CHAPTER - IV
DESIGN AND PROCEDURE

1. METHODOLOGY

1.1 Estimating The Extent of Dropout

The first objective is to estimate the extent of dropout. The method involves subtraction of the number of students enrolled in Class VIII in 1970 from that of the number of students enrolled in Class A in 1961. The difference obviously demotes the extent of dropout. This estimate is transformed into the rate of dropout. The difference obtained by subtraction for every class is divided by the number of enrolment in the different classes. The result is then multiplied by 100. The method is a crude estimate in the sense that it does not account for double or early promotions, like passing more than one class in a year and deaths occurred during the interval of estimation. It does not provide any scope for determining the extent of wastage and stagnation separately. It does not take into account for fresh admissions to Class I or II or in any other class within the primary course. Nevertheless, it balances transfers from one school to another, since it utilised global figures.

Cohorts corresponding to the base years, 1961 - 1962 through 1970 - 1971 are analysed. The rate of dropout for every 100
children in the different classes are calculated. Sex-wise rate of dropout of the different classes are also calculated. The rate is calculated for Imphal Town as well as for Manipur.

The following formula is used to calculate the rate of dropout.

\[
\text{Rate of Dropout} = \frac{\text{Number of Dropout in the Class}}{\text{Total Enrolment in the Class}} \times 100
\]

The rate of dropout is found out for classes from A to Class VIII. At Class VII onwards stagnation is clearly seen. The rate of dropout for each class is 48.38, 24.72, 20.83, 18.05, 13.55, 12.41, 18.14, 3.83 and 46.06. The stagnation rate at Class VII is 3.36.

1.2 Methods of Data Collection

The data for computing the rate of dropout are collected from the Statistical Cell of the Department of Education of the Government of Manipur and from various records and files of the schools. The data are collected from the school through the School Information Blank. The School Information Blanks are filled up from the School Attendance Registers, Examination Records, Admission Files and various other files containing transfer records, date of establishment of the school, number of teachers employed and number of equipments purchased for the school. Records from the Secretariate Library of the Government of Manipur, National Council of Educational Research and Training, New Delhi and Ministry of Education (Statistics Cell), Shastri Bhavan, New Delhi are also consulted in addition to library works.
1.3 Identifying the Causes of Dropout

Two methods can be used for identifying the causes of dropout. The first method is True Cohort. The second as contrasted with the cohort employed the 'Year' instead of 'Stage' as the time unit of enquiry. It enlists the names of all dropouts of all Classes from A to VIII. This method does not pursue the same cohort longitudinally. It does not pursue through a number of successive years.

The justification behind studying the dropouts identified by the method is validated by the fact that cases of wastage ascertained on the basis of a longitudinal study forms a part of the population of dropouts. The list of the school leavers are tested and from the list so obtained the names of those who are transferred to other schools are struck off. Out of 42988 school leavers 13.80 percent are transferred cases. Of the remaining names the number of students who died are also struck off. The percentage of death students during the period under study is 0.3. The remaining names in the list are utilised as frames for drawing out systematic samples of dropouts.

The causes of dropout are studied in relation to school variables, pupils variables and family variables. The hypothesis relevant to these three variables are tested. Both the Direct and Indirect Methods are used for identifying the causes of dropout.

The methodology followed in studying the causes involves differentiation of dropouts from stayins on a variety of personal and environmental variables. D.V. Chickermane used this approach in one of his investigations\(^1\). Chickermane used cohort method

\(^1\)Chickermane D.V., op.cit., pp. 135-139.
involving 'Stage' as the temporal unit of enquiry while 'Year' is used as the time unit of investigation in the present study.

1.4 Ascertain the Relative Importance of Dropout

In ascertaining the relative importance of the causes of dropout the only scientific method is adopted. According to this scientific method a common order of ranks based on the ranks assigned by the different agencies or groups of judges are obtained.

The causes are put in the form of a five point scale opinionnaire. Altogether 75 questions are set in the questionnaire. The rank orders of the five point scale are: most important, very important, important, less important and least important. These rank orders are same for both primary and middle school stages.

This five point scale opinionnaire is given to each of the three judges. The three judges are the 133 teachers (headmasters), 70 inspecting officers and 30 teacher-educators of the Teacher Training Institutions of Manipur. The 70 inspecting officers are from the six Districts of Manipur including the Directorate of Education at Imphal and its four zones of Inspectorate of Schools.

The six Districts of Manipur are: Manipur Central, Manipur East, Manipur West, Manipur South, Manipur North and Tengnoupal District. The Central District has four educational zones. Those zones are: Inspectorate of Schools at Keishamoat, Imphal, Zone I, Inspectorate of Schools at Porompat, Imphal, Zone II, Inspectorate of Schools at Thoubal, Thoubal, Zone III and Inspectorate of Schools at Bishenpur, Bishenpur, Zone IV. In addition

2The questionnaire pattern is based on the pattern given by R.C. Sharma and C.L. Sapra of the National Council of Educational Research and Training in Research Monograph No. 2.
to all these Zonal and District Education Offices the Directorate of Education at Imphal is the Head Office. The Districtwise divisions and the total number of respondents of the inspecting officers of the different Districts are given in Tables 4.1 and 4.2.

### TABLE 4.1
**DISTRICTS OF MANIPUR STATE**

<table>
<thead>
<tr>
<th>District</th>
<th>East</th>
<th>West</th>
<th>Central</th>
<th>South</th>
<th>North</th>
<th>Tengnoupal</th>
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</thead>
<tbody>
<tr>
<td>(Ukhrul)</td>
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<td>(Imphal)</td>
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<td>(Tamang-long)</td>
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<tr>
<td>(Churach-andpur)</td>
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<td>(Mao)</td>
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</tbody>
</table>

Directorate of Education

<table>
<thead>
<tr>
<th>Inspectorate of Schools</th>
<th>Inspectorate of Schools</th>
<th>Inspectorate of Schools</th>
<th>Inspectorate of Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Keishampat)</td>
<td>(Porompat)</td>
<td>(Thoubal)</td>
<td>(Bishenpur)</td>
</tr>
<tr>
<td>Zone I</td>
<td>Zone II</td>
<td>Zone III</td>
<td>Zone IV</td>
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</tbody>
</table>

### TABLE 4.2
**NUMBER OF RESPONDED INSPECTING OFFICERS IN THE DISTRICTS, DIRECTORATE AND ZONES**

<table>
<thead>
<tr>
<th>Districts</th>
<th>East</th>
<th>West</th>
<th>Central</th>
<th>South</th>
<th>North</th>
<th>Tengnoupal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>4</td>
<td>6</td>
<td>21</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Head Office | Directorate of Education

| Number of respondents | 1 |

Zones

<table>
<thead>
<tr>
<th>Zones</th>
<th>Zone I</th>
<th>Zone II</th>
<th>Zone III</th>
<th>Zone IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
The opinionnaire are then analysed. The itemwise quantified average ratings are computed for each set of judges or respondents. Ranks are given to each item on the basis of quantified average ratings separately for each set of judges. The ranks thus obtained indicates the relative importance of the causes according to each set of judges.

The percentage frequencies against each item of causes is graded according to importance by the three sets of judges. The importance grading of the percentage frequencies against each item indicates the rank order. After obtaining the three sets of ranks a new set of ranks is assigned to the causes based on the average ranks given by the three different groups of judges. This newly given common rank is the final rank order of the causes. Concordance or agreement among the three sets of judges are examined with the help of 'Concordance Test' and the 'Coefficient of Concordance' is tested for significance. The common rank order can be accepted only if the 'Concordance Coefficient' comes out significant. This test, therefore, makes it possible to establish an agreed order based on the community agreement among the various sets of judges.

Various formulae on Frequency Percentages, Mean, Median, Chisquare, Coefficient Correlation, F-Test, T-Test and Concordance Coefficient are applied for testing the hypotheses. Application of these formulae are shown whenever required.

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2. FIELD SURVEY TOOLS USED

The tools developed for this study are the School Information Blank, Information Sheet for Dropouts, Information Sheet for Stayins, Interview Schedule for Dropouts, Interview Schedule for Stayins, Interview Schedule for Dropouts' Parents and Guardians, Interview Schedule for Stayins' Parents and Guardians, Interview Schedule for Teachers, and Causes of Dropouts given by the Inspecting Officers, District Education Officers and Headmasters of the schools. The Causes of dropout, a five-point scale having 75 questionnaire, is developed for determining the causes of dropout. Each of these tools are briefly discussed here.

School Information Blank

This School Information Blank is designed to collect information identifying data for the lower primary, middle and junior high schools. Information in respect of classwise enrolment, present strength of trained and untrained teachers, particulars of school leavers during the period from 1961 to 1970 are taken. Data for teachers' educational qualifications, age, income, family size, social participation and distance of their residence from the schools are also taken in the School Information Blank. Information about the school building, teaching aids, furniture and other physical facilities available in the school are also recorded. In addition, the date of establishment of the school, type of school and shift system of the school are also noted down. The money paid by parents to the school or spent by them in purchasing school uniform,
stationery, and other accessories needed by their wards are also included in developing the instrument. The number of prizes by the school, and the provision for co-curricular activities, and so on are also recorded in the School Information Blank. In general, this School Information Blank tool attempts to collect data having a fact rather than a value or judgement bias. It consists of 36 major questions. This School Information Blank is given in Appendix A.

Information Sheet for Dropouts

This instrument aims at collecting some biographical material about the dropout. The items included in the instrument are: date of birth, sex, class to which admitted and the date of admission to school, class from which left and the date and reason of leaving. Details regarding attendance during the year of leaving and details in respect of achievement in different school subjects are also recorded. Information Sheet for Dropouts consists of 22 major questions which is given in Appendix - B.

Information Sheet for Stayins

This instrument aims at collecting some biographical material about the stayins. The stayins are to inform if there be any dropout students during the said period under study in their classes. The item included in the instrument are: date of birth, sex, class to which admitted and the date of admission to school and class which he or she has completed. Details regarding attendance during the academic year, and examination records are
also taken. The Information Sheet For Stayins consists of 18 questions which is given in Appendix - C.

**Interview Schedule For Dropouts**

The Interview Schedule For Dropouts has an opinion rather than a fact bias. It includes questions relating to personal data about the respondent and his perception of teachers, parents and peers on certain references which largely explain the interactional influences the pupil has at home, in the neighbourhood and in the school. This Schedule consisting of 41 questions is in Appendix - D.

**Interview Schedule For Stayins**

Like the Interview Schedule For Dropouts this Schedule has an opinion rather than a fact bias. The instrument includes questions which relate to personal data and his perception of his teachers, parents and peers on certain references which largely explains the interactional influences the pupil has at home, in the neighbourhood and in the school. It includes 37 questions which is given in Appendix - E.

**Interview Schedule For Dropouts' Parents and Guardians**

This Schedule aims at collecting data having both a fact as well as an opinion bias. The fact questions seek information on the size, structure and socio-economic status of the family of the dropout. It includes the opinion of the parents about the
school and the need for educating children. The reason for their childrens' dropout is also recorded. This Interview Schedule consisting of 31 questions is in Appendix - F.

**Interview Schedule For Stayins' Parents and Guardians**

The Interview Schedule for Stayins' Parents and Guardians aims at collecting data having both a fact as well as an opinion bias. The fact question seeks information on the size, structure and socio-economic status of the family of the stayins. The opinion question pertains to the opinions of the parents about the school, and the need for educating children. This Schedule consisting of 25 questions is given in Appendix - G.

**Interview Schedule For Teachers**

This instrument is developed for collecting opinions of the teachers on the causes of dropouts. Information on the incidence due to each cause as perceived by the teachers is also collected. The questions in the Interview Schedule is organised in a funnel sequence. The Schedule consisting of 15 questions is given in Appendix - H.

**The Causes**

The opinionnaires are meant for ascertaining the relative importance of the causes of dropout. It contains provision for mentioning additional causes from the inspecting officers of all Zones including the Head Office and all Districts. Provision for
the staff of the teachers' training institutions and educated persons are also included for expressing their views. The opinionnaire provides for scoring the causes of dropout on a five-point scale carrying the credits of 5, 4, 3, 2 and one point respectively for most important, very important, important, less important and least important categories. Instructions are given to read the opinionnaire carefully before marking ticks to the five point scale. The Causes consisting of 75 opinionnaires is given in Appendix - I.

3. THE SAMPLE

Imphal Town is taken as the sample. Because, this town is not only a class I town but also the most congested town in comparison to the other seven towns of Manipur. It covers an area of 17.48 square kilometres having a population of 67,717 according to 1961 census which is increased to 1,00,366\(^5\) in 1971. The density of population per square kilometre is 5,742\(^6\). 71 percent of the total urban population is concentrated in Imphal town. The other towns are Churachandpur, Kakching, Moirang, and Thoubal. These towns are Class V towns. Bishenpur, Nambol, and Lamlai are the Class VI towns.

The Imphal town is, in fact, a cosmopolitan town in comparison to the other towns of Manipur. Many people from different places of Manipur and outside Manipur come to live here.

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with their families in connection with their occupation or business. It is really difficult to distinguish such pupils as purely urban or purely rural or purely hills as many rural and hill pupils come to read in the schools of Imphal town.

In Imphal town there were 133 schools during the period under study. Out of this total number 84 schools were primary, and 49 were middle, high and higher secondary schools. Out of the total number 92 schools were run by the State Government, 40 were aided and one was run by the Central Government. The total number of teachers were 1048; out of which 603 were government, 24 were Central Government and 421 were aided school teachers. Of the total number of teachers 402 belonged to primary and 646 belonged to middle, high and higher secondary schools.

The total number of enrolment in these 133 schools by 1970 were 28273. Out of this total number 12107 were primary, and 15835 were middle, high, and higher secondary school students.

The career of 2927 fresh entrants in Class A in 1961 has been followed upto Class VIII in 1970 in the present study. Class IX in 1971 is taken as the course completion year of the primary course for the purpose of finding out accurate result. The enrolment figure, classwise dropout and stagnation according to cohort is given in Table 4.3

7Municipal Year Book, Manipur, 1971, op.cit., pp. 8,9 and 12.
TABLE 4.3
INITIAL COHORT IN IMPHAL TOWN FROM CLASSES A TO IX FROM 1961 TO 1971

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</thead>
<tbody>
<tr>
<td>Class</td>
<td>A</td>
<td>B</td>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
<td>VIII</td>
<td>IX</td>
</tr>
<tr>
<td>Enrol-</td>
<td>2927</td>
<td>1505</td>
<td>1149</td>
<td>898</td>
<td>733</td>
<td>696</td>
<td>629</td>
<td>3717</td>
<td>3539</td>
<td>3785</td>
<td>2058</td>
</tr>
<tr>
<td>Drop-</td>
<td>1422</td>
<td>356</td>
<td>251</td>
<td>165</td>
<td>37</td>
<td>67</td>
<td>75</td>
<td>178</td>
<td>1195</td>
<td>1727</td>
<td></td>
</tr>
<tr>
<td>Stagna</td>
<td></td>
<td></td>
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<tr>
<td>tion</td>
<td>92</td>
<td>1894</td>
<td></td>
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</tbody>
</table>

Two dropouts and two stayins from each of the 133 sample schools of Imphal town are selected. Two parents and guardians each of the dropouts and stayins are interviewed. The headmasters or the headmistress and the teachers of the sample schools, the teacher educators, and the inspecting staff are also interviewed. The ratio is, however, kept varying depending upon the number of dropouts for each of the sample schools.

The sample schools represent various strata. The various strata into which the population are divided are: (a) schools with different number of teachers, (b) schools located in different areas, (c) schools according to stages of education (lower primary, U.J.B., J.B., middle, and junior high schools), (d) schools with trained and untrained teachers, (e) schools with teachers of different age-groups, (f) schools according to sex (boys', girls' and coeducational), (g) schools with male and female teachers, (h) schools with teachers possessing different qualifications, (i) schools according to the type of management, (j) schools with
teachers of varying teaching experiences, (k) mission schools and local schools, (l) schools with teachers having residence at different distances from the schools, (m) schools located in societies with different economic backgrounds, (n) schools located in societies with different degree of educational consciousness, (o) schools possessing different degree of physical facilities, (p) schools with different sizes (student strength) of total enrolment, (q) schools with varying pupil-teacher ratios, (r) schools with different chronological ages (standing of schools), (s) schools with buildings (broken and well built). The sampling fraction is kept in form for each stratum. But in the case of certain strata having very few schools the sampling fraction varies.

4. MECHANICS OF DATA COLLECTION

The core part of this present investigation consisted of studying the various quantitative aspects of the problem following the 'True Cohort Method'. For calculating the rate of dropout in 133 sample schools the relevant data are gathered by the investigator herself through the School Information Blank. Interview Schedules for dropouts and their parents, stayins and their parents are administered with the help of Headmasters or Headmistresses and Head Pandits of all the sample schools.

The investigator takes the initiative of distributing all the proforma to the sample schools. A time limit of 15 days for all the sample schools are given which they never complied with. Most of the Headmasters and Head Pandits have very poor knowledge of
the technique. Since most of the school records have not been kept properly, the investigator herself assisted as well as takes full initiative of finding out the proper records. In tracing a record it takes three days at least since the records have been kept in a hazardous way.

Real difficulty arises when the Headmasters and Headmistresses and the Head Pandits are not frank of their inability to follow the technique of filling up the requirements. So, they scheduled the investigator to collect their responses after one month; even then the work was left undone. Its most important factor is that they paid least importance because of their inefficiency of their school administration and improper keeping of the records. Sometimes the investigator has been discouraged by their inactivity of filling up the School Information Blank. For instance, the Headmaster of Tombisana High School* stated this investigation work is 'layman's business'++. However, there are schools keeping the records properly and systematically and as such they finished the work within the stipulated period.

Some teacher respondents considers filling up the questionnaire is an extra labour and therefore, they suggested the investigator for an allowance. Later on the investigator makes them understand it as a part of moral duty. The teacher-educators does not take time in responding the questionnaire.

*The Tombisana High School has classes from III to X, Since, the investigation is classwise basis and not on schoolwise basis the said high school is taken for study. Moreover, it situates at the heart of the town.

++The Headmaster, Sri Sarma, responded that since he is a busy man he cannot respond the questionnaire. When the investigator told him that he will be given enough time the Headmaster agreed to respond it. It takes more than one month.
Keen interest is taken when the investigator comes across schools without furniture, without blackboard, without playground, schools where the number of teachers are almost the same as pupils, schools where four classes are held simultaneously with no partition, schools where the teachers are found very irregular and when there are congested schools in one locality.

The inspecting staff of the District Education Offices at the five districts takes no time in giving their responses. On the other hand, the inspecting officers of the four zones of the Central District required persuasion. Out of these four zones two are located in Imphal town while the other two are in rural area. The inspecting staff in the two zones located in rural area, Zone No. III and Zone No. IV, takes longer time in giving their responses. The proforma are distributed personally and collected personally.

The interview schedules are administered to fathers and in their absentia to mothers. It is administered with the help of school teachers and local intellectuals. In dealing with the parents the investigator interviews technically and psychologically. The investigator sometimes comes down to the level of the respondent, sometimes higher and sometimes at the same level. There are some parents of dropouts who expects the investigator as one who can provide monetary help as well as employment to their wards.

5. STATISTICAL TREATMENT OF DATA

For finding out the total number of dropouts, stagnants, percentage rate of dropouts and stagnants and educational wastage
the investigator follows the technique used by D.S. Rawat and B.R. Goyal of the National Council of Educational Research and Training. Its process of calculation is as follows:

Total Number of Dropouts = \((A + B)\)

where 'A' is the number of pupils on roll at the beginning of the school year as per categories of (i) successful pupils from the previous class in the school, (ii) admitted for the first time in the class, and (iii) failures of the previous years. 'B' is the number of pupils on the roll at the end of the school year.

Total Number of Pupils Failing = \((B - D)\)

where 'B' is the same as above and 'D' is the total number of pupils passing the annual examination.

\[
\text{Percentage Rate of Dropout} = \frac{A - B \times 100}{A} \quad \text{or} \quad \frac{C \times 100}{A}
\]

where 'C' is the total number of dropouts and 'A' and 'B' are the same as above.

\[
\text{Percentage Rate of Stagnation or Failure} = \frac{(R - D) \times 100}{E \times 100}
\]

where 'E' is the total number of failed pupils.

Percentage Rate of Educational Wastage Including Both Dropouts and Failures:

\[
\frac{A - D \times 100}{A}
\]

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Responses given by the dropouts, dropouts' parents and guardians, stayins, stayins' parents and guardians and teachers are formed into frequency distribution. These frequencies of responses are converted into simple percentages. Thus the ranks obtained are graded according to their percentages.

To test the variation in the incidence of dropout at the primary level from 1961 to 1970 the 'Enrolment True Cohort Method' is followed. Its gradewise and yearwise variations are examined with 'Analysis of Variance' techniques. And 'F-ratios' are calculated to test the significance of the variations. The formula is:

\[
F = \frac{\text{Mean squares for each criterion variable}}{\text{Error Mean Squares}}
\]

The differences between the incidence of any two percentage rates of wastage, stagnation and wastagnation among boys and girls are measured by calculating the value of 'Z'. The formula is:

\[
Z = \frac{P_1 - P_2}{\sqrt{PQ(N_1 + N_2)}}
\]

where \( N_1 \) and \( N_2 \) are always very large. \( P_1 \) and \( P_2 \) are the percentage rates and \( N_1 \) and \( N_2 \) are their respective true values.

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cohorts. P is the estimate of the common population parameter (percentage rate) found by pooling \( P_1 \) and \( P_2 \). The pooled estimate is by the formula:

\[
P = \frac{N_1 P_1 + N_2 P_2}{N_1 + N_2} \quad \text{and} \quad Q = (1 - P)
\]

The average rate of dropout in the sample schools of Imphal town is calculated by using Arithmetic Mean, Median and Standard Deviations for the years from 1961 - 1970. The formulae are:

1. Mean (\( \bar{x} \)) = \( \frac{\sum fx}{N} \) where \( f \) = frequency \( x \) = mid points of class intervals \( n \) = total number of schools of Imphal town

2. Standard Deviation (\( \sigma \)) = \( \sqrt{\frac{\sum f(x - \bar{x})^2}{N}} \) where \( \bar{x} \) = mean

3. Median = \( L + \frac{N}{2} - F \) \( \frac{f}{f_m} \) i

4. Standard Error (Mean) = \( \frac{\sigma}{\sqrt{N}} \)

Standard Error (Median) = \( \frac{1.253 \times \sigma}{\sqrt{N}} \)

To ascertain concomitant relationships between the rate of dropout (Criterion Variable) and the physical facilities in schools, pupil-teacher ratios, size of schools and standing of schools (the school variable), rank correlations\(^{11} \) are computed.

\(^{11}\)Ditto.
The formula is:

\[ r = 1 - \frac{6 \sum d^2}{N(N^2 - 1)} \]

For calculating the difference between dropouts and stayins on certain pupil variables and family variables as judged by the three set of judges the formula of Chi-square and 't' test are used. The formulae are:

\[ X^2 = \sum \left( \frac{(f_o - f_e)^2}{f_e} \right) \]

where \( f_o \) = observed frequencies and \( f_e \) = expected frequencies

in which degrees of freedom (df) = \((r - 1)(c - 1)\) where 'r' and 'c' are the numbers of rows and columns in the table.

In ascertaining the common agreement among the three sets of judges for the causes of dropout Concordance Coefficient is calculated by the formula:

\[ \text{Concordance Coefficient (w)} = \frac{\sum \sum 1 - \frac{Lxij}{n + 1}}{m \cdot n} \]

where \( x_{ij} \) is the rank assigned by the ith set of judges to the jth items of cause.

\[ m = \text{sets of judges or sets of ranks} \]
\[ n = \text{number of items of causes} \]

Significance of the value of Concordance Coefficient (w) is tested by:

\[ F = \frac{(m - 1)w}{(1 - w)} \]

\(^{12}\text{Edwards Allen E}; \text{op.cit., pp.} 403-413.\)
with \((n - 1)\) for the numerator and \((m - l) (n - l) \text{df}\) for the denominator, and 'w' is the Concordance Coefficient.

'W' is also related to the Mean Coefficient of Correlation among the three sets of ranks through the formula:

\[
\text{Mean Correlation Coefficient } (R) = \left(\frac{m}{m - 1}\right) \text{w}
\]

where \(R\) is the average value of all the three possible rank Correlation Coefficient.

The value of Concordance Coefficient is also tested by 't' test for significance. The formula is:

\[
t = \frac{r'}{\sqrt{1 - r'^2}} \sqrt{n - 2}
\]

where \(n = \text{number of pairs of observations}\)

Continuity Corrections (Wc) in W is used before testing it for significance. W with continuity corrections is given by

\[
Wc = \frac{\text{Sum of squares between columns} - \frac{1}{m^2}}{\text{Total sum of squares} + \frac{1}{m}}
\]

where \(m\) is the number of judges or sets of ranks available.