

A study on the learner-centred evaluation strategy

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ABSTRACT: Learner-centred instruction takes students' learning activities as its main objective, in which teachers play the roles in supplying teaching design, and providing guidance, suggestions and encouragement through various teaching activities in order to inspire students' learning interests to encourage students to learn actively, enrich their lives, further students' creative thinking abilities, as well as enhance their ability to adapt to social changes. Learner-centred instructional activities are based on the needs of learners, which go through the processes of systematic teaching and evaluation. Because the basic theoretical idea of this teaching strategy is consistent with the implementation goals of vocational high school curricula, the vocational high school curricular contents begin from a learner-centred standpoint to perform the construction and sub-sanitation of evaluation modes, which become feasible strategies for promoting teaching qualities. The primary purpose of this study lies in substantiating an evaluation of the learner-centred strategy and teaching effects. In this study, the authors hope to present examples of systematic teaching experiments as references for future vocational high school curricula implementation.

LITERATURE REVIEW

The learner-centred teaching takes students as its main focus, while teachers play such roles as designers, leading guides, proposers and encouragers in students' learning activities. Through diverse teaching activities, and by integrating and combining the relevant subjects for daily life, teachers stimulate students' learning interests, encourage students to study actively, enrich students' lives, further students' creative thinking, and increase students' ability to adapt to social changes (see Table 1) [1].

TEACHING AND EVALUATING PROBLEM SOLVING ABILITIES

Learner-centred instruction is an innovative concept of education aimed at cultivating students' ability in solving practical

living problems. This is a trend in global educational reforms. With the endless progress in modern technology, the daily life and work environments are full of problems waiting to be solved, so problem-solving ability is an indispensable ability in the fast-changing modern society. The so-called problem-solving skills means using individual thinking to seek problem-solving methods in order to achieve the purposes of solving problems [2]. Problem-solving is the mental process whereby persons go from their initial states towards orientation states. This process is the highest level in thinking techniques and requires a higher level of rules [3].

Schwartz, Mennin and Webb regard evaluating the practical effects of learning based on problems as capable of evaluating students' performance in tests. This is conducive to learning habits, behavioural and thinking processes, to the degrees of

Table 1: A comparison between the teacher-centred school and the learner-centred school.

The Teacher-Centred School	The Learner-Centred School
Knowledge is passed from teachers to students	Students obtain knowledge through methods such as collecting, combining and integrating the obtained information, and posing questions, communicating, making critical judgements and problem solving
Students receive knowledge only passively	Students actively take part in acquiring knowledge
Knowledge comes from textbooks	Sources of knowledge are related to practical life, like problems currently taking place in society or heatedly discussed popular issues
Teachers play the roles of the major providers and evaluators of information	Teachers and students are mutual evaluators
Teaching and evaluation are separated	Teaching and evaluation are put together
Evaluation is used to monitor and control learning	Evaluation is used to improve and evaluate learning
Only emphasise correct answers	Emphasise learning from errors and the creation of better questions
Evaluation methods stress grades from written tests	Evaluation methods include written tests, presentations, achievement evaluations, file evaluations, etc
Emphasis is on a single academic field	Emphasis not just on one single academic field, many fields
Focus is on competition and individualism	Emphasis is on cooperative learning
Only students are the learners	Teaching and learning complement each other

satisfaction of the participants (including students and teachers) and participants' learning abilities [4].

It can be learnt from the above-mentioned study that when teachers conduct teaching in problem-orientation or develop learner-centred problem-solving abilities, they should understand students' initial knowledge and their active learning willingness, and make proper prior planning for the related teaching process. The participating and intervening methods are not pre-determined. When intervening, teachers should respect students' learning initiatives and promote students' learning effects; the balance between the two being the greatest dilemma in intervening evaluation.

Regarding the related study on problem-solving abilities, small-group discussions can be put to good use, including dialogue recordings, or personal note-taking, the Internet environment and such teaching strategies as the teaching nodes of framework theory, all of which are helpful to developing students' abilities in problem-solving.

PURPOSES OF THE STUDY

Based on the research background and motivation, the overall purposes of this study are as follows:

- To establish the contents of the evaluation strategies for the learner-centred vocational high school curricular teaching effects;
- To construct the evaluation strategies for the learner-centred vocational high school curricular teaching effects;
- To substantiate the evaluation strategies for the learner-centred vocational high school curricular teaching effects.

METHODOLOGY

Research Framework

In this study, the authors conducted practical tests to explore the feasibility of intellectual, emotional and technical learning

effects by means of examining related literature in Taiwan and abroad by utilising quality management concepts and constructing learner-centred vocational high school curricular learning teaching modes. The framework of this study is shown in Figure 1.

Research Methods

In order to obtain complete and accurate information, this study aimed at exploring and confirming preliminary research so as to understand vocational high school curricular contents and the characteristics of individual vocational groups, then conduct interviews with the vocational high school teachers involved in the study to understand the present situation and difficulties in vocational high school teaching evaluation, and to correct evaluation strategies of teaching, which were set in the preliminary study. To achieve the above-mentioned purposes, the authors also conducted statistical analyses in the teaching experimental process on the data gathered from the process of evaluation strategies for individual items of teaching effects.

PERIOD OF EXPERIMENT

This study was conducted over 30 weeks, with the experimental teaching beginning with the first semester of the 2004 academic year until the end of March in the second semester.

SUBJECTS

A total 74 subjects participated in the study. They were selected from the programme of Business Management at the National Taichung Home Economics and Commercial High School, Taichung, Taiwan. Each group comprised 37 students (see Table 2).

Table 2: Distribution of the subjects.

Course	Names of Classes	N
Accounting	Second grade class 1 (experimental)	37
	Second grade class 2 (control)	37

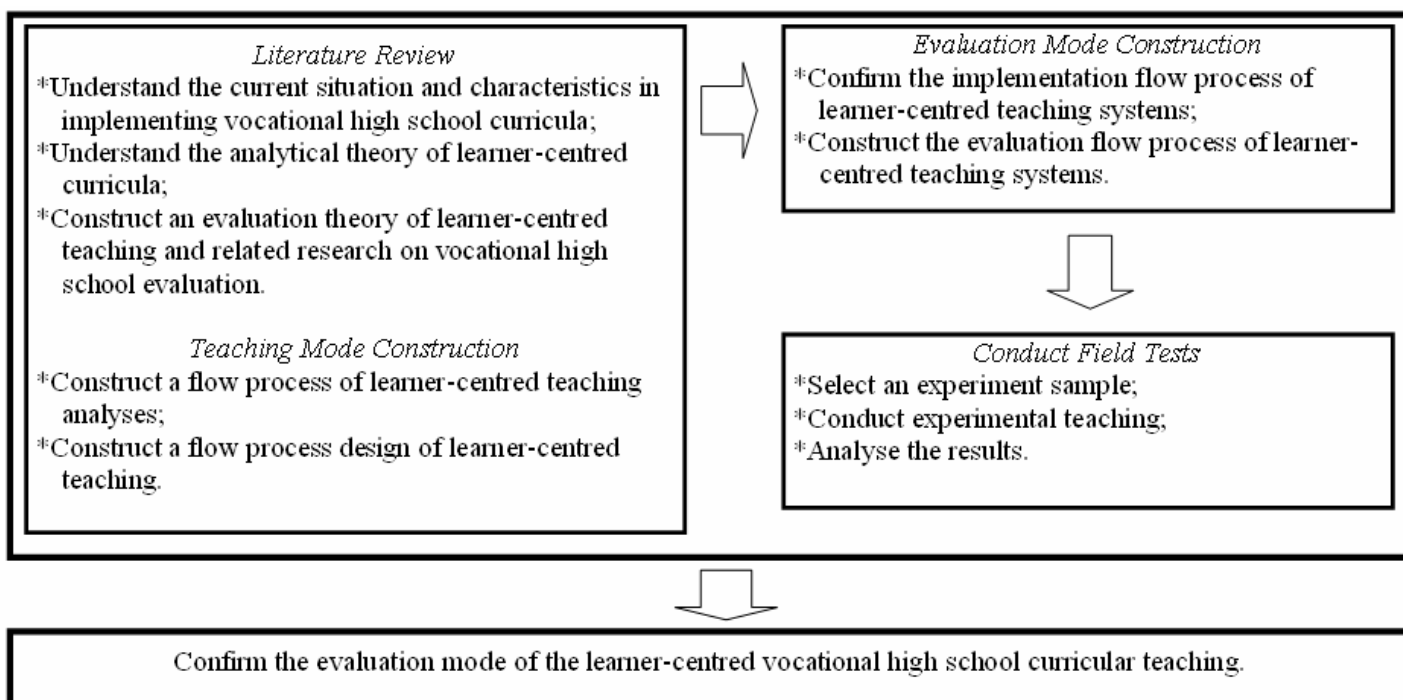


Figure 1: The research framework.

EXPERIMENT DESIGN

Because this study was limited to the original educational environment and the number of students in a class, it was not possible to conduct a random true experiment. It is for this reason that the pre- and post-experiment designs of the non-random experimental group and control group in the quasi experiment designs have been adopted. Students from the same grade have been selected for the experimental group and the control group, and the same teachers used different teaching strategies to teach the same course. The experiment designs are shown in Table 3 and Figure 2.

Table 3: Quasi experiment design.

Group	Pre-test	Experiment Processing	Post-test
Experimental	Y ₁	X	Y ₂
Control	Y ₁	—	Y ₂

Prior to the experiment, all of the subjects took pre-tests (Y₁), which were compiled by the research group entitled *the measuring table for problem-solving ability*. After completing the pre-tests, the experimental group was given experiment processing (X), ie carrying out an evaluation strategy of learner-centred teaching effects, while the control group was given traditional teacher-centred teaching methods to conduct teaching. After the end of the experiment, in addition to giving post-tests (Y₂) to students in the experimental group and the control group, questionnaire polling and observation interviews were conducted on the degree of learning satisfaction in order to explore the different levels in the experimental group students and control group students.

INSTRUMENT

There were three instruments utilised in the study. The self-compiled *Problem-Solving Ability* was referred from Chao, which includes five phases, namely: identify problem, collect information, select tactic, implement and resolve effects [5]. The instrument of instructional satisfaction included: goal setting, teaching materials teaching method, teacher quality, teaching in progress and environment facilities. The class teacher developed the learning achievement instrument.

RESULTS AND DISCUSSION

The Experiment Effect for the Problem Solving Ability

A problem-solving ability pre-test was conducted to ascertain the homogeneity of the subjects. According to the results of independent t-test (see Table 4), no significant difference was

detected between the averages of the overall problem-solving ability of the experimental group and the control group.

Table 4: Comparison of pre-test results on the problem-solving abilities of students from the different groups.

Group	N	Mean	S.D.	t
Experimental	37	17.56	4.51	0.77
Control	37	16.81	3.87	

Afterwards, a mid-term test was conducted on the experimental and control groups, as shown in Table 5. Mid-term grade difference testing was conducted on the results. After the teaching was conducted, the mid-term grades of the experimental group were not conspicuously higher than the control group's.

Table 5: Comparison of mid-term test results on problem-solving ability for students from the different groups.

Group	N	Mean	S.D.	t
Experimental	37	21.39	4.74	1.45
Control	37	19.89	4.12	

Table 6 shows the test results analyses of the average t inspection on every phase of the post-test on: *the problem-solving ability of different student groups after teaching statistics*. Except for the *resolve effect phase*, which showed no significant difference between the experimental and control groups, the experimental group displayed higher averages in all other phases than those in the control group; notably, *the identify problem phase* and *the collect information phase* even reached the significance level of 0.01.

Table 6: Comparison of post-test results on the problem-solving abilities of students from the different groups.

Phase	Group	N	Mean	S.D.	t
Identify problem	Experimental	37	6.73	1.67	4.43**
	Control	37	5.14	1.40	
Collect information	Experimental	37	6.54	1.69	3.88**
	Control	37	5.06	1.59	
Select tactics	Experimental	37	5.86	2.11	2.10*
	Control	37	4.94	1.63	
Implement	Experimental	37	5.48	2.26	2.47*
	Control	37	4.32	1.76	
Resolve effect	Experimental	37	4.46	2.42	0.76
	Control	37	4.09	1.69	
Overall	Experimental	37	5.81	0.91	2.41*
	Control	37	4.71	0.47	

*p<0.05 **p<0.01

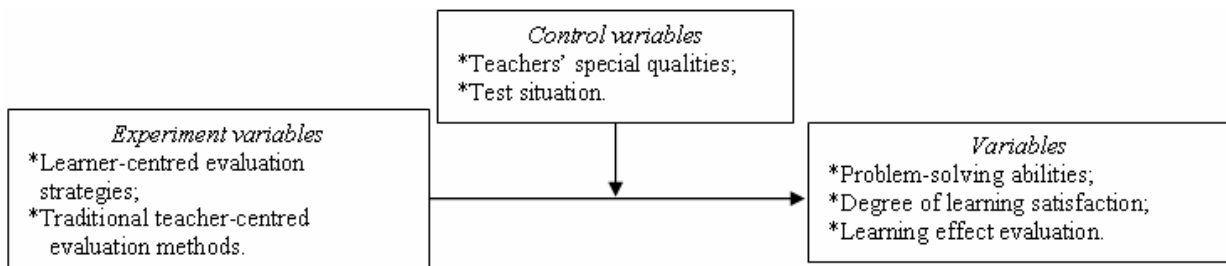


Figure 2: Framework of the experiment.

DEGREE OF STUDENTS' LEARNING SATISFACTION

After going through the teaching experiment, a self-developed *student learning satisfaction* questionnaire was conducted on the experimental group, and the overall attitudes are listed in Table 7. Based on the single sample t-test ($H_0: \mu=3$, $H_a: \mu>3$), excepting the phase of goal setting, the mean scores of every phase in the experimental group were significantly higher than the average score [3].

Table 7: The t-test on *student learning satisfaction* for the experimental group.

Phase	N	Mean	S.D.	t
Goal setting	37	3.04	0.93	0.27
Teaching materials & methods	37	3.94	0.61	9.42**
Teacher quality	37	3.99	0.56	10.66**
Teaching in progress	37	3.54	0.60	5.55**
Environment facilities	37	3.27	0.76	2.16**
Evaluation	37	4.02	0.60	10.27*
Overall	37	3.63	0.49	7.81**

* $p<0.05$ ** $p<0.01$

STUDENTS' LEARNING ACHIEVEMENTS

In order to test the homogeneity of the students' achievements, a mid-term examination was conducted on the students (see Table 8). The t-test values show that the averages in all structural phases did not significantly differ between the experimental group and the control group.

Table 8: Comparison of mid-term test learning achievements by evaluation strategy.

Group	N	Mean	S.D.	t
Experimental	37	85.38	12.15	-0.10
Control	37	85.68	13.24	

The t-test analysis results at the end of the term on *learning achievements* of the students from the two groups are shown in Table 9. The means in every structural phase still have not reached a significance difference between the experimental group and the control group, although those from the experimental group are higher those of the control group.

Table 9: The t-test of the post-test on learning achievements.

Group	N	Mean	S.D.	t
Experimental	37	58.20	17.78	0.41
Control	37	56.43	19.43	

CONCLUSION

This study was aimed at constructing and testing a learner-centred evaluation strategy for vocational high schools, in order

to promote teaching effects through effective and diverse evaluations. In order to achieve these purposes, this study built up a theoretical foundation from the exploration of literature, and then set up an evaluation strategy for vocational high school curricula. After this, two classes from the Taichung Home Economics and Commercial High School were selected for the experiment. There were 37 students included in the experimental group and the learner-centred evaluation strategy was applied. There were 37 students in the control group, which utilised traditional teacher-centred evaluation.

During the study period, the research group and teachers in the experimental teaching kept in touch with one another from time to time, and went individually to the experiment school to conduct interviews and communicate opinions so as to compile the research data. The research instruments, such as problem-solving ability measurements, learning satisfaction measurements and learning achievement measurements, were adopted in the research process in order to evaluate students' problem-solving abilities and learning attitudes.

The following conclusions were gained after analysing and discussing the research results:

- Six phases of a learner-centred evaluation strategy, including conducting an instructional analysis, establishing evaluation goals and methods, and so forth (see Figure 3);
- The learner-centred evaluation strategy including phrasal evaluation methods and testing instruments;
- After conducting the learner-centred evaluation strategy, the effects in part of the academic courses show a positive influence on such phases as students' problem-solving abilities, information collection and strategy selection;
- Positive viewpoints have been shown with regard to the learner-centred evaluation strategy, students' degree of satisfaction with the teaching methods of the teaching materials, the environment facilities and the structural phase of evaluation;
- Most of the teachers and students participating in the learner-centred evaluation showed support for the experiment;
- There should be relative environmental resources to support the implementation of the learner-centred evaluation strategy.

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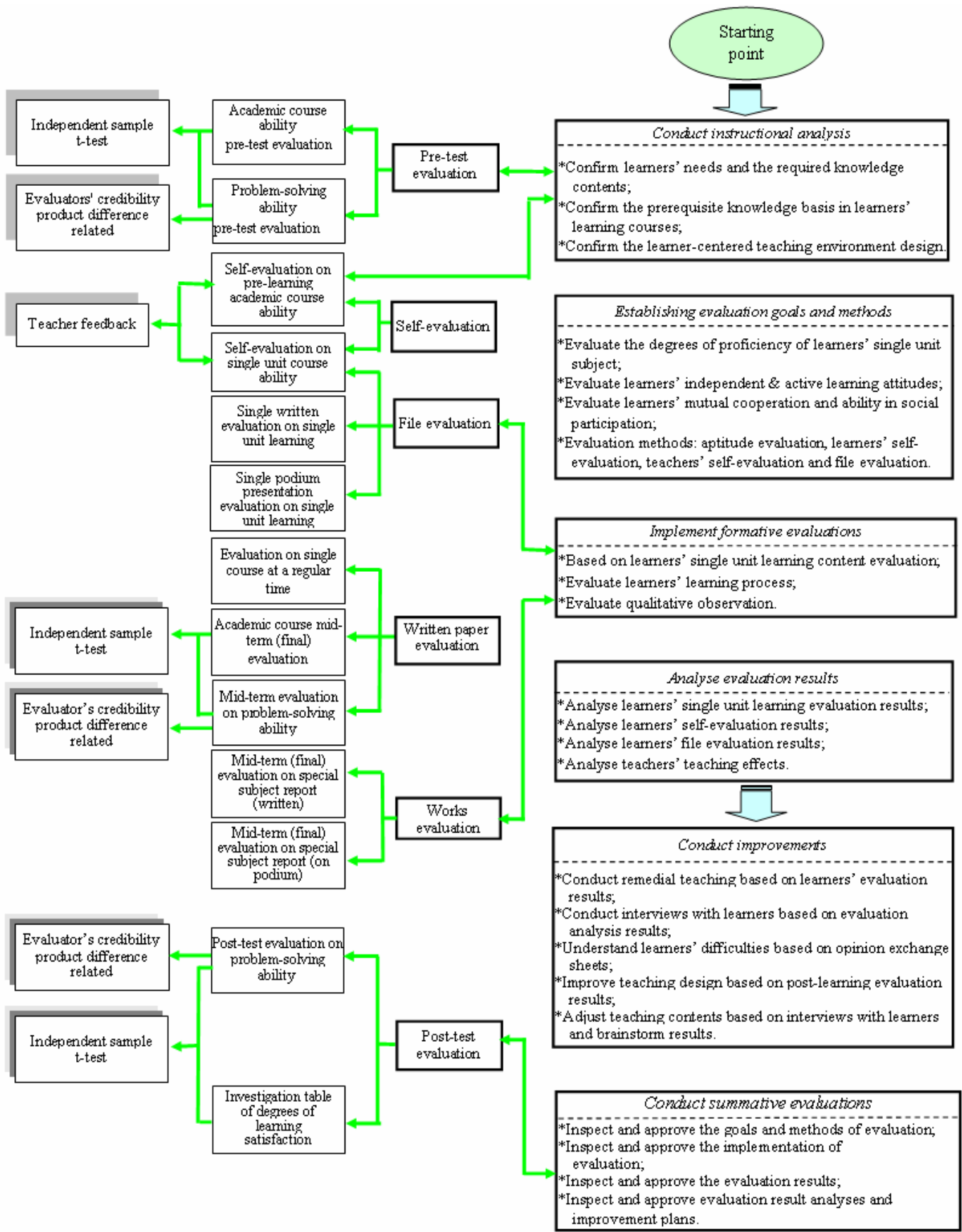


Figure 3: The learner-centred evaluation strategy.

Proceedings of the 4th Asia-Pacific Forum on Engineering and Technology Education

edited by Zenon J. Pudlowski

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