4. Empirical Studies

Example 4.1 A teacher wants to have a dinner party with students in the end of this year. He wants to know that will the sex make a difference choice about dinner style? He conducts a sampling survey and randomly chooses 100 samples (50 males and 50 females) from NCCU. During answering process, people are asked to reply in two methods: traditional reply and fuzzy reply. In traditional reply, people just only can choose one answer. In fuzzy reply, people can answer the questionnaire in percentage (the total percentage is 100%). For instance, they can answer that 70% like Chinese style, 20% like Japanese style and 10% like Korean style. Then he sum up the percentage and the result is as follows:

Table 4.1. ***Response in traditional way***

style / voter	Chinese style	Japanese style	Korean style	Thailand style	Others	χ^2-test of homogeneity
Male	27	12	2	3	6	$\chi^2 = 3.46 >$
Female	26	14	2	0	8	$0.71 = \chi^2_{0.95}(4)$

Table 4.2. ***Response in fuzzy numbers***

Style / voter	Chinese style	Japanese style	Korean style	Thailand style	Others	χ^2-test of homogeneity
Male	19.86	16.09	4.45	3.6	6	$\chi^2 = 0.18 <$
Female	18.7	13.5	6.82	4.29	6.69	$0.71 = \chi^2_{0.95}(4)$

Null hypothesis H_0 : there is no difference of the choice for the dinner style against the alternative hypothesis H_1 : H_0 is not true. Under the significance level $\alpha = 0.95$, we can find that there exists difference statistical testing conclusion: for traditional reply, we will reject the null hypothesis. While for the fuzzy reply, will accept the null hypothesis. i.e. For traditional reply, the sex make a difference choice about dinner style. While for fuzzy reply, the sex make no difference choice about dinner style. Therefore we had different conclusion in this case. We feel that using sampling survey can best reflect the truly thought of human being.