# An Introspection of Developing A Non-English Web-Based Learning Community

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## Abstract:

*This series of research attempted to develop a collaborative learning community shared by a university and three primary schools. An interactive platform was developed for children and to design a quasi-experiment to understand the users' learning behavior. The series has been conducted from 1996 until the present. Five generations of web-human interaction and user interfaces have been developed and tested.*

*Three major finding were examined: culture, learning model and learning achievement. During the development of users interface, we found the non-English diverse/local culture was impacted and deprived by the 'internationalization'. The 'web community model', which was different from the common 'radiation model' or 'broadcasting model', was a better design for web-based learning. Though we did not find a clear difference of learning achievement between users and non-users, we suggested that the concept of cultivation, which has a long tradition, deserved a new look.*

# 1 Introduction

This series research was divided 2 stages that attempted to access the specific objectives as follows:

First, to developing an interactive learning platform 'Gold Peach' for children based on the fundamental ideas of 'web community'. This stage had conducted since 1996. There were five generations of web-human interaction and user interface that had been developed and tested.

Second, to designing a quasi-experiment including 3 primary schools to testify the usability and to observe the learning behaviors in 'Gold Peach'. Two pretests and an interval test have been done. This stage began with 2001. The experiment is still under going.

During the research, we also initiated the discussions on 'culture' and 'cultivation' features for developing web-learning environment.

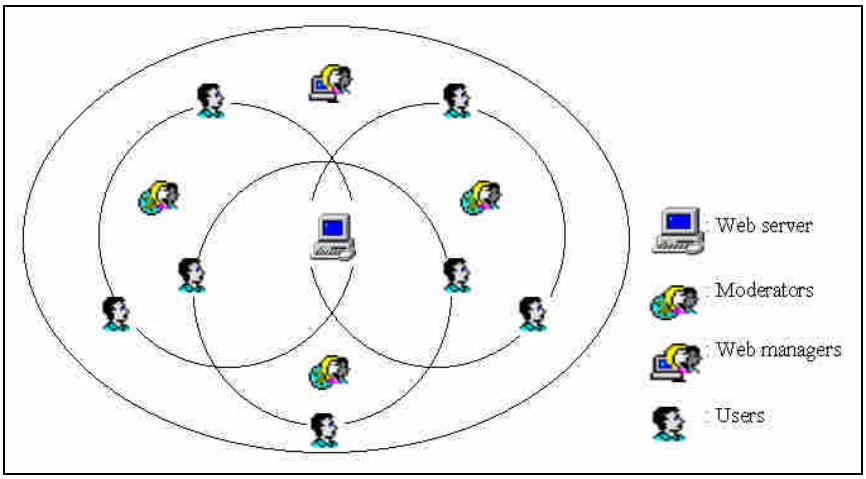
# 2 Literature Review and Problems Defining

## *2.1 Web Community*

Web community was a progressive and extended concept from 'network-based learning community' that was introduced by Lave ea al. (1991)'s 'situated learning' and modified by Qiou (1996). In the recent years, researchers both from the fields of education and information systems contributed deliberate ideas to build a web-based learning community with various points of view.

Reviewing relevant literatures, the components of network-based learning community are including:
The organization of community (Boisvert, 2000);
The learning activity (Lave et al., 1991) (Michalski, 2000);
The learning material (Mioduser et al., 2000);
The moderation (Qiou, 1996) (Kearsley, 1997) (O'Leary, 2000).
After examining the literature above, the author suggested there should be the fifth element: 'the integrated interaction model'.
Most of current website managers have a 'one to multiple' interaction with users through internet. The website manager will provide all web function, service content and all learning activities.
In practice, it is impossible to prepare complete and sophisticated learning material, achievement test, and all peripheral participation by a single manager or few individuals. It reflects the facts that a lot of existing learning websites that are lacking of updating or content depth.
Therefore, the author brought a new 'web community model' as Figure 1.

Figure 1. Web Community Model




This model designed two different interactions: systems functions and information contents. The website manager would only take the former responsibility. The information contents would be divided into more sub communities or interest groups that would be coordinated by external moderators. It was expected that there would be some interlaced area between groups, thus it would be linked as an integrated community. Group moderators did not have to worry about the web techniques; they could be concentrated to develop the learning behavioral interaction for users.

## *2.2 Culture*

During the process of developing the web community, we were inevitable to deal with the 'culture' feature on designing the visual usability.
Internet makes the earth smaller, brings the world into a village. Some advocated the software behind the browsers could be 'without frontiers'. (Hall, 1997) They believed that it could adapt the user interface to different social and cultural requirements that was referred to as 'software internationalization'. (Hall et al. 1999)
However, when we are celebrating the international boundary is falling down; do we regret that the pluralistic colors are also vanishing? Though there are millions web sites, we have found the inevitable trend that the web characters grow similar faces, wear same uniforms, their interactions are more and more following consistent pattern. We cannot tell which web site is from a certain corner of which continent.

It worried him when the author called for a seminar of designing a new web with his college students. When we needed an innocent leading actress, there was only Snow White left in students' mind; when we made up a worrier model, the Black Knight came out; when we set up exploring plots, they were thinking of Star Trek. They ignored or forgot there are plenty of symbols and scientific fictional stories in Chinese history and mysteries. The young generation is losing its heritage of cultural imagination. (Wu, 1997)
Thus researchers began to criticize the US-centric viewpoint and the US 'software evangelists' who determine the system design. (Kersten et al., 2001) A reconsideration suggested that we should remind web designers to consider 'cultural feature' to be an essential factor for designing web. It would be not interesting, if there were no cultural differences in the cyber world. (Hendeson, 1996; Wu, 1998; Wu et al. 2000,1999)
Kersten et al. (1999) even advocated that the culture factor should be deeper-than-interface localization. It should reflect the beliefs, ideas, language, rules, knowledge, procedures and norms. The approach was clear. However, the questions of implement remained. We need more studies working on this subject.

### *2.3 Cultivation*

The evaluation of users behavior through the brand new media in the web community came as the next question. However, the relevant research tradition suggested that it would not be easy. Media's form (or environment) is as well as content may produce cultivation effect to children, according to Gerbner et al. (1979)'s series work concerning Media Sociology perspective. This idea may trace back from a long tradition of 'The Medium is the Message' (McLuhan, 1966). It argued that media itself would affect audience's recognition, attitudes, and even behavior.
There were rich studies and documents on 'TV cultivation theories' in 1970s and 1980s. (Anderson, 1980; Hughes, 1980) Scholars advocated that there are heavy effects influencing children by television. They also found television would build up a 'media reality' which is far different from the 'real reality'. 'TV children syndrome' was discovered and considered a serious problem.
Nevertheless, there was still a positive angle to this effect. We could conclude that although media might distort one's behavioral development, while it also might inspire one's mental potential especially in his/her childhood.
WWW is the most powerful media next to television. When we reviewed the lessons from television, the author wanted to suggest that developing web is not only defining a mechanism but also initiating an organism that might cause cultivation between community members. There was a more than important methodological issue: many of the cultivation theories were concluded by qualitative approaches. It was and is very difficult to measure and collect data on the effect of cultivation in a short term.
The effect of cultivation could be operationalized and explored by users' behavioral changes after their experiencing the new media's form and environment. Therefore, the web community also needs a two-way feedback system to measure and collect users behavioral data in a long-term period. Then, we might be able to interpret the effect of cultivation, if there is any. This old tradition deserves a new evaluation.

### *2.4 Current Learning Webs*

The author thoroughly investigated ten significant current learning webs in Taiwan to understand if they also noticed the above three concepts. The observation could be summarized as:

Table 1.

| | Web Community | Culture | Cultivation |
|---|---|---|---|
| Yes | 2 | 0 | 1 |
| No | 8 | 10 | 9 |

Most of learning webs were in radiation model, one way teaching, and without any culture consideration. This fact explained the emerging need and encouraged the author to develop an integrated web learning community environment.
Furthermore, there was only one research paper concerning the academic evaluation on web community learning according to Eric (the U.S. Department of Education Educational Resource Information Center database) 2001. Since that paper (Waterkins, 1997) focused on the higher education system, it covered student retention rates, increased efficiency, but issues of culture and cultivation. It reflected the emerging need of a research on such issues through thorough methodology.

# 3 Methodology

A longitudinal quasi-experiment was designed and conducted from the spring semester of 2001 and 2002 (Wu, 2004e); four steps of methods were employed:
1. Literature reviews.
2. In-depth interviewing with experts whose major is in children education.
3. Web systems analysis and design. Four requirements had been defined, they were: Total Web-Based CAI, Interactive learning navigation, Collaborative classroom, and Community management.
4. Quasi-experiment and its design:

This experiment was conducted in the spring semester in 2001.
-Two small primary schools UJ and JM that were within the same location and similar size were designed to be the quasi-experimental groups. One control group XK primary school was chosen with the same profile as the quasi-experimental groups.
-Students of third to sixth grade were designated users. One class of each grade was randomly selected from UJ and JM, while two classes of each grade were chosen from XK.
-All groups took the same learning materials and same tests before and after training. The two quasi-experimental groups took the Gold Peach as an enhanced learning web community, while the control group followed the traditional classroom learning.
-Natural sciences materials were defined as the core task of the learning goal. All groups' learning achievement tests would be measured 3 times, once a month, during the experiment program.
-A training course was prepared to the teachers of the experimental groups. This training presented the necessary knowledge and skills to run the web community for teachers. The teachers' capability on using computer and their motivation of joining the web community were also measured for further references.

The processes of the experiment were summarized as the following:

Table 2.

| Process | | Teachers training | | | Students practice | | |
|---|---|---|---|---|---|---|---|
| | | Preliminary | Training | Tests | 1st month | 2nd month | 3rd month |
| Experiment groups | Teachers | Environment set up | Skills, materials, methods, examples. | Capability, Motivation. | Teaching | Teaching | Term seminar |
| | Students | | | | Test 1 | Test 2 | Test 3 |
| Control group | Students | | | | Test 1 | Test 2 | Test 3 |

# 4 Results

## *4.1 The structure of the web community*

The web was named 'Gold Peach Web Community'. Gold Peach is a magic fruit in West Holy Mother's garden based on Chinese ancient legend. You could navigate the cloud and explore unknown world after eating the Peach. The sprit of scientific fiction is as keen as modern imagination.
Since Gold Peach also appears in the famous Chinese classic fiction 'The story of the venture tour to West', we adopted and inherited the background, characters and plots from the story to create the cyber environment of the web as Figure 2.

Figure 2. Gold Peach Entrance


After logging in the community, the child users could play roles as Magic Monkey, Pig, Sandman, Dragon Horse or other genius etc. They could follow Master Monk to break in 81 forbidden area that were controlled by different monsters and demons. They could steal Gold Peach to surf the WWW to find out the answers for their questions. Or, they might join one of parties in Flower Island where they could chat or work out a task together.

## *4.2 The quasi-experiment*

Students' learning achievement was examined by the ANOVA techniques.

### 4.2.1 Year 2001

In the year 2001, the author found no differences between the students of the 3rd, 5th, and 6th grades. There was a P=.004 significant difference found for the 4th grade (shown in Table 4). The mean scores indicated the traditional learning students were even better than the web community learning students (shown in Table 3).
The author wanted to identify whether the difference derived arose from one extraordinary school in the experimental group. Comparing the F test with ANOVA, there was no difference between the two schools.

Table 3. Mean scores arising in experimental and control situations, 2001

| | N | Mean | SD | SE |
|---|---|---|---|---|
| Experimental | 61 | 77.8525 | 14.3115 | 1.8324 |
| Control | 54 | 84.4383 | 8.4100 | 1.1445 |
| Total | 115 | 80.9449 | 12.3118 | 1.1481 |

Table 4. Significant differences demonstrated for 4th grade students, 2001

| | SS | df | MS | F | P |
|---|---|---|---|---|---|
| Between | 1242.352 | 1 | 1242.352 | 8.753 | .004 |
| Within | 16037.855 | 113 | 141.928 | | |
| Total | 17280.207 | 114 | | | |

### 4.2.2 Year 2002

In the year 2002, the author found no differences between the students of the 3rd, 4th, and 5th grades. There was a P=.003 significant difference found for the 6th grade (shown in Table 6). The mean scores suggested the web community learning students' learning achievement were better than the traditional learning students (shown in Table 5).

Table 5. Mean scores arising in experimental and control situations, 2002

| | N | Mean | SD | SE |
|---|---|---|---|---|
| Experimental | 62 | 80.3290 | 9.4946 | 1.2058 |
| Control | 64 | 73.8719 | 13.7918 | 1.7240 |
| Total | 126 | 77.0492 | 12.2623 | 1.0924 |

Table 6. Significant differences demonstrated for 6th grade students, 2002

| | SS | df | MS | F | P |
|---|---|---|---|---|---|
| Between | 1313.058 | 1 | 1313.058 | 9.313 | .003 |
| Within | 17482.437 | 124 | 140.987 | | |
| Total | 18795.495 | 125 | | | |

A significant difference of P=.042 was also found for the 3rd grade between the two schools (shown in Table 8). The mean scores indicated the students of JM's learning achievement were better than UJ's (shown in Table 7). There is no difference for the other grades between the two schools.

Table 7. Mean scores arising for 3rd grade students in two schools, 2002

| | N | Mean | SD | SE |
|---|---|---|---|---|
| UJ | 31 | 64.3763 | 19.2692 | 3.4608 |
| JM | 29 | 73.1264 | 12.3051 | 2.2850 |
| Total | 60 | 68.6056 | 16.7362 | 2.1606 |

Table 8. Significant differences demonstrated for 3rd grade students in two schools, 2002

| | SS | df | MS | F | P |
|---|---|---|---|---|---|
| Between | 1147.186 | 1 | 1147.186 | 4.327 | .042 |
| Within | 15378.701 | 58 | 265.150 | | |
| Total | 16525.887 | 59 | | | |

In 2001, we found no particular factor related to the two classes' teachers. The factors considered included the teachers' age, seniority, computer capability, participating motivation, etc.
However, in 2002, all participant teachers of JM have been changed since the change of the school's president and their administrative policy, while the teachers of UJ remained the same. The new teachers were much younger and less senior than the former participants.
To sum up the overall information, we wanted to be careful and could not suggest any strong evidence to support the view whether web community learning or traditional learning was better. After checking the detailed variables, we suggested that the difference came about as a result of a small number of students and their individual learning behavior. We could not show that the learning environments in this experiment had made a clear difference. We considered that the experiment was too short to detect any cultivation effect.

# 5 Discussions and Conclusions

## *5.1 Web Community: A progressive idea for learning environment*

Web Community could be considered as a progressive idea for learning environment. It improved traditional one-way teaching and display and realized total peripheral participation and interaction. Some ideas could be summarized as the following:

### 5.1.1 Designated activities

First of all, we suggested that the learning activity is more important than the learning materials. Examining the current learning website, we found most of them were storages of electronic textbooks. Some of them provided online tests and some of them maintained a bulletin board without a devoted moderator. It was obvious that the centralized design could not afford a function to react every user. It was almost impossible to initiate and guide an interactive learning activity for each individual user.
Though we found no learning achievement difference in this period of experiment, there were some qualitative advantages of web-based learning that was reported by the teachers in the term seminar. The Web Community design could develop interactive learning platform and environment where all community members could learn, solve problems, and share knowledge. For example, one school of our experimental groups is located beside a stream. When the students received the learning unit of 'ecological field study', the teacher had designated an observation and collection tour along the stream with a thorough web-based map and tips. The discovered clues in this activity have been proven to be more fruitful than the students can learn from a standard material.
Furthermore, the teachers could prepare various tests by consolidating learning contents that were combined primary schools' curricula with internet resources and information.

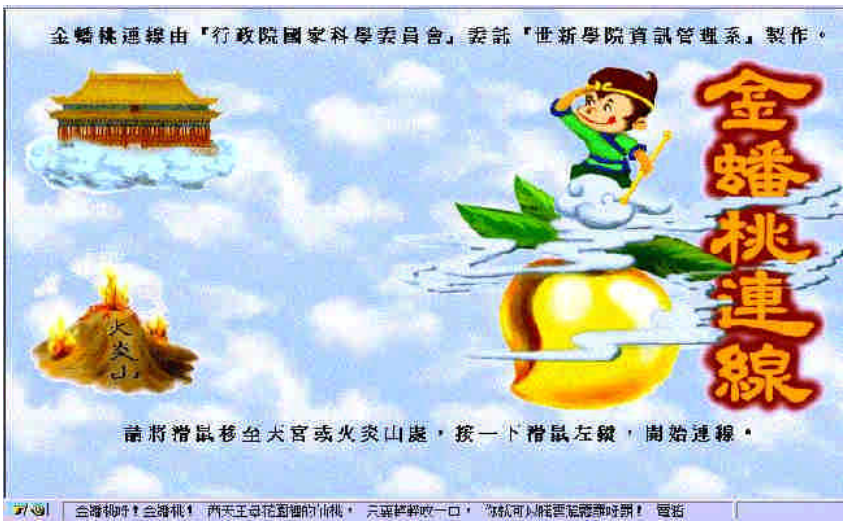
### 5.1.2 Remote workgroups

The author also suggested the importance of the exchange, communication, and integration between sub-communities. Though the two schools of our experimental groups are in the same district, they had few opportunity to share their teaching and learning before this project. During this experimental period, they could share, refer, or modify each other's learning abstracts, tests, and assignments. We are planning a final presentation that will be accomplished by remote workgroups in these two separated schools. They are going to finish a collaborative work in remote condition.
It was expected this collaboration model could produce more understanding in value and confidence, if these remote workgroups were in different social economic status.
Reviewing the literature of the experiences of web-based learning, we found, especially in higher education systems, the purpose of many systems were to let the students study at home and reduced the hours in classrooms. The author did not recommend that a web-based learning system is a replacement, even an alternative, for classroom learning. It should be a support and enhancement for learning in personal. The author's model suggested creating a pluralistic virtue classroom without space boundary and with holistic learning ideas while all sub-communities kept their uniqueness.

## *5.2 Culture: A deficiency, excess and integration trace*

Though the perspectives of examining the culture factor in a system design varied, the succinct and distinguished direction was from the presentation, i.e. the user interface. (Kersten et al. 1999)
Three generations of the user interface were developed during last a few years. It revealed the introspection on seeking the cultural feature of web design.
Though the 'culture requirement' was highlighted according to the web developing strategy for the 1st generation, the implement was relatively unsuccessful. The artists in the project team were still lost in the long term Westernized training. The leading role, Magic Monkey, was cute, but lack of originality. The presentation of icons and background were inevitably under European shadow. (See Figure 3)

Figure 3. 1st Generation




The effort on discovering lost tradition inspired the using of Chinese ink and calligraphy art to stylize the home page for the 2nd generation. The cultural specification was distinguished, however, the black-and-white idea was too abstract to attract children's attention. (See Figure 4)

Figure 4. 2nd Generation


We did not find a balance between cultural skill and modern technique until the 3rd generation. We inherit the 3-D model of Chinese flour idol and the styling interest of folk drama to cerate cyber characters. The objects in the background were Chinese materials with modern simplified geometric outlines. The real culture should be a living idea that contented historic and current context. (See Figure 3)

### *5.3 Cultivation: A ferment attempt*

The result of this research 'Gold Peach Community' was expected to guide a new direction and a new method for children to develop their abilities of learning and problem solving under silent and positive cultivation.

The effort to discover the cultivation effect was still under ferment period. However, this research investigated and accomplished some feedback mechanisms in the systems. They could detect and reveal possible cultivation effects by comparing users learning behaviors and achievement.

The author is developing new functions into 'Gold Peach' to observe students' cultivating learning behaviors. These on going functions are including:

*-A data mining function: it will watch the interaction between students and teachers. There is a database to monitor and record their behaviors in 'Gold Peach'.*

*-A parameter base: it can analyze students' learning categories.*

*-An intellectual teaching-learning model base: it will select proper teaching model for teachers that will match the students' individual learning category.*

Since cultivation is more likely a time series effect than a sudden change, the author also suggests a large scaled and longitudinal experiment on this issue in the future studies.

### *5.4 Future*

The author found some problems that were coincidently matched Lee (2000)'s findings in Korea. Suggestions for future improvement are as follows:

-Failing students should be identified and should receive more instructional attention.

-Feedback systems should be considered that would satisfy students' high expectation and avoid over instructions' workload.

-There is a strong need for instructional efforts to maintain the proper levels of learning and instructional demand.

-Deliberate strategies may be needed to stimulate students' serious perception of online instruction,

-It is desirable to design more fun and interesting procedures in the learning environment. Though the 'Gold Peach' used the legend characters and fictional plots, the process seemed not very attractive yet. It could be a good idea that combining game and test in the future. We are also working on developing more supplicated measuring methods and data mining tools into the Gold Peach's platform in order to monitor more users' behavior. We wish we could observe more solid data in the current term of this experiment series.

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