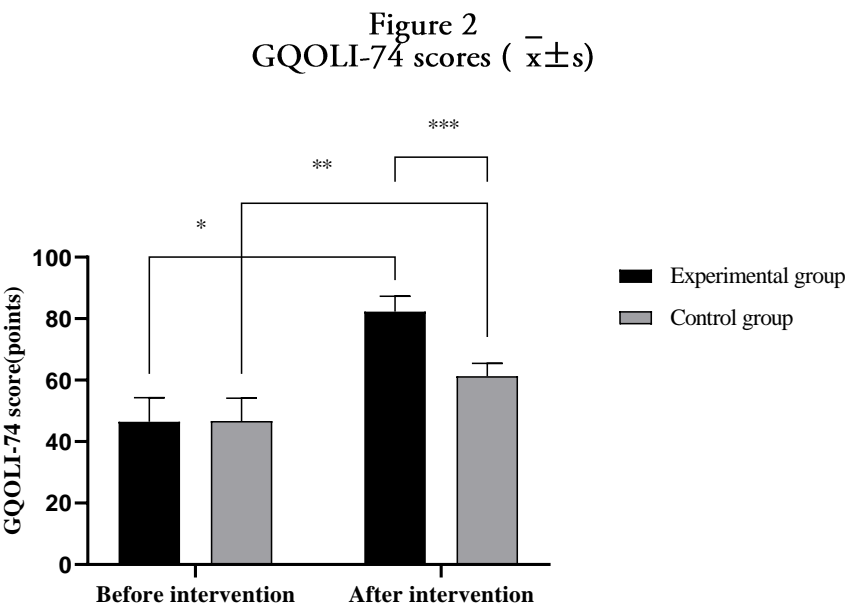
Group	n	Before	After
Experimental group	325	11.27±3.71	3.28±1.12
Control group	325	11.33±3.66	6.88±1.31
$\chi^2$		0.208	37.656
P		0.836	0.000

**Comparison of Had Scores**  
The HAD scores of the experimental group

were obviously lower than those of the control group ( $P<0.05$ ), see Figure 1.



Note: The horizontal axis indicated before and after intervention, and the vertical axis indicated the HAD score (points);  
At the two periods, the experimental group obtained (35.81±3.25) and (5.36±1.21) on HAD, respectively;  
At the two periods, the control group obtained (35.88±3.22) and (13.29±2.53) on HAD, respectively;  
\* indicated that the HAD scores at the two periods of the experimental group were distinctly different (t=158.291,  $P=0.000$ );  
\*\* indicated that the HAD scores at the two periods of the control group were distinctly different (t=99.449,  $P=0.000$ ); and  
\*\*\* indicated that the HAD scores of both groups after intervention were distinctly different (t=50.976,  $P=0.000$ ).



Note: The horizontal axis indicated before and after intervention, and the vertical axis indicated the GQOLI-74 score (points);

At the two time points, the GQOLI-74 scores of the experimental group were (46.44±7.88) and (82.33±4.98), respectively;

At the two time points, the GQOLI-74 scores of the control group were (46.72±7.43) and (61.25±4.22), respectively;

\* indicated that the GQOLI-74 scores at the two time points of the experimental group were distinctly different (t=69.409, P=0.000);

\*\* indicated that the GQOLI-74 scores at the two time points of the control group were distinctly different (t=30.655, P=0.000); and

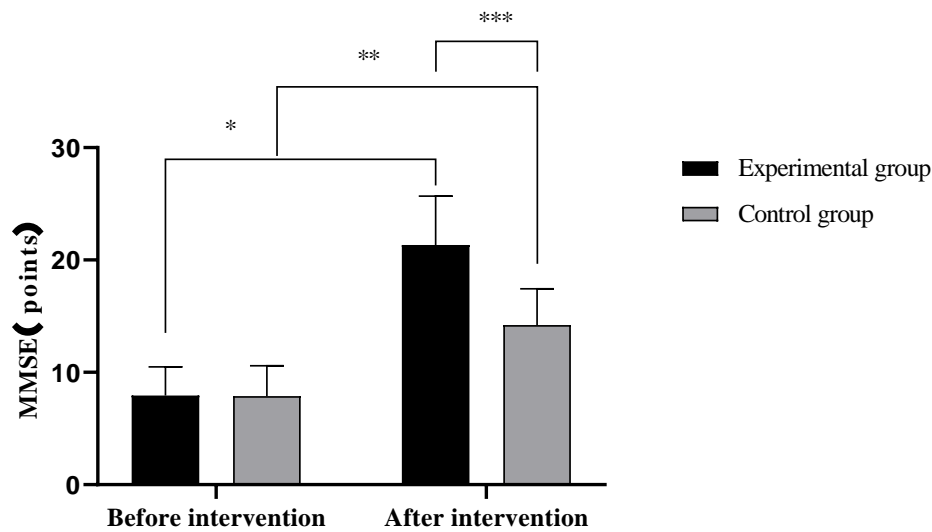
\*\*\* indicated that the GQOLI-74 scores of both groups after intervention were distinctly different (t=58.219, P=0.000).

**Comparison of Mmse Scores**

The experimental group obtained obviously

higher MMSE scores than the control group (P<0.05), see Figure 3.

Figure 3  
 MMSE scores (  $\bar{x} \pm s$  )



Note: The horizontal axis indicated before and after intervention, and the vertical axis indicated the MMSE score (points);

At the two periods, the experimental group obtained (7.93±2.56) and (21.33±4.35) on MMSE, respectively;

At the two periods, the control group obtained (7.88 ± 2.72) and (14.21 ± 3.22) on MMSE, respectively;

\* indicated that the MMSE scores at the two time points of the experimental group were distinctly different (t=47.861, P=0.000);

\*\* indicated that the MMSE scores at the two time points of the control group were distinctly different (t=27.073, P=0.000); and

\*\*\* indicated that the MMSE scores of both groups after intervention were distinctly different (t=23.717, P=0.000).

### Comparison of Physical Performance

After intervention, except for no remarkable

difference in the sit-and-reach (P>0.05), the physical performance of the experimental group was clearly better (P<0.05) as below.

Table 3  
 Physical performance (  $\bar{x} \pm s$  )

Group	n	50-meter dash/s	Standing long jump/cm	Sit-and-reach /cm	Vital lung capacity/ml
Experimental group	325	7.51±0.45	207.71±18.26	13.91±6.74	3954.13±713.46
Control group	325	7.69±0.43	204.76±17.14	13.29±6.34	3642.08±604.54
t		5.214	2.124	1.208	6.016
P		0.000	0.034	0.228	0.000

### Comparison of Psychological Capital Scores

The psychological capital scores of the

experimental group were significantly higher than those of the control group (P<0.05), see Table 4.

**Table 4**  
**Psychological capital scores (  $\bar{x} \pm s$  )**

Group	n	Efficacy	Hope	Resiliency	Optimism
Experimental group	325	28.16±3.09	26.13±2.87	24.39±2.69	24.15±2.77
Control group	325	24.31±2.88	24.51±5.59	22.76±2.56	22.57±2.63
t		3.628	4.648	7.913	7.457
P		0.000	0.000	0.000	0.000

## DISCUSSION

In recent years, people's living standard in China has increased gradually. However, the overweight and obesity proportion has grown continuously due to long-term lack of physical exercise, unbalance diet and irregular daily routine. The health-related fitness of university students in China also gradually declines, which leads to weak resistance and easy occurrence of various diseases, thus causing a serious impact on their sound mind and body, and bringing trouble to students in living and learning. College students major in electronics engineering in China have even more serious declined physical fitness due to poor health awareness[14-19]. Although students have the chance to learn knowledge about health, not sufficient attention has been paid. According to the related surveys, 57% of students are occasionally concerned, even never concerned, in the knowledge and issues about health care, do not pay attention to the nutritional balance in their daily life, fail to adhere to exercise, and even some female students are on a diet for weight loss, which causes a serious burden on the body, inducing various diseases such as gastrointestinal discomfort and anemia. Most college students major in electronic engineering pointed out that their weekly activities are mainly the PE classes, so their physical performance is gradually declined[20-24]. Besides, current college students are strongly dependent on network, so it is feasible to carry out intervention on college students major in electronic engineering by web cloud platform management combined with exercise, which can raise their recognition of health and promote them to develop good living habit. The study results showed that the psychological capital scores obtained by the experimental group were remarkably higher ( $P < 0.05$ ), which fitted with the founding of NORA SHIELDS[25] et al. In their article, it was pointed out that the experimental group obtained obviously higher psychological capital scores (28.74±3.13 vs 24.29±2.93 on efficacy, 26.26±2.91 vs 24.47±5.53 on hope, 24.42±2.73 vs 22.71±2.34 on resilience, and 24.08±2.83 vs 22.42±2.56 on optimism,  $P < 0.05$ ), indicating that the combined intervention could increase the psychological capital scores of

college students major in electronic engineering.

To sum up, the intervention of web cloud platform management combined with exercise conducted to college students major in electronic engineering can effectively relieve their adverse emotions, promote their physical performance, cultivate a confident, optimistic and positive living attitude, and strengthen their psychological health level, which should be further applied and promoted.

## FUNDING

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