



E-ISSN: 2707-7020
P-ISSN: 2707-7012
Impact Factor (RJIF): 5.41
JSSN 2025; 6(2): 46-51
www.allsportsjournal.com
Received: 19-07-2025
Accepted: 22-08-2025

Rajesh Dahiya
Associate Professor & Head,
Department of Physical
Education, Teacher Education
Learning and Research,
Postgraduate Government
College, Sector-11, Chandigarh,
Union Territory of
Chandigarh, India

Anshul Singh Thapa
Assistant Professor,
Department of Physical
Education, Teacher Education
Learning and Research,
Postgraduate Government
College, Sector-11, Chandigarh,
Union Territory of
Chandigarh, India

Pranshu Verma
Research Scholar, Department
of Physical Education, Teacher
Education Learning and
Research, Postgraduate
Government College, Sector-
11, Chandigarh, Union
Territory of Chandigarh, India

Mohamad Anas
Research Scholar, Department
of Physical Education, Teacher
Education Learning and
Research, Postgraduate
Government College, Sector-
11, Chandigarh, Union
Territory of Chandigarh, India

Corresponding Author:
Rajesh Dahiya
Associate Professor & Head,
Department of Physical
Education, Teacher Education
Learning and Research,
Postgraduate Government
College, Sector-11, Chandigarh,
Union Territory of
Chandigarh, India

Vigilance and intellectual development among professional students of various colleges of Chandigarh

Rajesh Dahiya, Anshul Singh Thapa, Pranshu Verma and Mohamad Anas

DOI: <https://doi.org/10.33545/27077012.2025.v6.i2a.331>

Abstract

The present research aimed at measuring vigilance and intellectual development among professional students of various colleges of Chandigarh. A descriptive research design was employed, utilizing a survey method. One hundred and twenty (N=120) students from various educational institutions with the age group of 20-28 years were selected through random sampling technique to act as subjects from various colleges of Chandigarh. Vigilance was evaluated using the cognitive vigilance test (Jitender mohan, 1980), while intellectual development was assessed with the Raven's standard progressive matrices found by (Malhotra, 1974) later revised by (Sen and Sachdev, 1977) and (Mohan, 1980). Data analysis was performed using t-test, one way ANOVA and product moment correlation, where the F value was significant post hoc test was used. The results indicated female students of various professional courses have higher vigilance as compared to male students of various professional courses. Male students of various professional courses have higher intellectual development as compared to female students of various professional courses. Further, it is revealed that the professional students of Physical Education, Yoga and Education have similar vigilance, but having different intellectual development.

Keywords: Vigilance, intellectual development, teacher education programs

Introduction

Psychology has increasingly focused on how cognitive and psychological factors shape learning outcomes and professional success. One key factor is vigilance, which is the ability to maintain attention and detect rare or unexpected stimuli. It requires staying focused, resisting distractions, and responding accurately to signals over long periods (Davies & Tune, 1970; Grunzke *et al.*, 1974; Johnson & Proctor, 2004) ^[2, 3, 7]. Vigilance is complex and affected by sensory, temporal, and cognitive factors (Parasuraman, Warm & See, 1998) ^[11]. It is vital in jobs and sports that need quick decisions and accurate responses under pressure.

Intellectual development, in contrast, refers to the growth of higher-order mental skills like reasoning, problem-solving, and decision-making. These skills support critical thinking, creativity, and resilience, which are essential for academic success and professional excellence. Since vigilance and intellectual development both play an important role in overall performance, studying their connection is crucial to understanding student success.

In professional education, where students learn specialized skills and knowledge, vigilance and intellectual development are essential for academic performance and career readiness. Investigating these factors among professional students can provide insights into how psychological influences affect learning and performance in real-life situations.

This study aims to assess the vigilance and intellectual development of students from various professional colleges in Chandigarh. The findings should help educators, teachers, and coaches understand how these factors affect performance. This understanding will enable them to create more effective strategies for student growth. Additionally, the study is particularly important for coaches, players, and physical education teachers since knowledge of vigilance and intellectual development can support the comprehensive growth of students both academically and athletically.

Objectives of the Study

1. To investigate the relationship between vigilance and intellectual development among professional students

2. To explore the influence of gender on vigilance and intellectual development
3. To explore the influence of different profession on vigilance and intellectual development.

Hypotheses of the Study

1. There will be a significant connection between vigilance and intellectual development among professional students.
2. Male professional students will show higher vigilance than female professional students.
3. Male professional students will exhibit more intellectual development than female professional students.

Methodology

The study was descriptive in nature. Therefore, a survey was done on population of Chandigarh. The purpose of the research was to find out the relation between dependent

variables i.e., *vigilance* and independent variable i.e., *intellectual development*

Participants

The sample of the study was both male and female students of various professions studying in different educational institutions of Chandigarh. The sample was selected by using random sampling technique. The sampling was done at two different levels i.e., in selecting educational institutions at the first level and then the students of courses. Students of three teacher education courses were randomly selected from the selected educational institutions of Chandigarh. The age of the sample varies from 20-28 years. Total 120 students from various educational institutions are selected for the sample of the research.

The division of sample is presented in the figure below:

Sample distribution

| Sr. No | Collage name | Course name | Subjects |
|-----------------------|--|--------------------------------|----------|
| 1 | Post Graduate Government College for Girls Sector -42, Chandigarh | B.P.Ed. Two-year Course | 30 |
| 2 | Government College of Yoga Education and Health, Sector 23, Chandigarh | B.Ed. (Yoga) - Two Year Course | 35 |
| 3 | Panjab University, Campus | B.P.Ed. Two-year course | 34 |
| 4 | Government College Of Education Sector-20, Chandigarh | Education | 21 |
| Total Sample Size (n) | | | 120 |

Tools

Vigilance: Cognitive Vigilance Test developed by Jitender Mohan (1980) was used to measure Vigilance.

Intellectual development: Raven's Standard Progressive Matrices found by Malhotra in (1974), later revised by Sen and Sachdev (1977) and Mohan (1980) was used the measure Intellectual development.

Statistical Techniques

To analyze the data Product Moment Correlation was used to see the relationship between the variables. To compare the mean t -test and One Way ANOVA was used accordingly. Where the F value was significant Scheffe Post Hoc Test was used. The hypotheses of the study were examined at 0.05 level of significance

Analysis of Data

Table1: Descriptive statistics of professional students of physical education, yoga and education on Vigilance and Intellectual Development

| Variables | N | Mean | SD | r-value |
|--------------------------|-----|-------|-------|---------|
| Vigilance | 120 | 66.03 | 16.08 | 0.235 |
| Intellectual Development | 120 | 36.81 | 8.36 | |

Table 1 presents the descriptive statistics of professional students of Physical Education, Yoga, and Education on vigilance and intellectual development. The mean score of professional students on vigilance was 66.03 with a standard deviation of 16.08, while the mean score on intellectual development was 36.81 with a standard deviation of 8.36. Further analysis revealed that the correlation coefficient ($r =$

0.235) was significant at the 0.05 level of significance with 118 degrees of freedom. This indicates a positive relationship between vigilance and intellectual development. Consequently, the null hypothesis stating that there is no relationship between vigilance and intellectual development among professional students of Physical Education, Yoga, and Education is rejected.

It may therefore be concluded that the scores of vigilance are significantly related to the scores of intellectual developments. In other words, as vigilance increases, the intellectual development of professional students also tends to increase.

Table 2: Gender wise N, Mean, SD, SEM and t-value of the professional students of various courses of Chandigarh on vigilance

| Gender | N | Mean | Std. Deviation | Std. Error Mean | t-value | p-value |
|--------|----|-------|----------------|-----------------|---------|---------|
| Male | 40 | 61.80 | 15.61 | 2.46 | 2.066* | 0.041 |
| Female | 80 | 68.15 | 15.99 | 1.78 | | |

Significant at 0.05

Table 2 shows that the calculated t-value (2.066) is significant at the 0.05 level of significance with 118 degrees of freedom. This indicates that there is a significant difference in the mean scores of vigilance between male and female professional students. Thus, the null hypothesis stating that there is no significant difference in vigilance between male and female students is rejected.

The mean vigilance score of female students ($M = 68.15$) was higher than that of male students ($M = 61.80$). Hence, it may be concluded that female students of various professional courses possess higher vigilance compared to male student

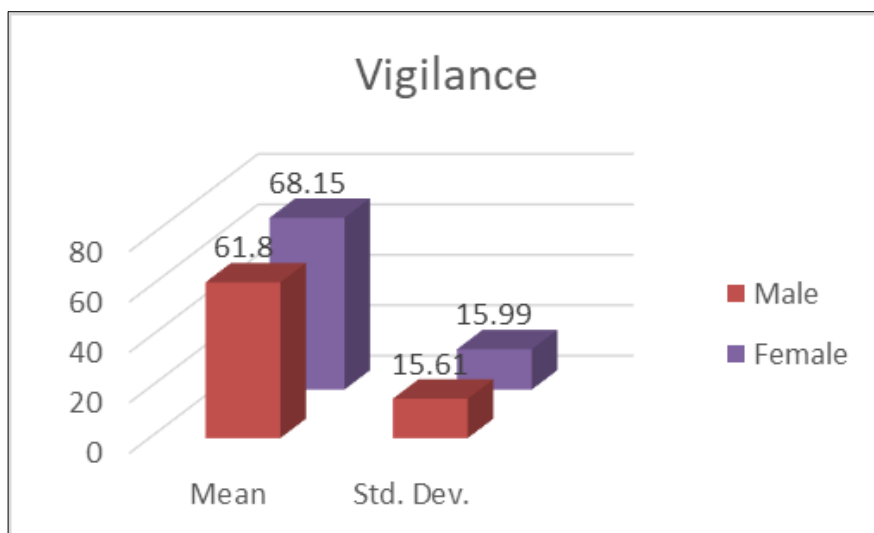


Fig 1: Showing mean values of male and female students of various professions on Vigilance

Table 3: Gender wise N, Mean, SD, SEM and t-value of the professional students of various courses of Chandigarh on Intellectual development

| Gender | N | Mean | Std. Deviation | Std. Error Mean | t-value | p-value |
|--------|----|-------|----------------|-----------------|---------|---------|
| Male | 40 | 38.97 | 7.08 | 1.12 | 2.026 | 0.045 |
| Female | 80 | 35.73 | 8.77 | 0.98 | | |

* Significant at 0.05

Table 3 reveals that the calculated t-value (2.026) is significant at the 0.05 level of significance with 118 degrees

of freedom. This indicates a significant difference in the mean scores of intellectual development between male and female professional students. Accordingly, the null hypothesis stating that there is no significant difference between the two groups is rejected.

The mean score of male students ($M = 38.97$) was higher than that of female students ($M = 35.73$). Hence, it may be concluded that male students of various professional courses demonstrate higher intellectual development compared to female students.

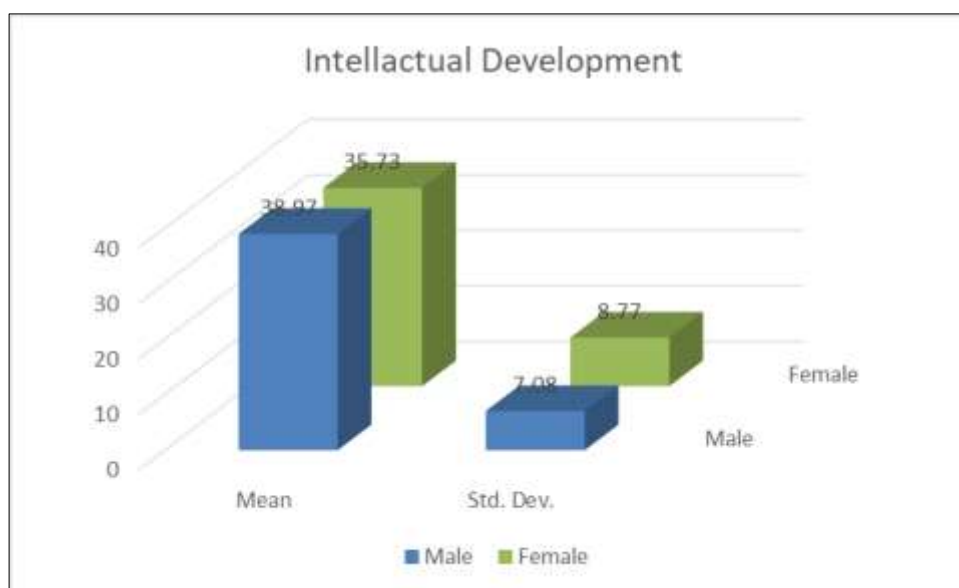


Fig 2: Showing mean values of male and female students of various professions on Intellectual development

Table 4: Descriptive statistics of the students of various professions on Vigilance

| Professions | N | Mean | Std. Deviation | Std. Error Mean |
|--------------------|----|-------|----------------|-----------------|
| Physical Education | 64 | 64.00 | 14.94 | 1.86 |
| Yoga | 35 | 68.85 | 16.75 | 2.83 |
| Education | 21 | 67.52 | 18.16 | 3.96 |

Table 4 shows the mean and standard deviation of professional students from different courses on vigilance. The mean score of Physical Education students was 64.00 ($SD = 14.94$), while the mean score of Yoga students was 68.85 ($SD = 16.75$). The mean vigilance score of Education students was

67.52 ($SD = 18.16$). This indicates that Yoga students reported the highest vigilance, followed closely by Education students, whereas Physical Education students obtained comparatively lower vigilance scores.

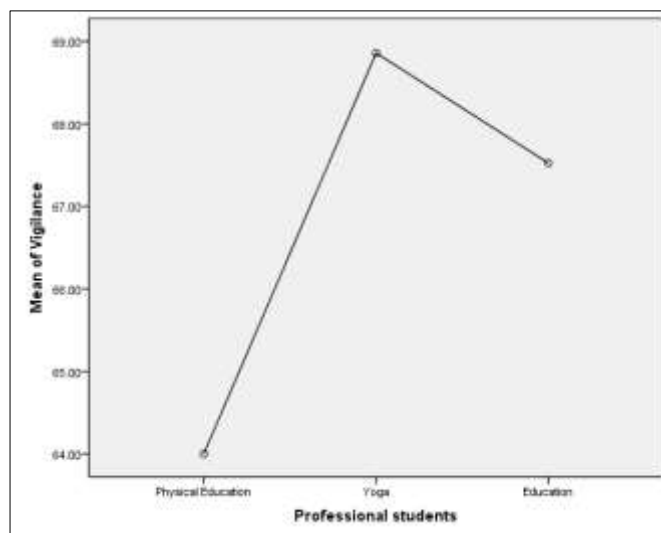


Fig 3: Showing mean values of students of various professions on Vigilance

Table 5: ANOVA Summary of Descriptive statistics of the students of various professions on Vigilance

| Variable | Source of variance | Sum of Squares | Df | Mean Square | F |
|-----------|--------------------|----------------|-----|-------------|-------|
| Vigilance | Between Groups | 590.34 | 2 | 295.17 | 1.143 |
| | Within Groups | 30213.52 | 117 | 258.235 | |
| | Total | 30803.86 | 119 | | |

Table 5 shows that the obtained F-value (1.143) is not significant at the given degrees of freedom (2, 117). This indicates that there is no significant difference in the vigilance scores of professional students of Physical Education, Yoga, and Education. Therefore, the null hypothesis stating that there is a significant difference in vigilance among these groups is not rejected.

It may therefore be concluded that professional students of Physical Education, Yoga, and Education possess similar levels of vigilance, with no meaningful differences across the

three courses.

Table 6: Descriptive statistics of the students of various professions on Intellectual development

| Professions | N | Mean | Std. Deviation | Std. Error Mean |
|--------------------|----|-------|----------------|-----------------|
| Physical Education | 64 | 37.01 | 7.20 | 0.90 |
| Yoga | 35 | 34.22 | 10.24 | 1.73 |
| Education | 21 | 40.52 | 6.89 | 1.50 |

Table 6 presents the mean and standard deviation of intellectual development among professional students across three courses. The mean score of Physical Education students was 37.01 (SD = 7.20), while Yoga students had a mean score of 34.22 (SD = 10.24). The highest mean score was obtained by Education students, with 40.52 (SD = 6.89).

These results suggest that Education students demonstrated the highest intellectual development, followed by Physical Education students, whereas Yoga students scored comparatively lower on intellectual development.

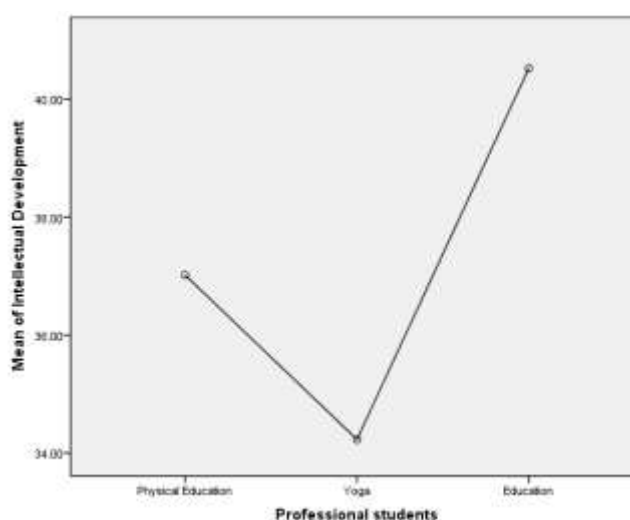


Fig 4: Showing mean values of students of various professions on Intellectual Development

Table 7: ANOVA Summary of Descriptive statistics of the students of various professions on Intellectual development

| Variable | Source of variance | Sum of Squares | Df | Mean Square | F |
|--------------------------|--------------------|----------------|-----|-------------|--------|
| Intellectual development | Between Groups | 525.57 | 2 | 262.78 | 3.946* |
| | Within Groups | 7792.39 | 117 | 66.60 | |
| | Total | 8265.93 | 119 | | |

* Significant at 0.05

Table 7 shows that the obtained F-value (3.946) is significant at the 0.05 level of significance with degrees of freedom (2, 116). This indicates that there is a significant difference in the intellectual development scores of professional students of Physical Education, Yoga, and Education.

Therefore, the null hypothesis stating that there is no significant difference among the groups is rejected. To identify the direction of differences between the groups, the Scheffé Post Hoc Test was applied. The results of the pairwise comparisons are presented in Table 8 below.

Table 8: Pair wise comparison among the professional students of the three professional courses

| Variable | (I) Groups | (J) Groups | Mean Difference (I-J) | p-value |
|--------------------------|--------------------|--------------------|-----------------------|---------|
| Intellectual Development | Physical Education | Yoga | 2.78 | 0.271 |
| | | Education | 3.50 | 0.236 |
| | Yoga | Physical Education | 2.78 | 0.271 |
| | | Education | 6.29* | 0.023 |
| | Education | Physical Education | 3.50 | 0.236 |
| | | Yoga | 6.29* | 0.023 |

*Significant at 0.05

Table 8 reveals that there is a significant difference in the mean intellectual development scores of Education students (M = 40.52) and Yoga students (M = 34.22). Since the mean score of Education students is higher, it may be concluded that professional students of Education possess significantly better intellectual development compared to professional students of Yoga.

The table also shows that there is no significant difference in the intellectual development scores between Physical Education and Yoga students, as well as between Physical Education and Education students. This indicates that Physical Education students have statistically similar intellectual development to both Yoga and Education students.

Results

This study looked at the vigilance and intellectual growth of professional students in Physical Education, Yoga, and Education courses in Chandigarh. The findings from descriptive and inferential statistics are summarized below: Relationship between Vigilance and Intellectual Development:

The correlation analysis (Table 1) showed a significant positive link between vigilance and intellectual development ($r = 0.235$, $p < 0.05$). This means that higher vigilance relates to higher intellectual development among professional students.

Gender Differences in Vigilance and Intellectual Development"

There was a significant difference between male and female students in terms of vigilance (Table 2). Female students (M = 68.15) scored notably higher than male students (M = 61.80), suggesting that female students are more vigilant.

A significant difference was also found in intellectual development (Table 3). Male students (M = 38.97) scored higher than female students (M = 35.73), indicating that male students show greater intellectual growth.

Course-wise Differences in Vigilance

The average scores of vigilance across courses (Table 4) showed that Yoga students (M = 68.85) had the highest scores, followed by Education students (M = 67.52) and Physical Education students (M = 64.00).

However, the ANOVA results (Table 5) showed that these differences were not statistically significant ($F = 1.143$, $p > 0.05$). Thus, professional students across the three courses had similar levels of vigilance.

Course-wise Differences in Intellectual Development:

The average scores of intellectual development (Table 6) revealed that Education students (M = 40.52) had the highest

scores, followed by Physical Education students (M = 37.01) and Yoga students (M = 34.22).

The ANOVA results (Table 7) indicated that these differences were statistically significant ($F = 3.946$, $p < 0.05$). The Scheffé Post Hoc Test (Table 8) further showed that Education students had significantly higher intellectual development than Yoga students. No significant differences were found between Physical Education and Yoga students or between Physical Education and Education students.

The results highlight that:

- Vigilance and intellectual development are positively related.
- Female students show higher vigilance, while male students show higher intellectual development.
- Professional students in different courses display similar vigilance. Education students have significantly higher intellectual development compared to Yoga students.

Discussion

The current study looked at how gender affects vigilance and intellectual development among professional students in Chandigarh. The results showed that male students had higher levels of vigilance than female students. This finding matches what Bejjamini *et al.* (2007) ^[1] reported, where boys performed better in vigilance tasks compared to girls. However, the evidence in this area is not straightforward. Krishnan and Collop (2006) ^[9] found that women generally have better sleep quality, with longer sleep duration, shorter time to fall asleep, and higher sleep efficiency. This is often linked to better vigilance. This creates a paradox: although men may do better in vigilance tasks, women's better sleep quality should give them an advantage. One possible explanation could be differences in behavior and context. Jason *et al* and Hudson *et al.* (2020) ^[6] noted that poor sleep and sleep deprivation can hurt vigilant attention, but these effects can be lessened with rest breaks and good recovery sleep. Therefore, differences in lifestyle, workload, and coping strategies might help explain these conflicting results. In terms of intellectual development, the current findings suggest that gender is an important factor. Previous research often favored males. Hernandez *et al.* (1984) ^[5] noted that males not only show higher intellectual development but also reach intellectual maturity sooner than females. Miller *et al.* (1995) ^[10] indicated that males have greater intellectual potential, while Halawah (2006) ^[4] found significant gender differences in both intellectual and personality development. However, such claims should be taken with caution. The idea of male superiority in intellectual development may reflect the social and cultural settings of earlier studies, where educational opportunities and expectations varied between

genders. Modern views suggest that intellectual development is influenced by multiple factors, including environmental, cultural, and teaching methods, rather than just gender. Overall, the literature presents a mixed view. Some evidence supports male advantages in vigilance and intellectual development, while sleep-related and contextual factors point to potential benefits for females. These contradictions indicate that differences in vigilance and intellectual growth are not merely due to biological sex. Instead, they result from a complex mix of sleep patterns, lifestyle factors, social and cultural influences, and educational settings. Future research should take a more integrated approach, considering these contextual aspects to better understand how gender interacts with vigilance and intellectual development.

For educators in general, these findings suggest that teaching methods should not generalize based only on gender. Instead, classroom strategies and academic support should reflect individual differences in sleep habits, workload management, and cultural backgrounds. Promoting healthy sleep practices, encouraging balanced schedules, and providing gender-sensitive teaching methods could improve both vigilance and intellectual development among all students. Ultimately, understanding the mix of biological and contextual factors will help teachers create fairer and more effective learning environments.

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