Situational Adaptive Teaching and Evaluation Design in University Classroom

Qizhi Zhang[1]，Hongxiu Tan[2*]，Xianglan Mu[3]，Lishen Wang[4]

[1234]*School of Teacher Education, Shaoguan University, Shaoguan, Guangdong, 512005, China*
Corresponding author- Email: lshow@163.com

ABSTRACT

Classroom situational adaptive teaching and evaluation requires the consistency among specific teaching situations, teaching activities and evaluation methods based on subject content. The basic concepts and requirements of classroom situational adaptive teaching and evaluation are: Teachers' teaching activities should be guided by students' evaluation and its results; evaluation has a strong impact on students' learning, and teachers should use this influence; evaluation and teaching activities should be adapted to specific situations; a single type of evaluation is not applicable to all teaching objectives. In the design of situational adaptive teaching and evaluation, eight related factors must be taken into account, including the types of subject content, the embodiment of individual differences, the schools of learning theories, the types of learning transfer, the types of teaching objectives, the types of tests, the types of scores and the types of score interpretation.

Keywords: Situational adaptive teaching and evaluation, subject content, individual differences, learning theory, learning transfer, teaching objectives, test score interpretation

1. INTRODUCTION

In recent years, in view of the decline of university teaching quality, some people blame it for the consequence of "emphasizing scientific research and neglecting teaching", and some blame it for the curse of university enrollment expansion. It is undeniable that these factors are all the reasons for the decline of teaching quality, but only some external reasons. The internal reason is the problems of university teachers themselves. In retrospect, university teachers all have profound theoretical knowledge and practical foundation in education. But now, most of the master's degree and doctor's degree recruited by universities have not received the specialized and systematic learning of theoretical knowledge and strict and standardized teaching practice training before and after their posts. In their opinion, classroom teaching is a simple dissemination of knowledge or a simple translation, "as long as they have a strong foundation in teaching practice With practical professional knowledge, who can't teach? "Does teaching need learning and special research?" these teachers are engaged in the technical operation activities of spreading knowledge day by day, playing the role of "teachers". They don't understand the analysis and design of teaching situations, and don't understand the use of evaluation to guide teaching, which leads to the disorder and low efficiency of classroom teaching, and the teaching quality can't be guaranteed.

Recently, I read Gerald S. Hannah and Peggy a. Detmer's "situational adaptability evaluation of curriculum" translated by Wang Yanling, which is very enlightening. If university teachers can master the theory and technology of situational adaptability teaching and evaluation, it should be helpful to promote effective teaching.

2. THE BASIC IDEA OF SITUATIONAL ADAPTIVE TEACHING AND EVALUATION DESIGN

Classroom teaching activities should be guided by students' evaluation and results. "Good evaluation and evaluation are not only subordinate to effective teaching, but also an indispensable part of effective teaching." [1] "Evaluation cannot be separated from teaching." [2] "Evaluation can make teaching rich, complex and meaningful." [3] It can be seen that evaluation and teaching activities are symbiotic: evaluation is based on teaching, but higher than teaching; evaluation provides feedback for teaching activities, and serves teachers to improve and improve teaching.

Teachers should make good use of the influence of evaluation. "Evaluation is a powerful teaching tool", [1] [20] teachers should make good use of evaluation to "serve students' learning" -- "evaluation not only supports students' confidence: all students can learn well; evaluation also enables students to believe that hard learning will bring success." [3] [244] "evaluation can stimulate students' learning motivation, help students' memory and promote migration, and promote students' self-evaluation." [4][40].

Teaching evaluation and activities should be adapted to specific situations. "Student evaluation does not happen in a vacuum, but in a teaching situation.". [1] [56] "if the content

occurs in a problem-solving, project-based or service-oriented learning situation, then it means that the evaluation must also be suitable for the situation.". [5] Therefore, if teachers want to make a reasonable and practical classroom evaluation to promote effective teaching, they must be familiar with and actively create a good teaching situation.

A single type of evaluation is not applicable to all teaching objectives. "There is no way to evaluate all learning outcomes.". [1] "In any classroom situation, the selection of evaluation methods should be based on the information needs of users and the academic objectives to be evaluated." [6] Different teaching objectives need different evaluation types:

·For the objective content of teaching objectives, it is usually appropriate to use objective evaluation (such as judgment questions, matching questions, filling in blank questions, multiple choice questions and explanatory exercises).

·For continuous teaching objectives, papers or work evaluations (such as computer programs, music composition, art works) are usually used.

·For those teaching objectives that need long-term attention, performance evaluation is usually used (oral test, singing competition, debate, gymnastics performance, mechanical operation, class rotation, group cooperative learning activities, music trials, drama and sports).

Therefore, teachers must select the evaluation type that can best meet the evaluation purpose according to the characteristics of subjects and contents.

3. SITUATIONAL ADAPTIVE TEACHING AND EVALUATION DESIGN

Situational adaptive teaching and evaluation design involves eight main related factors: the type of subject content, the embodiment of individual differences, the school of learning theory, the type of learning transfer, the type of teaching objectives, the type of tests, the type of scores and the type of score interpretation. These eight related factors are interconnected and organically interwoven. They can be connected according to their internal relevance to form an arc chart, as shown in Figure 1.
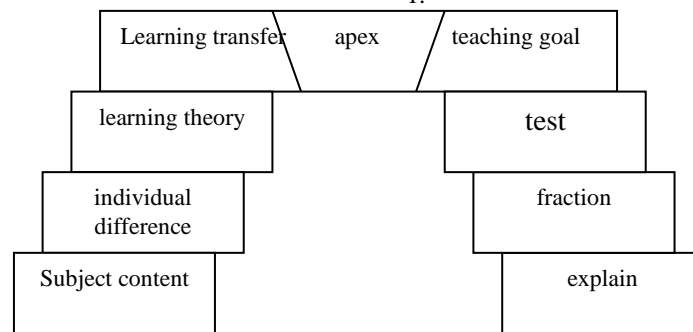

FIGURE 1 ORGANIC COMBINATION OF TEACHING AND EVALUATION ELEMENTS

The content on the left side of Figure 1 includes four major themes: subject content, individual differences, learning theory and learning transfer, which reveals the correlation among various elements in Teaching: "subject content is the cornerstone of all other parts, and the characteristics of subject content determine the best way to reflect individual differences, the most relevant learning theory and the type of learning transfer pursued.". [1] This kind of correlation forms a specific teaching situation based on the subject content. The content on the right side of Figure 1 includes four major topics: teaching objectives, tests, scores and explanations. It reveals the correlation among various factors of Evaluation Guided by teaching situations. Teaching objectives are the starting point of evaluation, which determine the most appropriate types of tests, scores and interpretations for each teaching situation.

The left and right sides are connected at the top, from left to right, indicating that the specific teaching situation "determines the most meaningful teaching objectives, tests, scores and interpretation types". [1] From right to left, it

shows that "classroom evaluation is related to the type of subject content taught, the best way to reflect individual differences, the effective teaching and learning of content, and the types of migration that can be facilitated.". [1]87

3.1. Confirm Teaching Situation According to Subject Content Type

There are two kinds of classification of subject content, one is easy to describe or specify - clear type and can't elaborate content - broad generic type; the other is able to master and can't master. In this way, the subject content can be divided into three types of ABC situations: situation a - clear, necessary and controllable subject content. This kind of learning content has internal continuity or linear hierarchical structure. The content in front is the basis for the successful learning of the content in the back, which students must master. For example, "the calculation method of reliability" in psychometrics. Situation B - clear

but not necessary or not mastered subject content. There is no inherent continuity or linear hierarchy in this kind of learning content. Students do not need to reach a certain technical level to start learning the next content. For example, in psychometrics, "the contribution of psychological test pioneers to psychological measurement" is a clear but not necessary subject content, while "566 items of Minnesota Multiphasic Personality Inventory (MMPI)" is a clear but not controllable subject content. Situation C - a broad and uncontrollable subject. There is

no inherent continuity or linear hierarchy in this kind of learning content. The purpose of learning a certain content can be achieved by learning other completely different content. For example, "moral and ethical issues in the use of tests". In this way, when teachers teach some subjects, they can be classified into three teaching situations: A, B and C (there should be four situations here, but the broad and controllable subjects do not exist). The classification decision can be made according to the following flow chart (Figure 2).
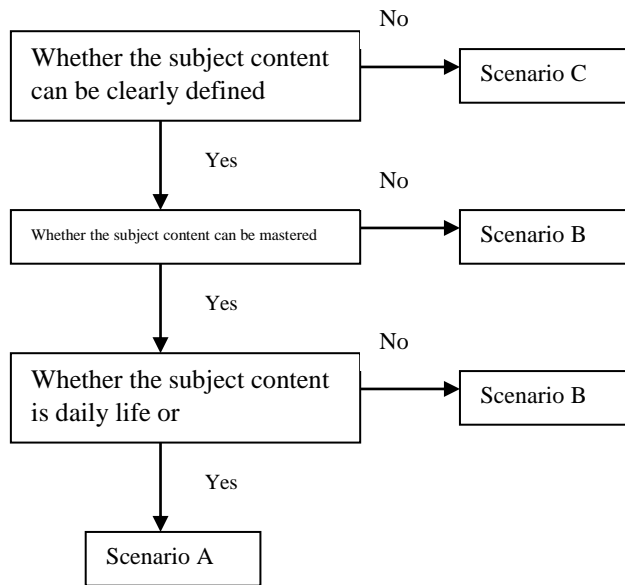

Figure 2 flow chart of confirming teaching situation[1]72

3.2. Situational Adaptive Teaching Design

Situational adaptive teaching requires the consistency among teaching situation and teaching activities. That is to say, the description of teaching situation and individual difference, the choice of learning theory and the pursuit of learning transfer must be consistent.

3.2.1. Describe Students' Individual Differences According to Teaching Situation

There are two differences in learning among students: one is the difference in learning achievement; the other is the difference in the time needed to achieve the goal. Therefore, in teaching, it is futile to try to erase the existence of individual differences among students and even to eliminate the differences between students in the two dimensions of time and achievement, because it is impossible to make all students reach the same level of achievement in the same time; in the same way, the time required for students to reach the same level of achievement must be different. According to the survey, in

order to achieve the same academic performance, the ratio of learning time required by good students and poor students is 1:2 or even 1:10 [7]. Therefore, we must fully realize that "effective teaching will increase students' differences in time dimension or achievement dimension. If the individual differences among a group of students do not increase, it means that effective teaching has not occurred. "We should accept rather than deny the existence of individual differences, and make wise choices between time dimension and achievement dimension with professional insight, so as to make full use of various educational opportunities." [1]63

Therefore, teachers must properly describe the dimensions of students' individual differences according to the teaching situation. In situation a, individual differences are mainly reflected by the time needed to master the content. Teachers should put forward clear task requirements to students and let them practice more until everyone masters it. In situation B, most or all of individual differences are reflected in the achievement dimension, and the teaching objectives should be It reflects the pursuit of "the more (the higher) the better"; in situation C, individual differences are mainly reflected by the level and (or) breadth of students' achievements. Teachers should flexibly choose a variety of teaching contents and methods

to help each student to achieve as high as possible within a limited time. Table 1 summarizes the relationship between the dimensions of individual differences and the types of subject content.

table 1 relationship between subject content type and individual difference expression

Situation	Type of subject content	Individual difference
A	Clear, necessary and controllable contents	Time dimension
B	What is clear but not necessary or not grasped	Achievement dimension
C	Broad and untraceable content	Achievement dimension

3.2.2. Choose the Most Relevant Learning Theory According to the Teaching Situation

Learning theory is mainly divided into two schools: behavioral learning theory and cognitive learning theory. Behavioral learning theory regards learning as a "stimulus response" connection, considers learning to be determined by stimulus, and emphasizes the importance of repeated practice and review. Cognitive learning theory regards learning as the formation or reorganization of cognitive structure through complex cognitive operations, so as to grasp the relationship between things, pay attention to the role of subjective conditions such as past experience and internal motivation for learning, and emphasize the importance of understanding, solving thinking and cognition. [8]

We should choose the most relevant learning theory according to the teaching situation. For situation a, what we need is to establish a connection between stimulus and response. Therefore, the learning style of students is behavior oriented; for situation B, the learning style of students is behavior oriented for the clear, controllable but not worth spending a lot of time and energy to master the subject content, while for the clear For clear and uncontrollable content, students need to use cognitive oriented learning method, or adopt behavior oriented and cognitive oriented learning methods before and after learning; for situation C, because of the rich content, students can interact with it and incorporate it into the existing cognitive structure, so students' learning method is cognitive oriented. Table 2 summarizes the relationship between schools of learning theory and types of subject content.

table 2   relationship between subject content types and learning theory schools

Situation	type of subject content	School of learning theory
A	Clear, necessary and controllable contents	Behavioral learning theory
B	What is clear but not necessary or not grasped	Both
C	Broad and untraceable content	Cognitive learning theory

3.2.3. Determine The Type of Learning Transfer to Pursue According to the Teaching Situation

By default, learning transfer can be divided into low-level transfer of training and high-level transfer of learning. "The low-level transfer of training is based on a large number of diverse exercises, so that the behavior can automatically occur; the high-level transfer of learning is that learners can consciously abstract knowledge from one situation and apply it to another new situation.". [1]78

Obviously, different teaching situations lead to different types of learning transfer. For scenario a, "repetition is the skill of teaching this type of content.", [1] 80 teaching pursues low-level transfer; in situation B, for the clear, controllable but unnecessary subject content, it pursues low-level transfer, while for the clear and uncontrollable content, in the early stage, "teachers should guide students to strengthen expected behaviors and provide appropriate practice opportunities", [1] The pursuit is low-level transfer, but in the later stage, teachers will not be so instructive, "the pursuit may not only be low-level transfer that makes mechanical response through training, but also high-level transfer formed by thoughtful self-evaluation" [1] 81; for scenario C, "teaching methods include emphasizing understanding, consciously connecting new and old knowledge, providing different contents for different students, using problem-solving strategies, and discovering learning". [1] Therefore, the pursuit is high-level migration. Table 3 summarizes the relationship between the types of learning transfer and the types of subject content.

table 3 relationship between subject content type and learning transfer type

Situation	type of subject content	Types of learning transfer
A	Clear, necessary and controllable contents	Low level transfer of learning
B	What is clear but not necessary or not grasped	Early same like A
C	Broad and untraceable content	High level transfer of learning

3.3. Design of Situational Adaptability Evaluation

Situational adaptability evaluation requires consistency between teaching situation and evaluation activities. That is to say, the teaching situation must be consistent with the

types of teaching objectives, tests, scores and explanations. Hannah and Detmer pointed out that "the design of student evaluation should be carried out at an appropriate time, or rather, when designing other aspects of teaching, the design of student evaluation should be carried out". [1]127

3.3.1. Determine the Effective Teaching Goal According to the Teaching Situation

Teaching goal is not only a factor to be considered in situational adaptive teaching, but also the starting point of situational adaptive evaluation. Teaching objectives can be divided into two types: "behavioral objectives" and "developmental objectives". Behavioral goal, also known as mastery goal, is based on behaviorism psychology, which provides a clear definition of behavioral operability. By default, Hannah and Dede think that a reasonable behavioral goal should have three characteristics: [1] 45 (1) the final behavior that learners are required to show, generally using an active behavioral verb to express the changes of students' behavior after teaching and what students will be able to do; (2) if necessary, pointing out the conditions for the behavior to happen, that is, to state what kind of thorns need to be provided Stimulation or information, or the ways and methods that can be used; (3) specify the minimum level that the behavior must reach, that is, specify the lower limit of mastery, and judge whether to achieve the goal according to whether to reach the lower limit of mastery. For example, "use SPSS statistical software to complete the t-test of data within 10 minutes".

The mastery goal is most suitable for the clear, necessary and controllable subject content - situation a. When teachers want students to master the content of situation a, they need to provide them with a series of detailed and clear mastery goals, and clearly tell students what they must be able to do and how to do it.

The developmental goal is based on the theory of cognitive psychology, "it often uses cognitive or emotional verbs to express the real goal, but it does not stay in the fuzzy cognitive or emotional verbs, but continues to provide how to reasonably evaluate the performance of the behavioral indicators.". [1] These indicators can describe students' psychological feelings, experiences, or clearly arrange opportunities for students' performance, and the behavioral verbs used are often experiential and procedural. The learning of these contents is an open and endless process. An example is as follows:

● cognitive goals of personality tests
1. Understand basic terms
1.1 pair terms with the same meaning.
1.2 select the term most appropriate for a definition.
1.3 differences between oral or written terms.
1.4 be able to use the terms correctly for oral or written expression.
1.5 use novel examples to describe the meaning of terms.
1.6 rank terms by level.

● emotional goals of personality tests
2. Experiential personality test
2.1 listen carefully to the teacher's introduction of various personality test scales.
2.2 discuss the main content of personality test scale and exchange experience.
2.3 check the borrowing records of personality test scale.
2.4 evaluate online personality test scale.
2.5 try to develop personality test scale and make quality evaluation.
2.6 use of personality test scale.

Developmental goals are suitable for context B and C. But because of different situations, the development goals are different. In situation B, the teaching goal should reflect the pursuit of "higher is better". This kind of goal is called clear development goal. The difference between it and clear mastery goal is that there is no lower limit of mastery. Table 4 shows the relationship between these two types of targets.

table 4 clear mastery objectives and clear development objectives

Clear mastery goals (scenario A)	Clear development goals (scenario B)
Students' final behavior	Students' final behavior
Specify the conditions under which the act takes place	Specify the conditions under which the act takes place
Including the minimum mastery limit that each student must reach	Avoid setting the mastery level based on subjective assumptions; the higher the level is, the better

In situation C, we can use non action verbs, i.e. cognitive or emotional verbs, to express such broad developmental goals. However, because the meaning of non action verbs is vague, there are enough behavior indicators or examples attached to each broad developmental goal to measure the achievement of students' mental goals. Table 5 shows the relationship between clear mastery goals and broad developmental goals.

table 5 clear mastery objectives and broad development objectives

Clear mastery goals (scenario A)	Broad development goals (scenario C)
It clarifies the final learning behavior of students	Broad goals are exemplified by the final behavior of the student (i.e. give an operational definition) The behavior index gives

Clarify the conditions of behavior	the condition of behavior occurrence
The lower limit of mastery that every student must reach is clarified	The goal avoids the lower limit of subjective assumption; the greater the achievement, the better

3.3.2. Choose Appropriate Types Of Tests, Scores And Explanations According To Teaching Situations And Teaching Objectives

3.3.2.1. Choose The Appropriate Test Type

"Effective test will help to improve the teaching effect" [2] [1]. Therefore, teachers must choose appropriate test types in teaching. In scenario a, the most appropriate test is the mastery tests, which is used to judge whether the students have reached the lower limit of the preset mastery goal. If it does, it can enter the next unit of teaching. If a student does not reach the lowest acceptable performance level, it is necessary to provide more teaching time or resources for the student to solve the remaining problems. Therefore, the purpose of choosing mastery test is to judge whether each student needs more teaching time or resources.

In scenario B, the most appropriate test is the differentiation tests. "It needs to determine two achievement level lines: the highest achievement level line to reveal the level that the students with the best performance can achieve; the lowest achievement level line to reveal the level that the students with the worst performance can achieve. Here, the purpose of choosing the differentiated test is to confirm the degree of achievement of clear developmental goals. [1]102

In scenario C, the most appropriate test is the discrimination survey test. The so-called survey test refers to that the test only samples a part of the content in the field, and infers students' learning level in the whole field through the test. As the content of scenario C is extensive and open, it is impossible for the test to cover all aspects of the field. But teachers want students to be able to apply what they have learned, so they have to teach for migration, that is, to use new materials (materials that students have never learned) to test migration. Here, the purpose of choosing the differentiated survey test is to measure the degree of students' achievement of broad developmental goals.

3.3.2.2. Choose the Appropriate Score and Interpretation Type

If teachers can choose appropriate test scores and explain the test results reasonably, they can make scientific classroom teaching decisions based on them.

There are two main types of test scores: original score and derived score. The original score is the initial score obtained according to the scoring criteria. The derived score is transformed from the original score to the score on the scale by statistical method. Including: grade equivalent and age equivalent; percentile grade and percentile score; standard score, etc. The derived score is a status measure, which can make the scores between people comparable.

Corresponding to the score type, there are two types of score interpretation: domain reference interpretation and norm reference interpretation. Domain reference interpretation, also known as target reference interpretation, generally uses the original score to reflect an individual's mastery of a specific content or skill. Norm reference interpretation generally uses derived scores to show the relative position of an individual's performance compared with that of others.

As mentioned above, situation a generally evaluates students' performance through mastery tests to check whether each student has reached the lowest level of mastery. Therefore, score interpretation should refer to the clear content field and the lower limit of mastery, which belongs to domain reference interpretation. Original scores are used to reveal what students can do and whether they have reached the lowest level.

Situation B generally evaluates the achievement of students through the differentiated test. The final score may be explained by norm reference, by using derived score to reveal the position of students' scores compared with other members of the reference group, or by domain reference, by using original score to reveal the degree of students, or both.

Situation C generally evaluates the achievement level through the differentiated survey test, which shows the differences in the breadth and depth of individual achievement. The explanation of test scores must be the norm reference explanation, and the derived scores are used to reveal the performance status of students compared with other members of the reference group.

4. CONCLUSION

To sum up, the so-called situational adaptive teaching and evaluation requires the consistency among the teaching situation, teaching activities and evaluation methods based on the subject content. In other words, for different teaching situations, teachers need to use different teaching methods and evaluation methods. If teaching activities and evaluation methods are inconsistent with teaching situations, effective teaching cannot be promoted.

Therefore, the design of situational adaptive teaching and evaluation must consider eight factors, such as the type of subject content, the embodiment of individual differences, the school of learning theory, the type of learning transfer, the type of teaching objectives, the type of tests, the type of scores and the type of score interpretation.

REFERENCES

[1] [US] Gerald S. Hannah [US] Peggy a. Detmer. Translated by Wang Yanling. Situational adaptability evaluation of curriculum [M]. Hangzhou: Zhejiang University Press, 2008

[2] James popam. A guide to the evaluation of teachers' Classroom Teaching [M]. Translated by Wang benlu and Zhao Jing, et al. Chongqing: Chongqing University Press, 2010

[3] Oakes et al. Teaching and social change [M]. Trans. Cheng Liang et al. Shanghai: East China Normal University Press, 2008

[4] Huang Guangyang. Education measurement and evaluation [M]. Shanghai: East China Normal University Press, 2002

[5] Hallerot, curriculum and teaching design in context, translated by Yang Mingquan, Beijing: China Light Industry Press, 2007:76-77

[6] Stikins. Participatory classroom evaluation of students in promoting learning [M]. Project group of "Evaluation Research on promoting teacher development and student growth", translated by Beijing: China Light Industry Press, 2005.71

[7] Zuo tengzhengfu. Principles of teaching theory [M], translated by Zhong Qiquan. Beijing: People's education press, 1996.342

[8] Morley, ed. educational psychology [M]. Guangzhou: Guangdong Higher Education Press, 2005.135-139

[9] Selected works of Deng Xiaoping, Volume 3 [M]. Beijing: People's publishing house, 1993,pp.370

[10] Collected works of Mao Zedong, Volume 6 [M]. Beijing: People's publishing house, 1999,pp.329

[11] Selected works of Jiang Zemin, Volume 3 [M]. Beijing: People's publishing house, 2006:548

[12] editor's office of the CPC Central Committee. Xi Jinping's excerpts on the comprehensive deepening of reform. [M]. Beijing: Central Literature Press,.2014:14.

[13] Ding Xuexiang. Speech at the party working conference and discipline inspection working conference of the organs directly under the Central Committee (January 26, 2018) party construction network directly under the Central Committee: http://www.zzdjw.org.cn/n1/2018/0211/c153945-29818949.html