Incorporating technology in designing a Chinese floral arts course for general education

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ABSTRACT: The normal procedure in the traditional teaching of the Chinese floral arts in general education has been all paper work. It is known that if one follows that procedure, then the learning effect for students is not that enduring. Therefore, a new teaching method is presented to make learning more efficient. Based on this concept, the author presents a 36-hour course on Chinese floral arts combined with traditional material and the 3D animated computer aids, as well as traditional teaching materials, to help in the vocational education system. After the course had been designed, the author has also created an evaluating toolbox based on the fuzzy comprehensive method and with *Matlab* software to evaluate whether this teaching method was effective. Having been evaluated through a series of practical teaching and student's evaluations, the result shows that the structure of this research method is reasonable and practical, and that the structure can be used in other related fields. Although the whole course was focused on the new tools, the main purpose was to make students understand the essence of Chinese cultural arts more deeply and, consequently, enjoy it. Results indicate that this method upgraded the cultural level of students and increased students' emotional intelligence.

INTRODUCTION

The beautiful flowers and plants of the environment symbolise the Chinese floral arts. It is one of the important Chinese aesthetic arts, which originated back in the Sixth Dynasty, about 1,500 years ago. There is the saying, *a flower represents a world; a leaf interprets the whole universe.* So, too, do the floral arts humanise themselves by blending the characteristics of flowers and plants into the spirituality of heaven and Earth. That is, this visually appealing artistic expression implies the renascent meaning of life. Also, floral art is widely used in Chinese daily life, such as altar offerings, decorations in a study or ceremony and garden designs, even as tea flavouring. Moreover, Chinese enjoy arranging flowers to convey their ideas and feelings. Chinese see life and art as inseparable, thus cultivating their tastes, manners and minds. Floral artistic expression exceeds all others in Chinese humanism.

Flower arrangement corresponds to the 24 solar terms, as well as the four seasons, for example, chrysanthemums on for the Double 9th Festival, Gomphrena Globosa L. on 7 July or appropriate flowers used for Dragon Boat Festivals and Mid-Autumn Festivals. Applying seasonal flowers into customs and traditions can colour people's lives and improve their living standards further. Sometimes, the focus is too much on the structures and techniques of flower-types, neglecting their real essence and disposition. Instead, we need to make friends with these *individuals*, and try to deeply understand them to have them presented in their own manner [1-4].

A study programme for a single-semester 18-hour course was devised for students in the Faculty of Technology. Hence, in this article, the author first introduces the whole course content of the Chinese floral arts, which includes teaching objects, teaching method, teaching materials, and the history of the Chinese floral arts. Also presented is 3D computer aided teaching [5]. The fuzzy method and evaluating toolbox, based

on *Matlab*, was created as an auxiliary to this course [6]. Some advantages and suggestions for further research are also given.

The course on the Chinese floral arts covers the following:

- *The teaching object*: The main object of this course is that the foundation of the Chinese floral arts is built up in the beauty and savouring of natural flowers; it not only can create a happy feeling in students' minds, but can also transfer the physical into a spiritual sense of beauty;
- *The teaching method*: In the teaching method of the Chinese floral arts, the VCD, demonstration by teacher and discussions between the teacher and students are in progress at the same time;
- *The teaching materials*: In the Chinese floral arts course, the total class time is 18 hours (over one semester) and is divided into nine parts, as shown in Figure 1 [7].

BRIEF HISTORY OF THE CHINESE FLORAL ARTS

The history of Chinese floral arts can be roughly divided into several sections (two hours). The contents are as follows:

- The creative state: 500 AD;
- The golden state of the Chinese floral arts: 581-960 AD; during this period, the combination of a plate with a vase for the floral arts was developed;
- The highest state of the Chinese floral arts: 960-1279 AD; during this period, four famous arts were presented: *arranging the flowers*, *offering the incense*, *ordering the tea* and *hanging the paint*;
- The stagnation state of the Chinese floral arts: 1279-1368 AD;
- The reconstruction state of the Chinese floral arts: 68-1664 AD: During this time, new concepts were the main characteristic with newly classical flowers and the history of the vase;

- The decline of the Chinese floral arts: 1664-1911 AD; due to an increase in the Japanese floral arts, the Chinese floral arts were under a state of decline;
- The recreation state of the Chinese floral arts: from 1911 AD on, with the Chinese floral arts applied to human life.
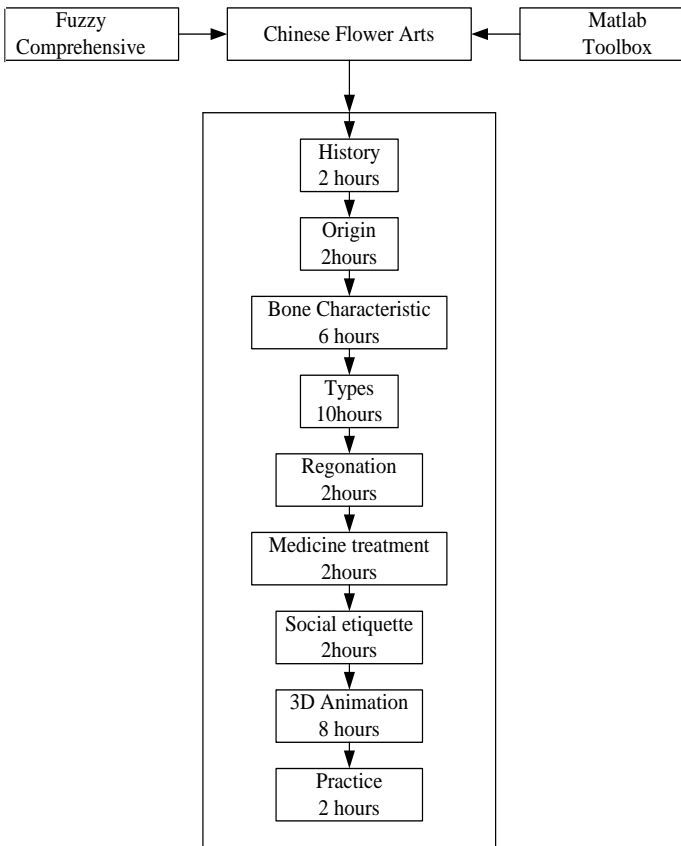
Figure 1: The structure of the research.

The section on the origin of flower containers and the key characteristics of the Chinese floral arts covers two hours teaching time.

The bone characteristics of flower type cover six hours and tackles the practice of flower arranging. The most important thing in flower arranging is to find the suitable point on the whole plane. The first step is to find the focal point, and then focus on its state harmony (see Figures 2 and 3).
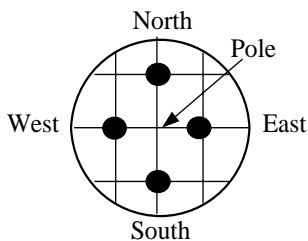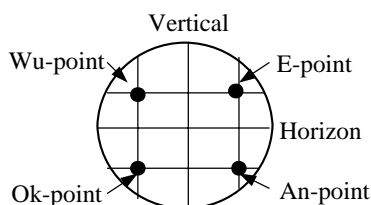
Figure 2: The bone of the flower type.

Figure 3: Characteristics of the flower type.

The section on elements of the Chinese floral arts introduces the six types of Chinese floral art, including plate, cylinder, barrel, basket, bowl and vase. The main point of the six types of Chinese floral arts focuses on how to define the modern ratio and classical ratio (see Figures 4-9). The total teaching time is 10 hours.
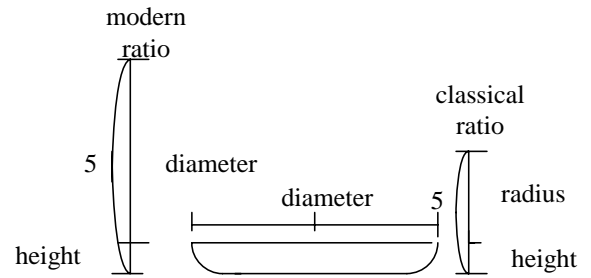
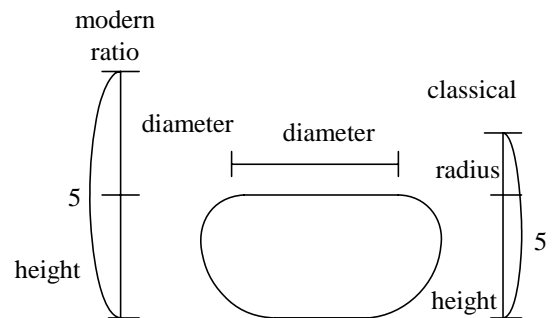Figure 4: The ratio of plate to the flower.

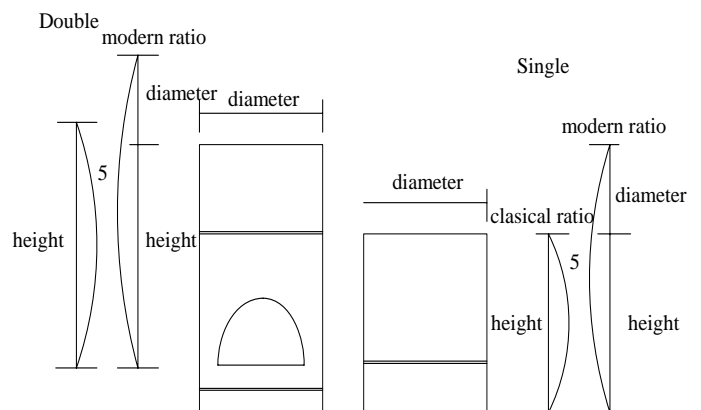Figure 5: The ratio of cylinder to the flower.

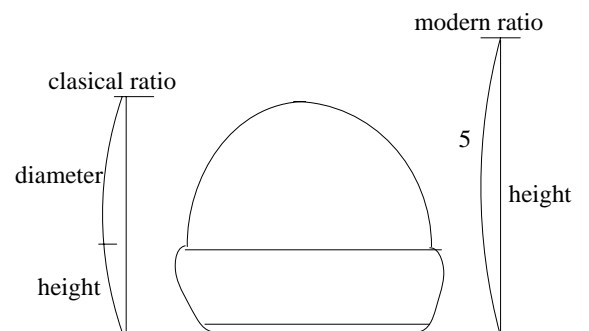Figure 6: The ratio of barrel to the flower.

Figure 7: The ratio of basket to the flower.

Recognising different flowers in campus involves introducing different kinds of flowers on campus to students, so as to enhance students' basic knowledge regarding flowers. The total teaching time is two hours.
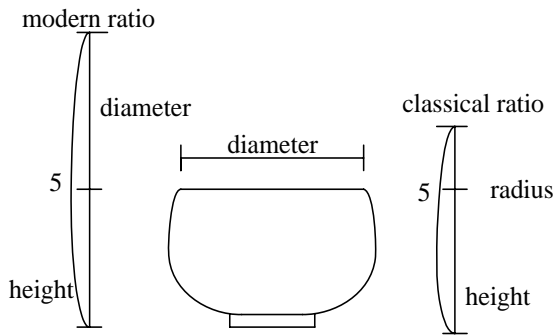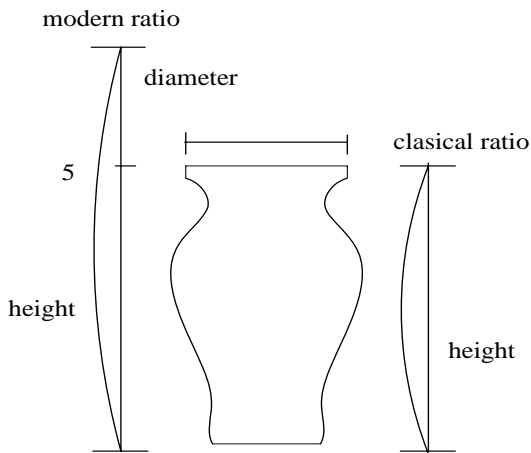
Figure 8: The ratio of bowl to the flower.

Figure 9: The ratio of vase to the flower.

The section on the Chinese floral arts in medicinal treatments introduces students to medical treatments via the Chinese floral arts (see Table 1). The total teaching time is two hours.

Table 1: The Chinese floral arts in family medicine.

Type of Disease	Kind of Flower
1. Diabetes	Alstroemeria
2. Anaphylactic trinities	Cunjevoi
3. High blood pressure	Chrysanthemum
4. Low blood pressure	African chrysanthemum
5. Shpilkehs	Lavender
6. Headache	Helianthus
7. Anaemia	Pasque flower
8. Asthenopia	Tulip
9. Frodone	Rose
10. Hepeatopathy	Gentian
11. Asthma	Cockscomb
12. Bronchitis	Azalea

Table 2: The Chinese floral arts and social etiquette.

Occasion	Kind of Flower
1. Accouchement	Rose or chrysanthemum (basket type)
2. Inauguration	Chrysanthemum, cunjevoi or gentian (basket type)
3. Entrance to school	Tulip or African chrysanthemum
4. Graduation	Orchid
5. Adulthood	Rose
6. Visiting the sick	Alstroemeria
7. Marriage	Hyacinthine
8. Congratulations	Rose or tulip

The Chinese floral arts in social etiquette introduces students to application in social etiquette. The classification is listed in Table 2 and the total teaching time is two hours.

3D Aids in Teaching Materials in the Chinese Floral Arts

Research into the field indicates that the use of Web sites or 3D animation methods to explain the Chinese floral arts has not been seen frequently [8]. Further, the teacher always finished the final product. Therefore, in this situation, the author has developed the concept based on the computer and presented 3D animation on a Web site. This provided a new approach to the Chinese floral arts, as well as a new concept for Chinese culture, and produced teaching materials of general education for vocational schools. For this section on teaching via the Web site, the teaching time was eight hours (see Figure 10).
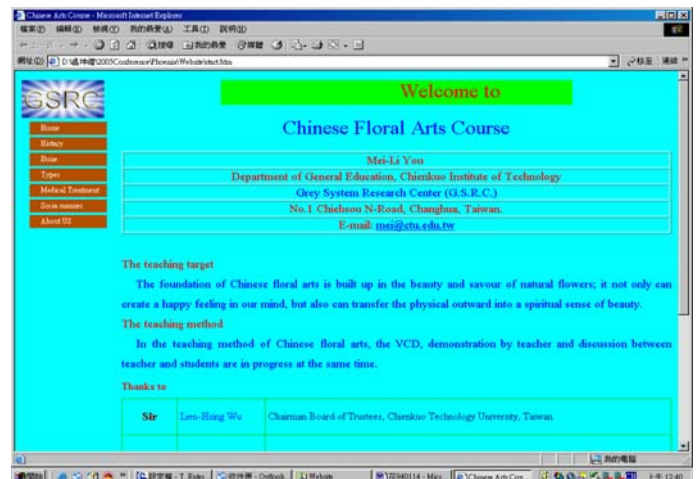

Figure 10: The main screen of the Web site.

The software and hardware requirements are as follows:

- Windows 2000 or upgrade version;
- Screen resolution set to at least 1024×768;
- Acrobat *Reader* (at least version 4.0).

The set-up is as follows:

- Create a folder called *Flower* on the hard disk;
- Copy all the files into the *Flower* directory.

The procedures are as follows:

- Click the *Start* button;
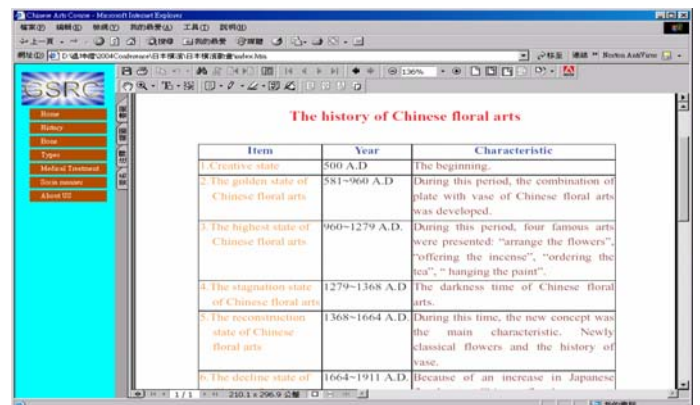- Select the *History* key (PDF file) (see Figure 11);

Figure 11: The history of the Chinese floral arts.

- Choose the *Bone* key (PDF file) (see Figure 12);
- Pick the *Types and 3D* key (FLASH & JPG file) (see Figures 13 and 14);
- Select the *Medical Treatment* key (PDF file) (see Figure 15);
- Choose the *Social Manner* key (PDF file) (see Figure 16).
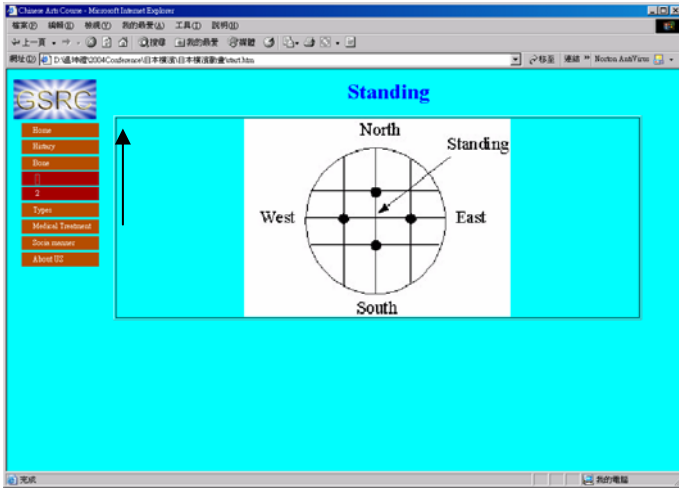

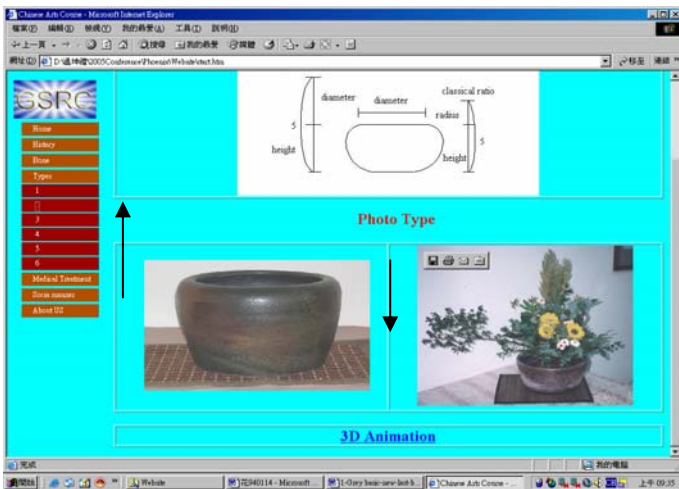Figure 12: The figure of for the standing point.

Figure 13: The detail of the cylinder-flower ratio (includes 3D animation).
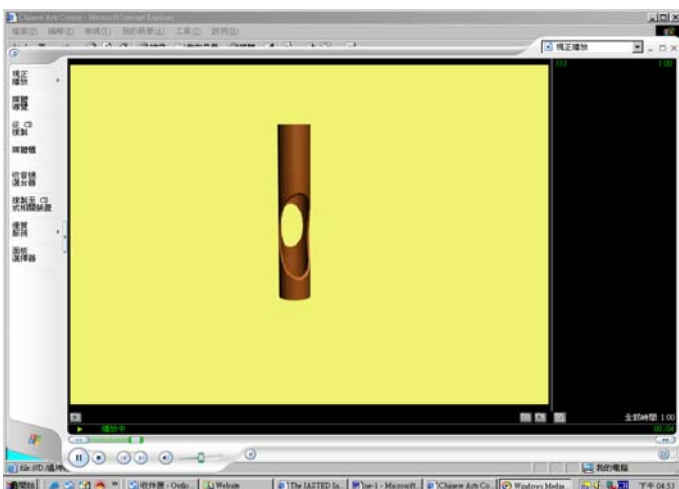

Figure 14: The 3D animation of the barrel flower.

After the course, students are instructed to undertake a practical exercise so as to intensify their skills. The total teaching time for this section is four hours.
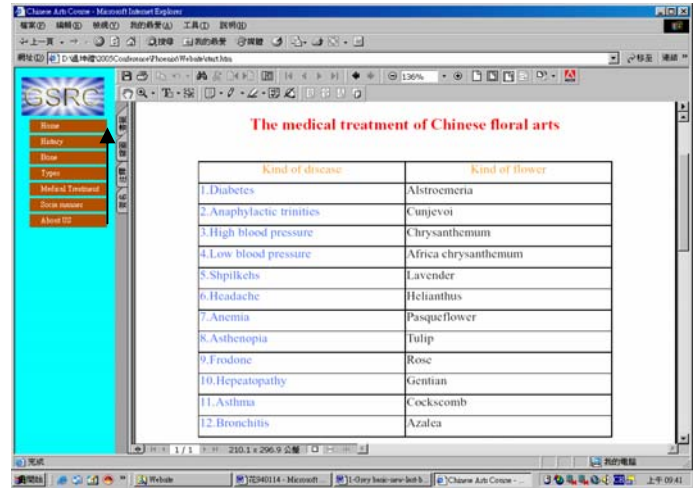

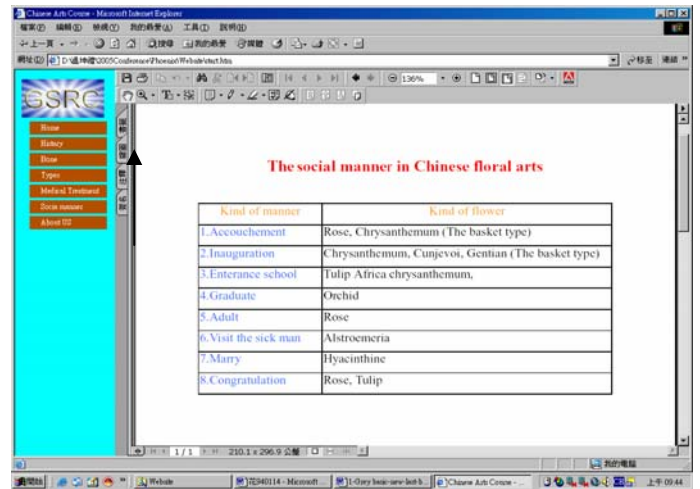Figure 15: The medical treatment of Chinese floral arts.

Figure 16: The social manner of Chinese floral arts.

EVALUATION

Mathematics Method

In this article, the fuzzy comprehensive evaluation method was utilised as the mathematics method. The whole process is described below [9][10].

Build the factor set *U*:

$$U = (u_1, u_2, u_3, ..., u_m) \tag{1}$$

where: u_i, $i = 1,2,3,...,m$ are the influence factors.

Build the fuzzy weighting set a_i to correspond to each influencing factor (based on the Zadeh method):

$$\tilde{A} = \frac{a_1}{u_1} + \frac{a_2}{u_2} + \frac{a_3}{u_3} + ... \frac{a_m}{u_m} \tag{2}$$

where: $\sum_{i=1}^{m} a_i = 1$

Build the evaluation set *V*:

$$V = (v_1, v_2, v_3, ..., v_m) \tag{3}$$

Calculate the fuzzy relationship:

$$\tilde{R}_i = \frac{r_{i1}}{v_1} + \frac{r_{i2}}{v_2} + \frac{r_{i3}}{v_3} + ... \frac{r_{in}}{v_n} \tag{4}$$

Translate Eq. (4) into a fuzzy evaluation matrix:

$$\tilde{R}_i = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & \ddots & \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix} \quad (5)$$

Calculate the evaluation index:

$$B = \tilde{A} \circ \tilde{R} = (a_1, a_2, a_3, ..., a_m) \circ \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1n} \\ r_{21} & r_{22} & \cdots & r_{2n} \\ \vdots & \vdots & \ddots & \\ r_{m1} & r_{m2} & \cdots & r_{mn} \end{bmatrix}$$

$$= (b_1, b_2, b_3, ..., b_n) \quad (6)$$

Based on the fuzzy maximum-minimum method, calculate the evaluation results:

$$b_j = \bigvee_{i=1}^{m} (a_i \wedge r_{ij}), \ j = 1, 2, 3, ..., n) \quad (7)$$

Evaluation Results

In building the factor set *U*, the subjects are third grade students enrolled at Chienkuo Technology University. There was a total of two classes and 100 students.

In building the fuzzy weighting set a_i, and based on Table 3, the following was achieved:

$$\tilde{A} = \frac{0.13}{u_1} + \frac{0.13}{u_2} + \frac{0.08}{u_3} + \frac{0.08}{u_4} + \frac{0.08}{u_5}$$
$$+ \frac{0.13}{u_6} + \frac{0.05}{u_7} + \frac{0.10}{u_8} + \frac{0.09}{u_9} + \frac{0.13}{u_{10}}$$

Table 3: The evaluation items.

No.	Items and Importance	Extremely Important	Very Important	Important
1	Had an abundance of professional knowledge	*		
2	Sufficiently prepared for this subject	*		
3	Energetic and interesting in this class		*	
4	Willing to accept different points of view		*	
5	Perfect schedule control		*	
6	Had a conscientious and serious attitude about teaching	*		
7	Encouraged students to think and try to resolve all questions			*
8	Strictly asked students to do their homework		*	
9	Had a precise trend towards the teaching programme		*	
10	Used extra instruments to enrich the teaching	*		

where: Extremely important: 3 points.
    Very important: 2 points.
    Important: 1 point.

In building the evaluation set *V*, the results listed in Table 4 were achieved (based on a Likert five-point scale).

Table 4: The evaluation levels.

Symbol	v_1	v_2	v_3	v_4	v_5
Level	Excellent	Best	Good	Bad	Worse

To calculate the fuzzy relationship $\tilde{R}_i$, and substituting the data from the investigation, the following was revealed:

$$\tilde{R}_1 = \frac{0.24}{v_1} + \frac{0.69}{v_2} + \frac{0.07}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_2 = \frac{0.22}{v_1} + \frac{0.62}{v_2} + \frac{0.16}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_3 = \frac{0.27}{v_1} + \frac{0.60}{v_2} + \frac{0.13}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_4 = \frac{0.24}{v_1} + \frac{0.49}{v_2} + \frac{0.27}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_5 = \frac{0.13}{v_1} + \frac{0.47}{v_2} + \frac{0.33}{v_3} + \frac{0.07}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_6 = \frac{0.25}{v_1} + \frac{0.62}{v_2} + \frac{0.13}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_7 = \frac{0.11}{v_1} + \frac{0.45}{v_2} + \frac{0.22}{v_3} + \frac{0.22}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_8 = \frac{0.14}{v_1} + \frac{0.53}{v_2} + \frac{0.33}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_9 = \frac{0.14}{v_1} + \frac{0.65}{v_2} + \frac{0.16}{v_3} + \frac{0.05}{v_4} + \frac{0.00}{v_5}$$

$$\tilde{R}_{10} = \frac{0.11}{v_1} + \frac{0.45}{v_2} + \frac{0.44}{v_3} + \frac{0.00}{v_4} + \frac{0.00}{v_5}$$

The calculation evaluation index of $B = \tilde{A} \circ \tilde{R}$, taking the maximum-minimum method, yielded:

$$B = (0.13, 0.13, 0.08, 0.08, 0.08, 0.13, 0.05, 0.10, 0.09, 0.13)$$

$$\circ \begin{bmatrix} 0.24 & 0.69 & 0.07 & 0.00 & 0.00 \\ 0.22 & 0.62 & 0.16 & 0.00 & 0.00 \\ 0.27 & 0.60 & 0.13 & 0.00 & 0.00 \\ 0.24 & 0.49 & 0.27 & 0.00 & 0.00 \\ 0.13 & 0.47 & 0.33 & 0.07 & 0.00 \\ 0.25 & 0.62 & 0.13 & 0.00 & 0.00 \\ 0.11 & 0.45 & 0.22 & 0.22 & 0.00 \\ 0.14 & 0.53 & 0.33 & 0.00 & 0.00 \\ 0.14 & 0.65 & 0.16 & 0.05 & 0.00 \\ 0.11 & 0.45 & 0.44 & 0.00 & 0.00 \end{bmatrix} = (0.11, 0.45, 0.13, 0.05, 0.05)$$

and normalise $(0.11, 0.45, 0.13, 0.05, 0.05)$ into:

$$B = (13.9241\%, 56.9620\%, 16.4557\%, 6.3291\%, 6.3291\%)$$

Table 5 shows the evaluation results, while Figure 17 presents the distribution using the fuzzy maximum-minimum method.

Table 5: The evaluation results.

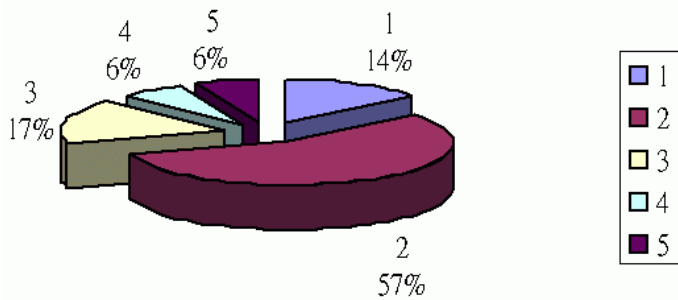| Level	Excellent	Best	Good	Bad	Worse
Results	13.9241%	56.9620%	16.4557%	6.3291%	6.3291%

Figure 17: The distribution using the fuzzy maximum-minimum method.

The Auxiliary Computer Toolbox

In the auxiliary computer toolbox, the input/output interface was based on the *Matlab* structure and, utilising one of tools of *Matlab*, the input data was expanded into the infinite in order to make this toolbox more powerful. This means that no matter how huge the matrix is, the operation process will not be influenced [13].

The Operation of the Auxiliary Computer Toolbox

The basic requirements are Windows 2000 or upgrade and *Matlab* 6.0 or upgrade.

The instructions in *Matlab* are as follows:

- Input the factors: f = [$a,b,c,d,…$] (factor set *U*);
- Input the relationship: r = [$a_1,b_1,c_1,d_1,…;a_2,b_2,c_2,d_2,…;…$], where: [$a_1,b_1,c_1,d_1,…;a_2,b_2,c_2,d_2,…;…$]: relationship *R*;
- Enter Fuzzymaxmin (f,r), and obtain the answer.

Matlab will display the values of the input data, factors, relationship, weighting for each factor, percentage weights and the results figure (see Figure 18).
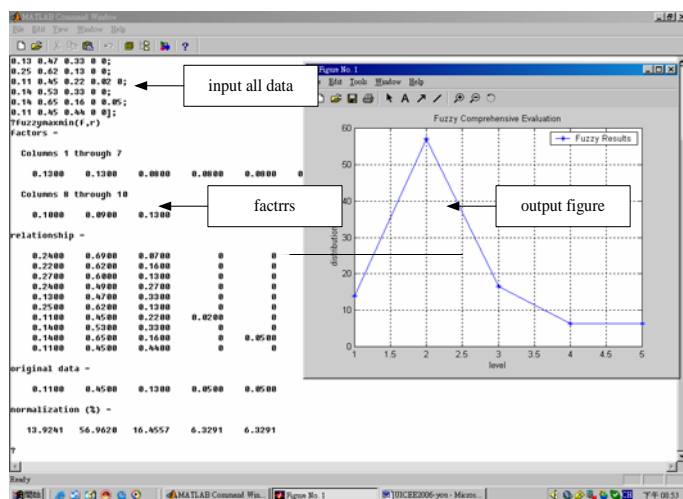

Figure 18: The screen of the *Matlab* toolbox.

CONCLUSIONS

In this research, the Chinese floral arts course was developed to be more precise, more teachable in class, and to make students more confident and appreciate the floral arts in an easier way. All of these factors are the focal points. Based on this research, the author has not only solved past problems of the teaching approach, but has also offered a new teaching approach. After the entire design of the course has been completed, the author plans to feature their results, including all materials, onto a Web site on the Internet to facilitate e-learning.

Furthermore, according to the evaluation of this course, it was found that over 87% (14+57+16 = 87) of students enjoyed this course very much. As a result, it can be concluded that this course design is rational and practical for general education.

To sum up, although an engineering evaluation method was used in order to obtain a cardinal result, it is known that the virtue development of students can be matched with their evaluation results. However, the use of different kind of engineering evaluation methods can lead to different results being derived. Those two points shall comprise the major research direction for the author in the future.

REFERENCES

1. Huang, Y.C., *Chinese Classical Flower Arranging.* Taipei: National History Museum (1995).
2. Chinese Floral Arts Foundation, *Flower Arranging in the Four Seasons.* Taipei: Chinese Floral Arts Foundation (1996).
3. Chinese Floral Arts Foundation, *Traditional Flower Arranging in China.* Taipei: Chinese Floral Arts Foundation (1997).
4. Chinese Floral Arts Foundation, *Flower Arranging for the Literate.* Taipei: Chinese Floral Arts Foundation (1998).
5. You, M.L. and Wen, K.L., The Computer Aid Chinese Floral Arts Course in general education. *Proc. 1st East-North Asia Inter. Conf. on Engng. & Technology Educ.*, 392-396 (2003).
6. You, M.L. and Wen, K-L., Applying *Matlab* to create a grey entropy toolbox for use in teacher appraisals. *World Trans. on Engng. and Technology Educ.*, 4, **2**, 281-284 (2005).
7. Chinese Floral Arts Foundation, *The Whole Basic Concept of Chinese Floral Arts.* Taipei: Chinese Floral Arts Foundation (2001).
8. Wen, K.L., You, M.L., Chen, H.C. and Jiang, J.J., The lot system presented by multi languages. *Proc. Inter. Conf. on Industrial Technology Educ.*, 233-238 (2003).
9. Wen, K.L. and You, M.L., The study of teaching via fuzzy comprehensive evaluation. *Proc. 10th Technological & Vocational Educ. Conf. (General and Educ. Topics)*, 257-263 (1996).
10. You, M.L. and Chyu, Y.W., The development of fuzzy comprehension evaluation toolbox and apply in students' reaction on teacher's instruction. *J. of Quantitative Management,* 3, **1** (accepted, 2006).