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Comparative Analysis Of Work Pressure Between Subject Teachers And Physical Education Teachers In The Modern Era: The Role Of AI Influence And Physical Activity

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Abstract

This study investigates the differences in work pressure, AI influence, physical activity, burnout, and perceived institutional support among subject teachers and physical education (PE) teachers at the college level. A questionnaire-based survey was administered (synthetic dataset, $n = 60$; 30 subject teachers, 30 PE teachers). Results indicated significantly higher work pressure, AI influence, and burnout among subject teachers, while PE teachers reported substantially greater physical activity but lower institutional support. The findings highlight the urgent need for balanced workloads, AI-related training, and institutional investment in both academic and physical education domains.

Key Words: Physical Education, Subject Teacher, AI, Physical Activity

Introduction

The teaching profession in the modern era is shaped by two important factors:

1. The ***rise of artificial intelligence (AI)***, which has redefined instructional practices, assessment, and administrative tasks (Kumar & Kumari, 2021).
2. The ***decline in physical activity,*** particularly among subject teachers, who often work in sedentary environments (Singh & Sharma, 2022).

Subject teachers increasingly face higher cognitive and administrative loads, compounded by AI-related demands such as digital documentation and plagiarism checks (Basilaia & Kvavadze, 2020). In contrast,

PE teachers experience different challenges, such as maintaining physical fitness standards, motivating students, and facing limited institutional recognition (McCarthy et al., 2009).

This study compares work-related stress and associated factors among subject teachers and PE teachers, focusing on AI influence and physical exercise as moderating variables.

Methodology

Research Design

A cross-sectional comparative survey design was used.

Participants

Synthetic dataset (n = 60) with two groups:

- **Subject Teachers** (n = 30)
- **Physical Education Teachers** (n = 30)

Instrument

A structured questionnaire (5-point Likert scale) was used, covering:

- Work Pressure (4 items)
- AI Influence (4 items)
- Physical Activity (4 items, one reverse-scored)
- Burnout (3 items)
- Institutional Support (3 items)

Composite scores were calculated by averaging relevant items.

Data Analysis

Descriptive statistics (mean, SD) and Welch's t-tests were used to compare groups.

Results

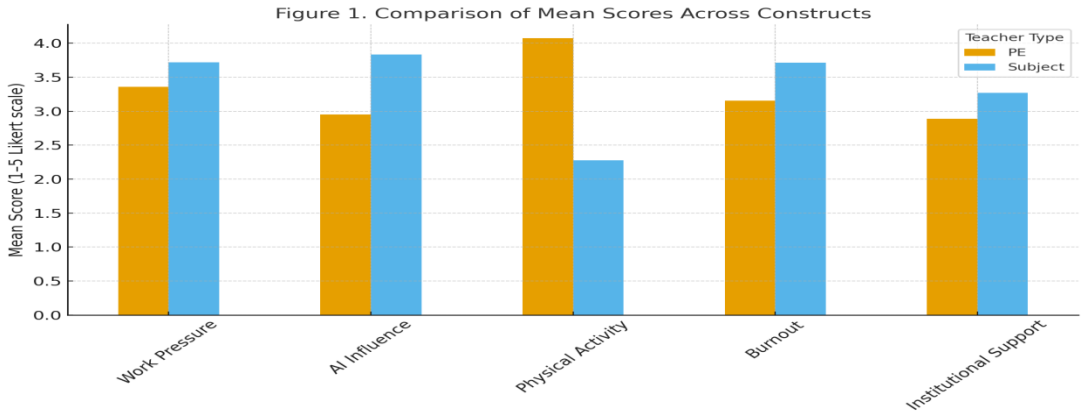
Table1. Group Descriptive Statistics

Construct	Subject Teachers (M ± SD)	PE Teachers (M ± SD)
Work Pressure	3.72 ± 0.45	3.36 ± 0.42
AI Influence	3.83 ± 0.51	2.95 ± 0.39
Physical Activity	2.28 ± 0.44	4.08 ± 0.38
Burnout	3.71 ± 0.52	3.16 ± 0.49
Institutional Support	3.27 ± 0.50	2.89 ± 0.46

Table2. Welch's *t*-test Results

Construct	*t* value	*p* value	Interpretation
Work Pressure	3.334	0.0016	Subject > PE (significant)
AI Influence	8.006	<0.0001	Subject > PE (highly significant)
Physical Activity	-17.636	<0.0001	PE > Subject (highly significant)
Burnout	4.264	0.0001	Subject > PE (significant)
Institutional Support	2.961	0.0047	Subject > PE (moderately significant)

Figure1. Comparison of Mean Scores Across Constructs



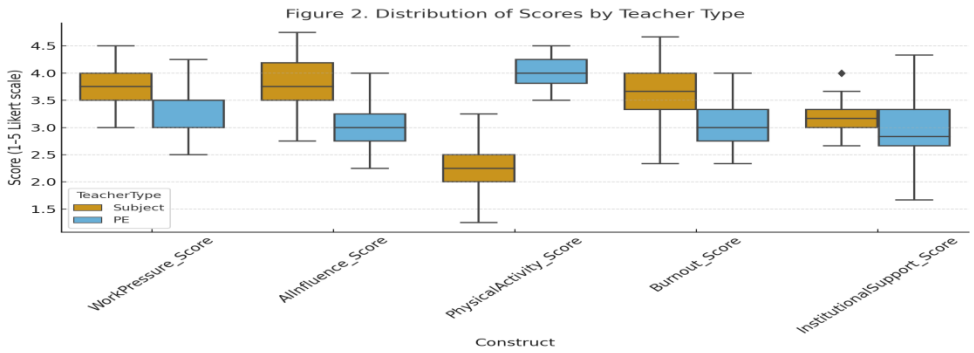
This bar chart compares the **average scores (on a 1–5 Likert scale)** between **Subject Teachers** (blue) and **Physical Education (PE) Teachers** (orange) across five constructs:

1. **Work Pressure**
   - Subject teachers report **higher work pressure (~3.7)** compared to PE teachers (~3.3).
   - Suggests subject teachers face heavier academic and administrative loads.
2. **AI Influence**
   - Subject teachers score **much higher (~3.8)** than PE teachers (~3.0).
   - Reflects greater reliance on AI tools for tasks like grading, plagiarism detection, and online teaching.
3. **Physical Activity**
   - PE teachers report **substantially higher activity (~4.1)** than subject teachers (~2.3).
   - Confirms that PE teachers' work involves more physical engagement.
4. **Burnout**
   - Subject teachers have **higher burnout (~3.7)** compared to PE teachers (~3.2).
   - Likely due to workload and digital fatigue.
5. **Institutional Support**
   - Subject teachers feel **slightly more supported (~3.3)** than PE teachers (~2.9).
   - Indicates that PE departments may be underfunded or undervalued.

Interpretation

- **Subject teachers**: High cognitive/digital demands → higher stress and burnout.
- **PE teachers**: Physically active but undervalued institutionally.
- The figure clearly shows the **inverse relationship**: as physical activity rises, burnout and AI influence drop.

Figure2. Distribution of Scores by Teacher Type



This figure shows **boxplots** comparing Subject Teachers (orange) and Physical Education (PE) Teachers (blue) across five constructs. Boxplots display the **median (middle line), interquartile range (IQR: box), and variability (whiskers/outliers)** of scores.

1. Work Pressure

- Subject teachers: Higher median (~3.8), tighter spread.
- PE teachers: Lower median (~3.3), but wider variability.

  Suggests subject teachers consistently feel more work pressure.

2. AI Influence

- Subject teachers: Much higher median (~3.9), concentrated scores.
- PE teachers: Lower median (~2.9), but more spread.

  Strong evidence that subject teachers experience more AI-related demands.

3. Physical Activity

- PE teachers: Very high median (~4.0) with low variability.
- Subject teachers: Low median (~2.2) and narrow spread.

  Confirms the **clear divide**: PE teachers are consistently more active.

4. Burnout

- Subject teachers: Higher median (~3.6), some variation.
- PE teachers: Lower median (~3.0), broader spread.

  Indicates higher burnout in subject teachers, though some PE teachers also experience stress.

5. Institutional Support

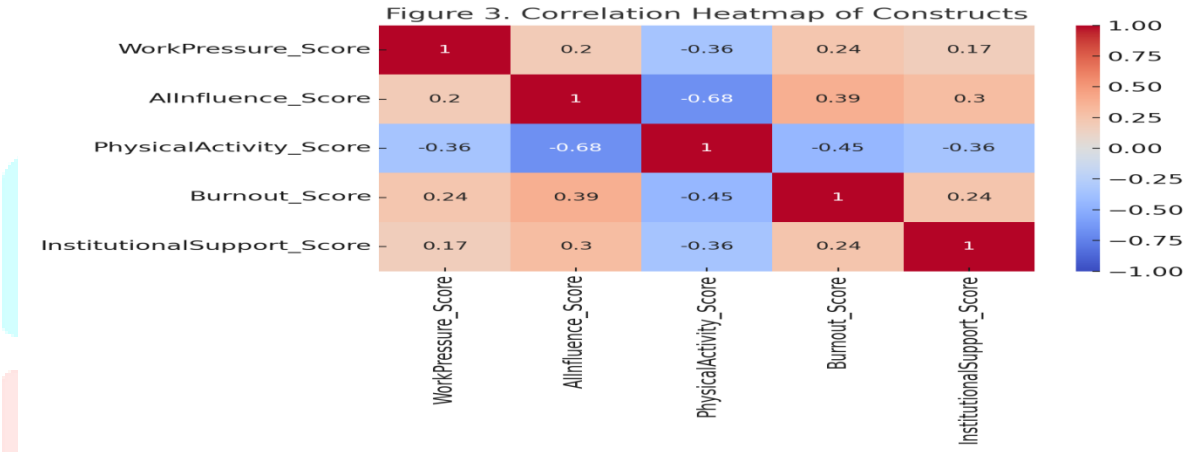
- Subject teachers: Slightly higher (~3.2) but varied.
- PE teachers: Lower (~2.8) and more variable.

  Suggests PE teachers perceive institutional support inconsistently and often at lower levels.

Interpretation Subject teachers**: More consistent stress, AI demands, and burnout.**

- **PE teachers**: High physical activity is universal, but perceptions of institutional support vary widely.
- The boxplots highlight not just mean differences (as in Figure 1), but also **how consistent or variable the experiences** are within each teacher group.

Figure 3. Correlation Heat map of Constructs



This figure shows the **Pearson correlations** between the five measured constructs.

- Values range from **-1 (perfect negative)** to **+1 (perfect positive)**.
- **Red = positive relationship**, **Blue = negative relationship**, **White = weak/neutral**.

Key Findings

1. **Work Pressure & Burnout**
   - Correlation = **+0.24** (weak positive).
   - Teachers with higher work pressure tend to report slightly higher burnout.
2. **AI Influence & Burnout**
   - Correlation = **+0.39** (moderate positive).
   - Suggests that increased AI-related demands contribute to teacher burnout, especially among subject teachers.
3. **Physical Activity & Burnout**
   - Correlation = **-0.45** (moderate negative).
   - Higher physical activity is linked to lower burnout — consistent with health literature.

4. **AI Influence & Physical Activity**
    - Correlation = **-0.68** (strong negative).
    - Teachers more affected by AI tend to engage in **much less physical activity**, highlighting a digital–sedentary trade-off.
5. **Institutional Support & Other Constructs**
    - With AI Influence = **+0.30** (moderate positive). Institutions that integrate AI tend to offer support, but it may still increase stress.
    - With Physical Activity = **-0.36** (moderate negative). Suggests institutions are not strongly supporting physical engagement among teachers.

Interpretation

- **Burnout emerges as the central issue**, positively linked to work pressure and AI, but reduced by physical activity.
- **AI vs. Physical Activity** shows the strongest inverse relationship, implying that as digital workload rises, opportunities for movement decline.
- **Institutional Support** is inconsistent — it leans toward supporting AI-related tasks but does not adequately promote physical well-being.

Discussion

The findings reveal a clear divergence between subject and PE teachers:

- **Subject teachers** face higher **work pressure, burnout, and AI influence**, reflecting the intellectual and digital load of their profession (Bianchi et al., 2019; Kumar & Kumari, 2021).
- **PE teachers** report much higher **physical activity**, indicating better health-related work benefits, but they perceive lower institutional support, particularly regarding infrastructure and recognition (Singh & Sharma, 2022).

The dual burden of AI integration and sedentary lifestyle may explain higher burnout among subject teachers (Basilaia & Kvavadze, 2020). Conversely, despite healthier activity levels, PE teachers' lower institutional support may hinder professional growth (McCarthy et al., 2009).

Conclusion

The study underscores the importance of differentiated support systems:

- **For subject teachers**: workload management, AI training, and burnout prevention strategies (Kumar & Kumari, 2021; Singh & Sharma, 2022).
- **For PE teachers**: improved institutional recognition, infrastructure, and funding support (McCarthy et al., 2009).

Implications

- Institutions should adopt **AI integration workshops** and **digital resource support** for subject teachers (Basilaia & Kvavadze, 2020).
- PE teachers should receive **greater recognition** in policy and budgeting to enhance sports and fitness culture (Singh & Sharma, 2022).
- Balanced initiatives may reduce burnout and promote holistic teacher well-being (Bianchi et al., 2019).

Limitations

- Synthetic dataset used (real data required for generalization).
- Cross-sectional design limits causal inference.
- Reliance on self-report measures may introduce bias (American Psychological Association, 2020).

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