Co-related t

$$t = \frac{M_1 \sim M_2}{(S.E)\sigma diff} \quad \text{---------- (i)}$$

$$\sigma diff = \sqrt{(\sigma M_1)^2 + (\sigma M_2)^2 - 2r \times \sigma M_1 \times \sigma M_2} \quad \text{---------- (ii)}$$

$$\sigma M_1 \text{ or } \sigma M_2 = \frac{SD}{\sqrt{N}} \quad \text{---------- (iii)}$$

for (iii) यदि $N = 30$ या 30 से कम हो तो $\sqrt{N-1}$ से भाग होगा.

NOTE :→

(i) यदि t का value .01 level के value से ज्यादा, बराबर या बराबर हो तो Significant और कम हो तो Not Significant होगा।

(ii) Co-related t में N बराबर रहेगा तथा r (correlation of score) का value दिया होगा।

Q)

	Before Training	After Training
N	101	101
mean	60.04 (M_1)	70.04 (M_2)
SD	10.65 (σ_1)	12.66 (σ_2)

$r = .70$

क्या Before Training और After Training के mean का अंतर सार्थक है?

$$t = \frac{M_1 \sim M_2}{(S.E)\sigma diff.}$$

$$\sigma diff = \sqrt{(\sigma M_1)^2 + (\sigma M_2)^2 - 2r \times \sigma M_1 \times \sigma M_2}$$

$$\sigma M_1 = \frac{SD}{\sqrt{N}} = \frac{10.65}{\sqrt{101}} = \frac{10.65}{10.05} = 1.05$$

$$\sigma M_2 = \frac{SD}{\sqrt{N}} = \frac{12.66}{\sqrt{101}} = \frac{12.66}{10.05} = 1.26.$$

$$\sigma diff = \sqrt{(\sigma M_1)^2 + (\sigma M_2)^2 - 2r \times \sigma M_1 \times \sigma M_2}$$

$$= \sqrt{(1.05)^2 + (1.26)^2 - 2 \times .70 \times 1.05 \times 1.26}$$

$$= \sqrt{1.1025 + 1.5876 - 1.4 \times 1.05 \times 1.26}$$

$$= \sqrt{1.1025 + 1.5876 - 1.7522}$$

$= \sqrt{2.6901 - 01.8522}$

$= \sqrt{.8379} = \sqrt{.9379}$

$= .92$

$t = \frac{M_1 \sim M_2}{\sigma diff.}$

$= \frac{60.04 \sim 70.04}{.92} = \frac{10}{.92}$

$= 10.86$ Significent

$df = N-1 = 101 - 1. = 100$

The obtained t value, 10.86 and its df 100 is significent byond .01 level of confidence. Thus, it can be said that Before training and After training is differ from each other.