What is the impact of teacher self-efficacy on the student learning outcome?

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ABSTRACT: Research that investigated the impact of teacher self-efficacy on student learning outcomes is presented and discussed in this paper. An effective teaching and learning model was devised and constructed through a review of the literature. In addition, in order to achieve its goal, five hypotheses were proposed and tested: 1) teacher self-efficacy has a positive effect on student learning satisfaction; 2) teacher self-efficacy has a positive effect on student learning outcomes; 3) the teaching process has a positive effect on student learning satisfaction; 4) the teaching process has a positive effect on student learning outcomes; and 5) student learning satisfaction has a positive influence on student learning outcomes. Research results and concluding remarks are presented and discussed in this paper.

INTRODUCTION

In recent years, there has been a considerable proliferation of research concerned with student learning outcomes. Accountability and assessment were the most important issues, as quality assurance in education has been an important development trend in Europe and the USA, and among the assessment topics, researchers have focused on student learning outcomes (SLO) [1][2]. Students achieve deep learning when they successfully construct knowledge and, then, retain the constructed knowledge for the purpose of bringing benefits to themselves and society, so learning outcomes were the main target of the European and American educational institutions [3].

Teachers provide school education and teacher efficiency is reflected in the teaching process and practice. Some researchers have revealed that teachers produce different teaching situations through how their differing backgrounds and decisions intersect with the teaching model. Teachers' teaching efficiency is displayed in teaching practice and student learning outcomes. Kelchtermans noted that teaching practice is a learning process resulting from meaningful interaction with the context (both in time and space) and teachers' professional practice (actions) and thinking [4].

In the learning process, learning satisfaction is an important factor in student learning outcomes. Many studies have found that learning satisfaction has a positive effect on learning outcomes and similar examples abound in the literature [3][5]. Thus, teaching practice and learning satisfaction are important indicators of teachers' instruction and student learning outcomes. However, no clear direction has emerged about the implications of the impact of teacher self-efficacy on student learning outcomes. This realisation is the motivation for the research outlined in this study. It is hoped that answering these questions will contribute to the understanding of the impact of teacher self-efficacy on student learning outcomes.

LITERATURE REVIEW

Teacher Teaching Self-efficacy

Teacher self-efficacy cannot be easily defined, because teaching is complex and constantly evolving, and self-efficacy involves a great many traits and factors. Ashton argued that the teacher influences students, and that the intensity and ability of teachers represents their self-efficacy [6]. Hoover-Dempsey, Bassler, and Brissie defined teacher self-efficacy as including three aspects: 1) teaching effectively oneself; 2) learning abilities; and 3) professional knowledge [7]. Tschannen-Moran, Woolfolk Hoy and Hoy defined teacher efficacy as a teacher's judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated [8].

Based on social cognitive theory, teacher self-efficacy may be conceptualised as individual teachers' beliefs in their own ability to plan, organise and carry out activities that are required to attain given educational goals [9]. Attempts have also been made to fashion a model of teacher self-efficacy. Ashton [6] placed the construct of teacher self-efficacy within the framework of Bronfenbrenner's [10] ecological perspective and identified a complex set of interactions which differentially support or threaten teachers' personal sense of self-efficacy. Their studies demonstrated the contextual dependency and relative instability of efficacy beliefs, but also emphasised the importance of the construct to teaching outcomes.

Ashton concluded that a potentially powerful paradigm for teacher education can be developed on the basis of the construct of teacher efficacy and suggested a number of modifications to teacher education programmes to enhance pre-service teachers' efficacy beliefs [6]. These modifications included many of the approaches recommended for the promotion of deep learning, especially the development of analytical problem-solving approaches from meaningful, context based learning.

Researchers have posited multiple dimensions to self-efficacy. Schunk proposed the three kinds of index: personal self-efficacy, general self-efficacy and professional self-efficacy [11]. Bandura used seven kinds of index to illustrate teacher self-efficacy: 1) influencing the school to make policy; 2) influencing the intersection of schools and resources; 3) the intersection of classes and teaching; 4) regular classroom management; 5) leading parents to participate in the educational process; 6) impelling the community to invest and educate; and 7) build the school interaction atmosphere [12].

Based on the foregoing research, the following components of teacher self-efficacy were identified:

1. Teachers' personal teaching self-efficacy: the teachers' belief in the efficiency of their own teaching, understanding of their students and belief that their methods can overcome the harmful effects of the external world on the students and on their own teaching.
2. Teachers' general teaching self-efficacy: the teachers' belief in their impact on students' individual differences, belief in their impact on all students, and belief to overcome the harmful effects of students' family and society.
3. Teachers' professional teaching self-efficacy: the professional belief and skill that could train students to have professional skill operational ability and the professional knowledge of professional subjects and practice.

Teachers' Teaching Process

Teaching practice is an essential component of teacher preparation. It trains teachers to be professional teachers, providing them the opportunity to learn classroom management skills and to match teaching theories with practice during contact sessions and classroom observation. The chance to interact with experienced teachers in schools provides a good opportunity for teachers at the start of their career. Even those who have been through some initial training have much to learn by observing other teachers teaching in an entirely different school [13].

The teaching process is defined as any activity related to teaching carried out by the teacher in the classroom [14]. Joanne argued that effective teaching processes can encourage students to think and make decisions, promote learning motivation and learning of new knowledge and skills [15].

O'Neill identified the 20 most important factors of the three stages in the teaching process: 1) Pre-active stage: teaching plan, teacher's knowledge, teacher organisation and teaching material; 2) Inter-active stage: teacher expectations, teacher's zeal, classroom atmosphere, teacher's management, teaching clearance, advance organisers, teaching model, question level, direct instruction, learning time, changes, flexibility, supervising and teaching progress; and 3) Post-active stage: feedback, teacher criticism and teacher appreciation [16].

In this research, based on the work of O'Neill, Marsh and Baily [16][17], and Douglas and Stacey [18], the teaching process was divided into three stages and eight factors:

1. Teaching preparatory stage: course plan and teaching preparation.
2. Teaching implementation stage: teaching methods, teaching materials and class management.
3. Teaching evaluation stage: teaching assessment, teaching evaluation and evaluation feedback.

Student Learning Satisfaction

Kuo and Ye, and Chang indicated that learning satisfaction can help teachers to understand the course successes and failures in order to improve the course and promote students' interest and motivation [19][20]. Thus, enhancing learning satisfaction offered the following benefits:

1. Inspiring learning motivation, reducing the dropout rate: As student learning satisfaction rises, learning failure falls. A well-designed course reduces the dropout rate and enhances learning satisfaction and learning outcomes.
2. Ameliorating course shortfalls and promoting learning outcomes: Learning satisfaction is a critical standard in assessing learning outcomes. If learning satisfaction is poor, then, the teacher and the course must be improved.

Moreover, when learning satisfaction is good, learners will recommend that others participate in the course.
3. Enabling the student to learn continuously: When learning satisfaction is good, learners have a higher sense of achievement, improving their learning motivation in order to learning more and continuously.

Student learning satisfaction depends on: 1) level of learning satisfaction demanded; 2) internal factors of learning satisfaction, such as sense of learning achievement, experiences with teachers and classmates; 3) external factors of learning satisfaction including: learning environment, learning software and hardware, interpersonal relationships; and 4) expected and actual learning satisfaction gap, which affects learning satisfaction.

Kaiser, Rosenfield and Gravois divided learning satisfaction into the two dimensions of teacher (teacher teaching capability, course preparation, caring, fairness, ability to inspire student thinking) and course (course organisation, progress, exercise content difficulty and quantity) [21]. Pianta and Hamre identified five dimensions of learning satisfaction: school administration, teacher's teaching, interpersonal relationships, learning achievement and learning environment [22].

Based on the literature reviewed, learning satisfaction was divided into the following five dimensions:

1. Professional teaching;
2. Course arrangement;
3. Learning environment;
4. Teaching equipment;
5. Course content.

RESEARCH HYPOTHESES

A school must understand students' individual differences and learning achievement in order to improve the teaching and learning environment and establish positive interactions between teachers and students. This will help to satisfy students' learning demands, and improve students' learning satisfaction.

Student Learning Outcomes

Student learning outcomes evaluate how the student has learned indicators of achievement. It, thus, indirectly evaluates teaching quality. Student learning outcomes are influenced by the learning model, course design and teaching factors [23]. Numerous scholars have canvassed the personality and learning behaviours that influence student learning outcomes. Bandura investigated the impact of student personality on ability, self-efficacy, personal goals and student learning outcomes [12]. Kaiser et al identified four indexes of student learning outcome: cognitive, skill-based, affective and results [21]. Hutchins found that learner's self-efficacy was one of the most important factors in student learning outcomes [24].

Based on the literature reviewed, the following hypotheses were proposed:

- H1: Teacher self-efficacy positively affects student learning satisfaction.
- H2: Teacher self-efficacy positively affects student learning outcome.
- H3: The teacher teaching process positively affects student learning satisfaction.
- H4: The teacher teaching process positively affects student learning outcome
- H5: Student learning satisfaction positively affects student learning outcome.

RESEARCH DESIGN

Research Model

The adopted research model is presented in Figure 1.

Participants

Following Krejcie and Morgan, study participants were selected from a convenient sample of vocational high school teachers and students in Taiwan [25]. Each participant was asked to complete a survey with items measuring their beliefs. The questionnaires were administered by the researchers. Follow-up surveys were administered to all participants. A total of 372 surveys were distributed to a vocational high school in Taiwan, and the students' samples were drawn randomly from the teachers' class.

Data Analysis

To address this issue, Structural Equation Modelling (SEM) was conducted to verify the theoretical model. First, the measurement instruments were verified by using tests of reliability and validity and, then, the hypotheses of the

structural model were tested. Additionally, a confirmatory factor analysis was performed, and the statistical software packages LISREL 8.70 and SPSS 13.0 were used.

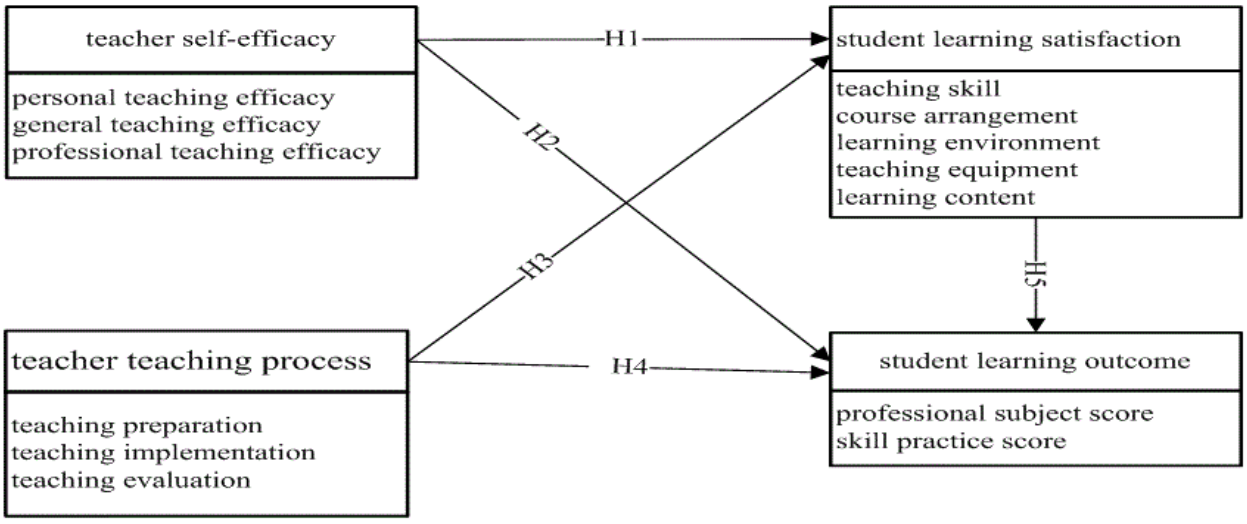

Figure 1: Research model.

Survey Measurement Instruments and Items

Due to the lack of empirical investigation into teaching self-efficacy, teaching process and student learning satisfaction, the measurement instruments of the pertinent constructs were developed from the theoretical statements made in the existing literature. The newly proposed research model in this paper, along with the proposed measurement instruments, reflects the exploratory nature of this study. Seven-point Likert-type scales ranging from 1 (strongly disagree) to 7 (strongly agree) were used throughout the survey.

Confirmatory Factor Analysis (CFA)

The CFA was applied to test the model. The structure of item loadings was consistent with the intended theoretical constructs. Although the chi-square test was significant, other measures, such as the ratio of chi-square and degrees of freedom, the values of Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI) Comparative Fit Index (CFI), Normalised Fit Index (NFI) and the Root Means Square Error of Approximation (RMSEA), were used [26].

RESULTS

Measurement Model

A confirmatory factor analysis using LISREL 8.70 was conducted to test the measurement model, and there were three kinds of indexes to evaluate the model fitness, as follows: absolute fit indexes, relative fit indexes, and parsimonious fit indexes.

Three model-fit measures were used to assess the model's overall goodness of fit, the absolute fit indexes including: χ^2, NCP, GFI, AGFI, RMR, RMSEA and ECVI, the ratio of chi-square to degrees of freedom (df), adjusted goodness of fit index (AGFI), incremental fit index (IFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The reason for using AGFI instead of GFI was due to the adjustment for degrees of freedom [26]. Further, IFI was used to address the issues of parsimony and sample size [27], while CFI takes into account sample size [28]. The model comprising the measurement items showed adequate fit, the relative fit indexes involved NFI, NNFI, CFI, IFI and RFI; the parsimonious fit indexes had PNFI, PGFI, AIC, CAIC and Normed χ^2.

Next, the psychometric properties of the measurement model in terms of reliability and convergent validity were analysed. The reliability of the scale was estimated through composite reliability [29], and the composite reliability may be calculated as follows: (the square of the summation of the factor loadings)/(the square of the summation of the factor loadings) + (the summation of item measurement error). The composite reliabilities for the three construct scales suggest acceptable reliability of the scales for further analysis (teacher self-efficacy values: 0.840; teacher teaching process: 0.855; student learning satisfaction: 0.889; and student learning outcome: 0.970). Convergent validity was evaluated by examining the factor loadings of the items and their squared multiple correlations.

Following the recommendation of Hair, Anderson, Tatham, and Black, the factor loadings that are greater than 0.50 were considered to be significant, and all the factor loadings are greater than 0.50 [30]. Consequently, squared multiple

correlations (SMC) between these individual items and their constructs were also high. Thus, all constructs in the measurement model were judged to have adequate convergent validity.

Structural Model

This model's fit indices showed reasonable fit (chi-square/df = 3.810, AGFI = 0.837, IFI = 0.973, CFI = 0.973, and RMSEA = 0.087). This model helped exploration of the predictive power of teacher self-efficacy, the teacher teaching process and student learning satisfaction on student learning outcomes, as well as it helped to explore the effects of these.

The results suggest that teacher self-efficacy significantly affects learning satisfaction (γ_{11} = 0.28, *t*-value = 5.84, $p < 0.001$), and teacher self-efficacy is closely connected to the learning satisfaction. Thus, Hypothesis 1 was supported. Teacher self-efficacy also significantly affected learning outcome (γ_{21} = 0.25, *t*-value = 7.70, $p < 0.001$), supporting Hypothesis 2. The teacher teaching process was found to affect learning satisfaction significantly (γ_{12} = 0.64, *t*-value = 11.50, $p < 0.001$), supporting Hypothesis 3. Teacher teaching process also significantly affects learning outcome (γ_{22} = 0.16, *t*-value = 3 .16, $p < 0.01$), supporting Hypothesis 4. Finally, the results showed that learning satisfaction significantly affects learning outcome (β_{21} = 0.63, *t*-value = 10.43, $p < 0.001$), supporting Hypothesis 5. Therefore, these data lend support to the hypotheses and this study has taken a step in the direction of defining the impact between teacher self-efficacy and student learning outcomes.

CONCLUSION

Teacher self-efficacy and the teacher teaching process show a s trong association with learning satisfaction. The proposed model accounts for 47.8% of the variance in learning satisfaction, and teacher self-efficacy, the teacher teaching process and learning satisfaction all showed a strong association with learning outcomes. The proposed model accounted for 72.0% of the variance in learning outcome. Several pedagogical implications can be drawn from this study, and future research will provide more detailed results, which may differentiate these views from one another.

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