CHI SQUARE TEST FOR INDEPENDENCE OF ATTRIBUTES

1.

Contingency table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Second Thoughts | |
| YES | No |
| First Choice | YES | 48 | 158 |
| NO | 60 | 41 |

Hypothesis:

H0 : Students having second thoughts about their course during their term of study and the UG degree chosen by them being their first choice are independent events.

v/s

H1 : Choosing their preferred course and having second thoughts about the course are not independent i.e. they are dependent.

Test Statistic:

Χ2 = ~Χ2(m-1)(n-1),α

Where N->Total no. of students(Here, N=307),

m->no. of rows

n->no. of columns

->observed frequency

-> expected frequency

= P[AiBJ] =

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | Second Thoughts(B) | |  |
| YES | No |  |
| First Choice(A) | YES | 48 | 158 | A1=206 |
| NO | 60 | 41 | A2=101 |
|  |  | B1=108 | B2=199 | N=307 |

Decision Rule:

We accept H0 ­ when Χ2­cal < Χ2(m-1)(n-1),α

and reject H0  when Χ2­cal > Χ2(m-1)(n-1),α

where Χ2(m-1)(n-1),α = X2(1, 0.05) =3.841

Computed chi square value:

X2cal = 37.16

Conclusion:

At α=5%, Χ2­cal > X2(1, 0.05). Hence, we reject H0 and conclude that first choice of course and having second thoughts about the course are dependent attributes.

2.

Contingency table:

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Involved parents | |
| YES | No |
| Gender | Female | 137 | 25 |
| Male | 105 | 40 |

Hypothesis:

H0 : Students’ gender and parents’ involvement are independent of each other

v/s

H1 : Students’ gender and parents’ involvement are not independent of each other.

Test Statistic:

Χ2 = ~Χ2(m-1)(n-1),α

Where N->Total no. of students(Here, N=307),

m->no. of rows

n->no. of columns

->observed frequency

-> expected frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | Involved parents(B) | |  |
| YES | No |  |
| Gender(A) | Female | 137 | 25 | A1=162 |
| Male | 105 | 40 | A2=145 |
|  |  | B1=242 | B2=65 | N=307 |

= P[AiBJ] =

Decision Rule:

We accept H0 ­ when Χ2­cal < Χ2(m-1)(n-1),α

and reject H0  when Χ2­cal > Χ2(m-1)(n-1),α

where Χ2(m-1)(n-1),α = X2(1, 0.05) =3.841

Computed chi square value:

X2cal =6.3386

Conclusion:

At α=5%, Χ2­cal > X2(1, 0.05). Hence, we reject H0 and conclude that students’ gender and parents’ involvement are not independent of each other.