

## A Discussion on Sphygmus-Based Teaching Quality Evaluation

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**Abstract** - Currently, the evaluation of teaching quality is mainly based on the method of combining scores given by students and teaching supervisors after attending classes. This method is based entirely on personal evaluation, which is much influenced by various subjective factors. So, the real effects of teaching quality could not be fully reflected by evaluation results. Based on the characteristics of teaching reform, this article puts forward a brand new teaching quality evaluation method and presents the data model of its realization. The modern sphygmus digitization technology is applied to monitor and evaluate activities during teaching process, making objective evaluation available and complementary to traditional subjective evaluation.

**Keywords** - Sphygmus; Evaluation; Emotion; Cognition.

### I. INTRODUCTION

Evaluation of teaching quality is a fundamental and imperative link in teaching activities, which adjust and control the teaching process as a whole and guarantee that teaching activities is properly carried out and would achieve the final target. To make it more objective, certain criterions are adopted to perform quality evaluation. Through various measurements and the gathering of relevant materials, objective evaluation and judgment could be made on teaching activities and its effects. Currently, the evaluation of teaching quality mainly depends on the scores given by students and teaching supervisors. Such an evaluation model primarily relies on man, with many subjective factors involved, so it could not genuinely reflect the teaching quality. In this paper, through proper measuring means, the evaluation is determined by certain quantified factors, which could describe the objects in mathematical ways. The measurement results could be used as the foundation for evaluation. In teaching process, the emotion and thinking status of students could well represent the teaching effects, good or bad, which is right the most difficult to control and measure. This paper presents a sphygmus-based evaluation model on teaching quality, with sphygmus of Chinese medicine, emotion and thinking entirely combined. The measurements of sphygmus is digitalized and evaluation model is established to objectively evaluate the teaching quality.

### II. THE RELATIONSHIP BETWEEN SPHYGMUS, MENTALITY AND EMOTION

Human emotion is type of psychological activities, which has solid material basis. The book Huangdi Neijing includes

the following sentence: "Parental essence comes with the body, the integration of parental essence brings about spirit, the activities accompanying spirit is named ethereal soul, corporeal soul flows inside and outside with ethereal soul... the management of things is what wisdom means." So, spirit is the external demonstration of inner mind activities, while ethereal soul refers to consciousness, including dreaming hallucination. Corporeal soul includes organ functions and instinctive perception, awareness is the motivation of thinking, while will is the staunch and mature consciousness after consideration. Also in the book, there are many sentences such as, "liver stores blood, while blood supports ethereal soul", "spleen stores nutrition, while nutrition supports awareness", "heart stores pulse, while pulse supports spirit", "lung stores qi, while qi supports corporeal soul", "kidney stores parental essence, while parental essence supports will". In the book QinNangMi written by Hua Tuo, there is also a sentence "body is the basis of spirit, while parental essence is the foundation of qi". These conclude that the spiritual consciousness and thinking process of spirit, corporeal soul, ethereal soul, awareness, and will all depend on material basis of internal organs.

Within all internal organs, heart is the dominant force of psychological activity. The book LiuJieCangQiLun indicates that "heart is the basis of body, from which derives spirit..." The book LingLanMiDianLun refers that "heart is the key organ, from which spirit is originated" So, in Chinese medicine, words like "heart controls spirit and will", "heart stores spirit" clearly define that the function of heart cover higher nervous activity and function. Could we draw the conclusion that Chinese medicine has no knowledge about brain, the chief organ of psychological activities? This kind of conclusions is definitely wrong. As early as in book Huangdi Neijing, there is the description that brain is the foundation of spirit. In Ming Dynasty, famous doctor Li Shizhen pointed that brain is the organ that contains soul. In Qing Dynasty, Wang Qingren wrote the book "The Correction on Medicine", within which brain is also considered the place where human memory of is stored. The reason that brain is not commonly used in words depicting will or spirit is that Chinese medicine adopted organs as unit to distinguish physiological functions. No matter happening in heart or at brain, spiritual and physiological activities are based on the material, namely the blood. Since blood belongs to heart, and pulse supports spirit, concepts such as heart controls spirit and will finally came into being.

Besides, HuangDiNeiJing also pointed out that thinking activity are not only connected to heart, but also to liver, kidney, and gallbladder. In LingLanMiDianLun, there is a saying “Strategies originate from liver, decision comes from gallbladder, and clever trick generated from kidney”.

Human spiritual awareness and the origin, development and variation of behavior are intimately related to psychological activities. Seven emotions, namely joy, anger, anxiety, thought, sorrow, fear, and fright, represent the human responses to external objective things, which are closely related to organs’ functioning. There is a saying in Discussion of Yin and Yang Phenomena, “Human have organs to derive five types of qi, then joy, anger, sorrow, anxiety, and fright are created”. Under normal circumstances, seven emotions are the external manifestation of spiritual activities, which belongs to the category of psychology.

Joy could appease tension, anxiety and sorrow, making mood lightly and qi and blood harmonized, thus came the saying “Joy puts heart into a man”. The book The Theory of Pain has the following sentence: Joy could make qi harmonized and will achieved, thus the body would be healthy.

Anger has the meaning of abreaction, which could make the liver-qi dispersed and harmony realized. A person in extreme anger, once dispersed, would feel instantly more comfortable and easily.

Thought is a basic instinct of human being, referring to premeditate problems with focused attention. The book Huangdi Neijing has a saying, “The changes made to the will are termed as thought”.

Emotional anxiety and depression could curb angry or over-joy, playing a role as regulating and harmonizing emotional disorders. As Zhu Danxi said, “Anger could harm health, while anxiety could curb anger”.

Fear is the psychological activities when people come across something abnormal (witness of strange things or frightened), which is a psychological response of retrocession when facing abrupt attacks from the environment. In a word, the psychological activities of human being are always reflected phenomena. Through the detection of sphygmus, we could infer the inner psychological activities and determine the right type of emotions. If most students are in a state of thought, then it could be concluded that the attractiveness of the class is relatively high. If it is in a state of joy, then the ambience would be quite active. All these emotions could demonstrate from a certain aspect the learning situation in the class.

### III. THE RELATIONSHIP BETWEEN EMOTION AND KNOWLEDGE ACCEPTANCE

From the above section, the conclusion is reached that emotions would be reflected through sphygmus. When a person is learning, different emotions could have distinct manifestation, which could display the deep inner motivation and adaptability for the study.

Emotions contain important motivation and adaptability, and emotion is the motive. Internal drivingsignal demands an amplified medium to stimulate the actions from organisms, while emotional process just plays that role. Emotion is an

even more flexible and powerful driving factor than internal driving signal, since it could activate without the presence of internal driving signal. Through the variations of observed sphygmus of the students in the classroom, it is not so difficult to find the characteristics and regular pattern of learning and the degree of acceptance.

Modern theory of motivation accommodates more complex contents. Emotion is a basic motive system, and from this point emotion-motivation system is established. Personality is composed by six sub-systems: homeostasis, internal drive, emotions, perception, cognition and action. Personality subsystems could be combined into four types of motivation structure: internal driving, emotional, emotion-cognition interaction, emotion-cognition structure. In this huge motivation system, emotion is the core. No matter emotion is associated with internal drive, perception, cognition, or characteristics of personality structure; it is important to motivation effects. Izard further pointed out that subjective part of emotion – namely experience, stimulates the function of motivation. A variety of emotional experiences is the motivation force behind the actions of organisms.

Modern emotion theory includes more integrated contents. From an evolutionary view point, the theory put forward the proposition that the growth of neocortex volume and function differentiation is parallel and synchronous to the differentiation of facial skeletal and muscle system and emotion. A variety of emotional differentiations is a product of evolution, thus it could have flexible adaptability, resulting in that emotion plays the central role in emotional adaptation and the survival of organism. Each specific emotion has its origin, specific sense of character and adaptation. Facial expression is the external representation of human cognition, while sphygmus is the internal representation of human cognition. External representation could be controlled and covered up deliberately, but internal representation is difficult to control, since it reflects the law of human biology.

Starting from the concept of emotional differentiation, the theory stresses the importance of facial expression. Human facial expression that reflects basic emotions is really patterns innately programmed and inborn facial expressions are involved in the mechanism of emotion development, while the sensory feedback from facial movement activated emotional experiences. External stimuli spark the excitement of the sensory cortex and limbic system, and the innate emotional patterns stored in the hypothalamus or amygdala would be activated, resulting in the facial expression of a specific emotion. This expression activity feedbacks to the brain sensory, causing the integration of activities by cortex and emotional experience. The learning and cognition experience could identically be manifested through sphygmus; sphygmomanometer could measure the variation of pulse waves during class, and so the emotional changes could be analyzed throughout the teaching process and different stages of students’ cognition could be inferred.

### IV. THE DIGITALIZATION OF SPHYGMUS

The human pulse is commonly divided into following categories:

- Feeble pulse: deep pulse, fine pulse and slow pulse

- Full pulse: floating pulse, rapid pulse, wiry pulse and slippery pulse
- Normal pulse

Different types of pulse could reflect the change of human emotion, and sphygmomanometer could detect the variation of pulse waves, such as listed below:

#### A. Feeble pulse

[Pulse features]Three divisions of pulses (cun, guan, chi) are feeble, and when these pulses are touched, there is the feeling of void and the response is soft. Feeble pulse refers to all pulse rather weak. The wave of the pulse is shown in Fig 1.

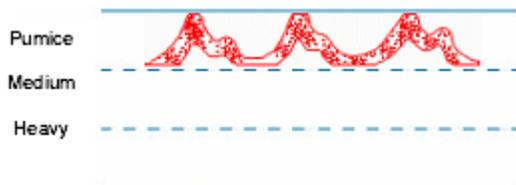


Fig. 1 Feeble Pulse

The wave is floating above normal, which indicates that students are not so activated and the class ambience is in low spirits. The incoming pulse is feeble and there is much deficiency of qi, so the pulse is quite slack. When pressed, it is hollow, and the deficiency of blood makes the pulse not full enough, causing the pulse fine and feeble.

#### B. Full pulses

[Pulse features]The incoming pulse is powerful and full, so is force of the pulse leaving. When these pulses are touched, there is the feeling of power all over. Full pulse refers to all pulse powerful. The wave of the pulse is shown in Fig 2.

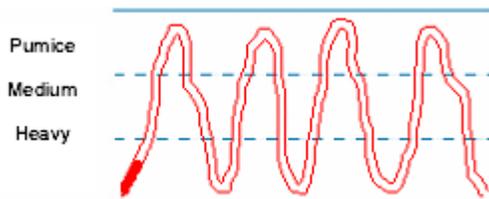


Fig. 2 Full Pulse

#### C. Other pulses

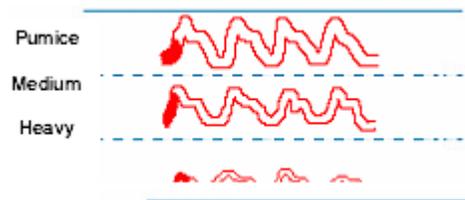


Fig. 3 Floating pulse

Medium  
Heavy

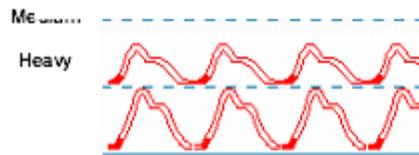


Fig. 4 Deep pulse

There are various types of pulse waves, which could more objectively reflect cognition. From above figures 1-4, it is shown that the results measured by sphygmomanometer are in the form of waves. Current computer graphics could easily handle these figures and make the wave digitalized. Once digitalized, information could be stored and analyzed with database technology. Then, the pattern of teaching quality could be determined. Since all these technology involved are completely developed, the method proposed in this paper could be easily realized.

#### V. EVALUATION MODEL

After all these analysis, the sphygmus-based evaluation model on teaching quality mainly includes sphygmomanometer, data analyzing module, algorithm on wave transformation, analyzing module and evaluation module. The relations among these components are shown n Fig 5.

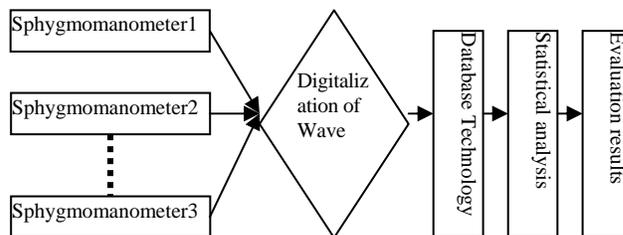


Fig. 5 Evaluation model

Modern technology could be adopted to make the evaluation of teaching quality more objective, and the evaluation model proposed has synthesized many techniques, such as digitalization of wave, database storage, wave filtering, statistical and analyzing technology. The utilization of these technologies could make the analysis more objective and effective, and the results could become the basis of analyzing teaching process and one of the standards for evaluating teaching quality.

#### VI. CONCLUSION

The proposed sphygmus-based evaluation model on teaching quality is completely different from former evaluation models. This entirely new model is more objective and reasonable, which could evaluate teaching quality in real-time. The aim of the model is to overcome the problem of much subjective in evaluating, thus making the evaluation more rational and providing better foundation for analyzing the regular pattern of teaching. This model is feasible and the technologies are available and mature, which could turn former obscured data more clear and distinguishable.

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