

Utilizing balanced scorecard to design instructional objectives and enhance student learning performance / satisfaction

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Abstract

The purpose of this study is to design instructional objectives and to enhance student learning performance/satisfaction through the use of Balanced Scorecard (BSC). To evaluate and improve enterprise performance, BSC can be divided into four perspectives: financial, customer, internal process, and learning and growth. The essence of BSC was extracted and instructional objectives were developed in four perspectives: academic performance, student, teaching process and learning and growth. A case was used to verify the usefulness of BSC in designing instructional objectives. Results showed that applying BSC in designing instructional objectives improved students' academic performance and satisfaction in a freshman intermediate accounting course in the Department of Business Education under certain university. Analyzed with LISREL, a significant cause-and-effect relationship is found among the four perspectives.

Keywords: Instructional Objectives, Balanced Scorecard, Intermediate Accounting Course, Accounting Education, Higher Education

1. Introduction

A complete series of instructional objectives should be well planned before teaching starts. These objectives are to contain what students should learn and what teachers should do to attain the instructional objectives. Objectives that any curricular activities wish to achieve are nothing more than the following three: knowledge, affection, and skills (Bloom, 1956; Krathwohl, Bloom, & Masia, 1964; Simpson, 1972). Therefore, teaching should be planned based on the above three objectives.

Balanced Scorecard (BSC) is originally designed as a tool to evaluate managerial performance, and later as a strategic instrument to gain competitive advantages. Many field studies (Kaplan & Norton, 1996a, 1996b) proved BSC to be an excellent tool for strategic management and evaluation. Noted companies, such as Rockwater, Apple

Computer, Advanced Micro Devices, Siemens Corporation, and many health care institutions, adopted BSC as a performance evaluation and strategic management tool (Inamdar & Kaplan, 2002; Protti, 2002; Ritter, 2003). In addition to the workplace practices, many educational institutions also employ this instrument (John, John, Trevor, & Mick, 2003; Lee & Lo, 2003; Storey, 2002).

Two main purposes for this study were:

- (a) to design instructional objectives for intermediate accounting course, and
- (b) to improve teaching effectiveness of the intermediate accounting course by way of BSC application.

2. Method

2.1. Theoretical frameworks

2.1.1. Use BSC to design instructional objectives

There are four main perspectives on BSC and one can also measure the instructional objectives with these four aspects. First, the financial perspective of instructional objective can be named as perspective of academic performance. Since the financial profit is the ultimate goal for enterprises, the academic performance is the ultimate goal for teaching. Second, the customer perspective of instructional objective can be named as student perspective. Since customers are the targets of service for enterprises, students are the targets served by teacher's teaching. The perspective of internal process for instructional objective can be named as perspective of teaching process. Since the internal processes are the operation of enterprises to achieve financial and customer goals, the teaching processes are the operation of teachers to achieve academic performance and student goals. The learning and growth perspective of instructional objective can be named as the learning and growth perspective of teaching. Since learning and growth are the continuous improvement and innovation carried out by enterprises to achieve the abovementioned three goals, the learning and growth of teaching are the continuous improvement and innovation carried out by teachers to achieve the abovementioned three instructional goals.

The four fundamental perspectives of instructional objectives shall be applicable to every subject. Speaking from the contents of goals and measurement indexes of detail items, however, as pointed out by Kaplan and Norton (1996a) that differences would arise from different enterprise strategies, it is also considered in this study that different subject or strategy adopted by the teacher will also cause differences. After setting each fundamental perspective of instructional objectives, this study takes students studying intermediate accounting under certain teacher training program of commercial schools as example, which attempts to establish the content of various goal perspectives and measurement indexes of detail items.

2.1.2. Strategic consideration on relationships between various perspectives of BSC for intermediate accounting instructional objectives

Kaplan and Norton (1996a) pointed out that in addition to emphasize the strategic link between organizational goals and actions, a BSC has pointed out the relationships between the four perspectives. Based on Kaplan and Norton (1996a), there shall be relationships between various perspectives of BSC for intermediate accounting course mentioned in the study. In other words, all perspectives of learning and growth (e.g. high satisfaction from teacher using concept maps as teaching media during lecture), teaching process (e.g. teacher's excellent ability in presentation and guidance), student (e.g. high satisfaction from teaching survey) and academic performance (e.g. high average scores in academic performance) shall have positively distinctive relationship. Furthermore, such a relationship also exists between perspectives of teaching process (e.g. vivid lecture), student (e.g. high satisfaction from teaching survey) and academic performance (e.g. high average scores in academic performance); from the perspective of student (e.g. more hours of exercising accounting for student per week) and academic performance (e.g. high average scores in academic performance).

In order to provide more evidences to support the strategic relationship between various perspectives of BSC proposed in this study, practical teaching experiment is used to verify the link of between various perspectives of goals, where review and replacement of perspective goals are executed. Regarding the relationships and indexes for various perspective goals of results from teaching experiment, the Linear Structure Relation (LISREL) is used in addition to qualitative analysis for verification.

2.2. Experimental design

The teaching experiment of this study was conducted by adopting standard experiment design of non-equivalent control group. Two classes studying first year of intermediate accounting in the Department of Commercial Education under certain university were taken as the targets of experiment and divided into experiment group and control group (preliminary tests were executed on both groups to determine if the prior knowledge of account is equivalent). The teaching hours are set as 6 hours per week with 4 hours of theory and 2 hours of practical lectures, which is provided for one academic year.

2.3. Instruments

Students' cognitive achievement tests were taken three times per semester. The first two tests covered questions on intermediate accounting (among them, the easy questions include acknowledge goals such as knowledge and comprehension; the normal questions include acknowledge goals such as application and analysis; the hard questions include acknowledge goals such as composite and assessed [case

studies]) and the last test covered composite accountant and license question as the final exam for the semester.

Students' affection test included students' survey on teaching and students' open survey. The students' survey on teaching was based on the school's survey on teaching for adequate effect. With the survey completed by former students of intermediate accounting over previous academic year, Cronbach's Alpha reliability test was carried out and the result indicated a reliability of 95.82%, which showed the scores of students' teaching affection towards the teacher. In addition, students were requested to provide feedback on teaching, which covered teaching and guiding ability of the teacher and assistant, rate of students' feedback, student complaints and support, as well as positive reaction on assistance with media.

Students' skill tests covered the students' trial teaching and exercise of practical cases. For trial teaching, each student was assigned with one unit during practical lecture for trial teaching at 10-15 minutes. For exercise of practical cases, the teacher applies examples of practical cases from teaching material in manner of group competition; students in the groups are then requested for practical exercise using the accounting knowledge. Such pattern of monitoring for one academic year can help students to understand the incorporation of theory with practice.

2.4. Sequences of teaching experiment

Upon curriculum introduction at first lecture of the semester, each student got a BSC sheet designed by the teacher. Relevant requirements and method of assessment for the semester were explained in details, where the students were then allocated into groups using the S-pattern approach according to the students' scores in accounting from joint examination of technical colleges. First, an investigation was carried out on the report compiled by former students under teacher's request in previous semester about repeated content between accounting course in commercial school and intermediate accounting in the university, which acts as the teaching reference. Second, the teacher taught with assistance of teaching media and concept maps during normal lecture. After understanding the connection and repetition of course in advance, the distribution of teaching progress can be executed accordingly. The teaching progress was based on the principle of 3 Chapters per month and 12 Chapters per semester, so the teacher had more time to perform the achievement test and supplementary teaching. Upon completion of 3 Chapters, the teacher delivered an academic achievement test in the following week. Students were also requested to complete the teaching survey and open survey for reference of future improvement. After one semester, there were 3 tests of academic achievement and 3 tests of affection achievement, which allowed comparison of progressive improvement on the scores and confirmation of achieving the goal of passing license examination.

During practical lecture, the students were requested to perform practical discussion, solution and case analysis in groups, as well as the group competition. The group with fastest solution was rewarded with extra scores and the students were required to establish a group knowledge base by the end of semester for one of the group evaluation standards. In addition, the assistant was required to participate in practical lecture and allow vacant time after the lecture to answer students' question, as well as helping the teacher to guide students. After mid-semester, the students were requested to exercise trial teaching and each student was assigned with one unit during practical lecture for trial teaching at 10-15 minutes, which was assessed by the teacher and students together. The standard of assessment includes students' comprehension, presentation ability, correctness of accounting concepts, provision of practical example and hypotyposis. The scores for trial teaching were taken as one of the assessing standards for skill achievement.

The teaching method of controlled class adopted the conventional method of lecturing originally used the teacher. In other words, the teacher gave one-way teaching by incorporating the text material with teaching media; noted the students' reaction and encouragement of questions from the students during the lecture at all times, as well as giving home works to be completed, so discussion can be done at a practical lecture.

3. Results and discussions

This study used academic scores and student satisfaction as indicators to evaluate the effectiveness of teaching using a BSC. A pre-test was administered in order to determine whether differences could be accounted for by prior knowledge. The average pre-test score (Table 1) for the control group is higher than that for the experimental group; however, the difference was not significant, $t=1.9$, $p>0.05$. Thus, prior knowledge for both groups is similar.

Table 1. Pre-Test Score Difference between Control and Experimental Classes

Group	Sample size	Average score	Standard deviation	t value
BSC class	37	69.19	11.53	1.90
Traditional class	38	73.82	9.45	
Difference		4.63		

To compare academic performance after the teaching process, students from both classes were administered the same post-test (i.e. the accountant and license question). The average score for the BSC class was 69.70, while that for traditional class was 63.42; the BSC class outperformed the traditional class by 6.28 points, which is a statistically significant difference ($t=2.08$, $p<0.05$). Thus, the BSC teaching method

makes a positive contribution to student academic performance. Results are shown in Table 2.

Table 2. Post-Test Score Difference between Control and Experimental Classes

Group	Sample size	Average score	Standard deviation	t value
BSC class	37	69.70	11.41	2.08*
Traditional class	38	63.42	14.55	
Difference		6.28		

Note. * $p < .05$

To further compare the teaching effectiveness with the two groups, this study administered a student learning satisfaction survey, the results of which are in Table 3. Student satisfaction in the BSC group is significantly higher than that in the Traditional group ($t=5.27$, $p < 0.01$), demonstrating that students have more positive opinions toward BSC teaching.

Based on the academic scores and student satisfaction, the BSC teaching method outperforms the Traditional teaching method. Instead of focusing only on summative evaluation, as Traditional teaching does, BSC teaching emphasizes learning effectiveness as well as student learning process, providing considerable influence on student learning performance.

Table 3. Comparison of Student Satisfaction between Experimental and Control Classes

Group	Sample size	Average score	Standard deviation	t value
BSC class	37	3.75	0.21	5.27**
Traditional class	38	3.26	0.53	
Difference		0.49		

Note. ** $p < .01$

Lesson plans were designed for the intermediate accounting course for the teacher training program in vocational education. The experimental period lasted for one year. From LISERL analysis, most designed measurement indexes can sufficiently represent the four perspectives of the BSC in this study. The result of the cause-and-effect relationship among the four perspectives meets the requirement for a theoretical basis. The instructional objectives of the BSC for intermediate accounting are shown in Table 1.

Table 1. Balanced Scorecard of Instructional Objectives for Intermediate Accounting under the Department of Business Education (After the Teaching Experiment)

Perspective	Content	Measurement index
Academic	1. passing the examination for	1. professional license score

performance	<ul style="list-style-type: none"> professional licenses 2. incubating teaching ability of vocational teachers 3. achieving instructional objectives (knowledge, attitude and skill goals) 	<ul style="list-style-type: none"> 2. trial teaching score 3. academic grade improvement 4. Application and analysis score (normal) 5. academic grade score 6. scores in composite and evaluative questions (hard) 7. scores in knowledge and comprehension (easy)
Student	<ul style="list-style-type: none"> 1. achievement of affection goals 2. improvement of students' satisfaction towards teacher's teaching 3. timely reply to the student 4. level of students' work 	<ul style="list-style-type: none"> 1. total scores from student survey 2. scores for students' comments on repeated course 3. scores for efficiency in replying and modifying student's comments 4. scores for student's willingness to attend relevant courses provided by the same teacher 5. number of hours of students' accounting exercise per week
Teaching process	<ul style="list-style-type: none"> 1. improvement in teacher's presentation ability, speed and volume 2. improvement in teaching performance with assistance of teaching media 3. application in accounting knowledge in practical exercises 4. attraction of students' learning interest 5. suitable material for students 	<ul style="list-style-type: none"> 1. teacher's presentation and guiding ability 2. satisfaction with auxiliary teaching media 3. satisfaction with practical exercise with accounting courses learned 4. vivid lecture scores 5. scores for suitable material for students
Learning and growth	<ul style="list-style-type: none"> 1. learning and growth from teaching 2. innovation of teaching method 3. teacher's teaching ability 4. achievement of skill goals 5. trial teaching 	<ul style="list-style-type: none"> 1. scores from interaction and growth while teaching students 2. scores for satisfaction with teacher using concept-mapping as teaching media during lecture 3. scores for satisfaction with bonus system 4. scores for satisfaction with applying trial teaching during practical lecture

5. Conclusions

The purpose of this study is to design instructional objectives and to improve teaching effectiveness through the use of a BSC in an intermediate accounting course. The result of this study found that the BSC class had significantly higher scores in academic performance and learning satisfaction than did the traditional class. This indicated that utilizing the BSC to design instructional objectives and teaching can enhance learning performance.

The other major finding of this study is that there are significant cause-and-effect relationships among the four perspectives of BSC in the design instructional objectives. The learning and growth perspective will impact the perspectives of academic performance, student, and teaching process; the perspective of teaching

process will significantly impact the perspectives of academic performance and student; and the perspective of student will significantly impact the perspective of academic performance. From the viewpoint of classroom management, teachers can design lessons based on the cause-and-effect relationship among the four perspectives and reinforce learning and growth, teaching process, and student satisfaction perspectives, in that order.

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7. References

- [1] Bloom, B. S. (Ed.) (1956). *Taxonomy of educational objectives: The classification of educational goals. Handbook 1: Cognitive domain*. New York: Mckay.
- [2] Inamdar, N., & Kaplan, R. S. (2002). Applying the balanced scorecard in healthcare provider organizations. *Journal of Healthcare Management, 47*(3), 179-196.
- [3] John, C., John, J., Trevor, H., & Mick, B. (2003). Quality in higher education: From monitoring to management. *Quality Assurance in Education: An International Perspective, 11*(1), 5-15.
- [4] Kaplan, R. S., & Norton, D. P. (1996a). Using the balanced scorecard as a strategic management system. *Harvard Business Review, 74*(1), 75-86.
- [5] Kaplan, R. S., & Norton, D. P. (1996b). The balanced scorecard is more than just a new measurement system. *Harvard Business Review, 74*(3), 3-4.
- [6] Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). Taxonomy of educational objectives: The classification of educational goals. Handbook II: Affective domain. New York: Longman.
- [7] Lee, S. F., & Lo, K. K. (2003). E-Enterprise and management course development using strategy formulation framework for vocational education. *Journal of Materials Processing Technology, 139*(3), 604-613.
- [8] Protti, D. (2002). A proposal to use a balanced scorecard to evaluate information for Health: An information strategy for the modern NHS. *Computers in Biology & Medicine, 32*(3), 221-237.
- [9] Ritter, M. (2003). The use of balanced scorecards in the strategic management of corporate communication. *Corporation Communication, 8*(1), 44.
- [10] Simpson, E. J. (1972). *The classification of educational objectives: Psychomotor domain*. Urbana, Il: University of Illiois Press.
- [11] Storey, A. (2002). Performance Management in School: Could the balanced scorecard help? *School Leadership & Management, 22*(3), 321-339.