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International Journal of Educational Development 24 (2004) 283–301

International Journal of
EDUCATIONAL
DEVELOPMENT

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Factors affecting student burnout and academic achievement in multiple enrollment programs in Taiwan's technical–vocational colleges

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Abstract

Instead of the 44-year joint entrance examination held so far in Taiwan, multiple enrollment programs are a more recent policy of the Ministry of Education to reform the deficiencies of the abovementioned examination. However, the results of multiple enrollment programs in reducing student pressure are not clear. Therefore, the main purpose of this research is to investigate the impacts of multiple enrollment programs on student burnout and academic achievement among technical–vocational college students. The result demonstrates that multiple enrollment programs have a significant effect on student burnout and academic achievement. Student burnout has a significant negative effect on academic achievement.

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Keywords: Technical–vocational education; Multiple enrollment programs; Burnout; Social support; Course load; Self-efficacy; Fairness; Academic achievement

1. Introduction

There are five categories of higher education systems in Taiwan, which include 5-year junior college, 2-year technical–vocational junior college, 4-year technical–vocational university, 2-year technical–vocational university/senior college, and 4-year general university. However, the 5-year junior college and 2-year technical–vocational junior college do not lead to a bachelor's degree. The 4-year general university, 4-year technical–vocational university, and 2-year technical–vocational university/senior college lead to a

bachelor's degree. The detailed structure is shown in Fig. 1. When students graduate from junior high school and pass the 5-year junior college entrance examination, they are entitled to study at a 5-year junior college. Students who have graduated from technical–vocational senior high school and passed the 4- and 2-year technical–vocational junior college entrance examination can study at 4-year technical–vocational universities or 2-year technical–vocational junior colleges. Students who have graduated from 2-year technical–vocational university/junior college and passed the 2-year technical–vocational senior college/university entrance examination can study at 2-year technical–vocational universities/senior colleges. Students who have graduated from general

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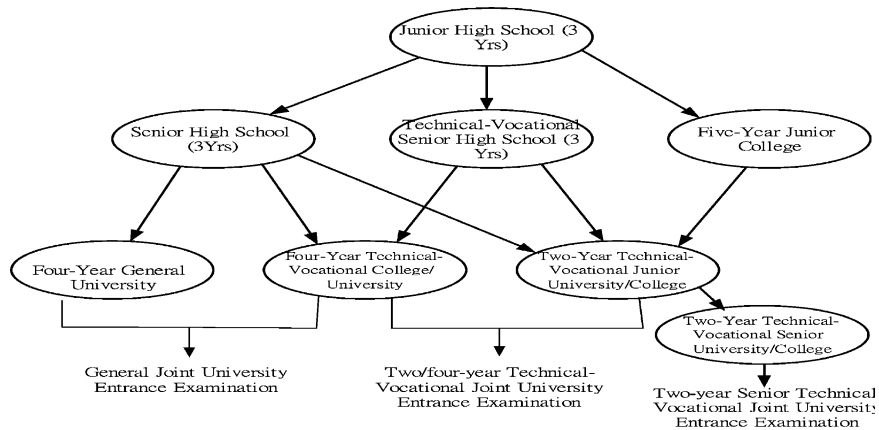


Fig. 1. The structure of higher education systems in Taiwan.

senior high school and passed the university entrance examination can study at a 4-year general university.

Briefly speaking, there are two types of joint university entrance examination. One caters to general junior high school students who intend to study at a general university, and the other accommodates technical–vocational senior high school students who intend to study at a technical–vocational university/college. Traditionally, the joint university entrance examination has been the exclusive route to enter a university or college for 44 years from 1954 until 1998 in Taiwan. The joint university entrance examination has been considered the fairest and most prevalent test medium appropriate for local needs, regardless of whether it is for general university or technical–vocational university/college. It was an impartial, non-discriminative system that offered equal opportunities to every Taiwanese student with no consideration of physical, financial, or superior social status. The only criterion was that a student had to pass the joint university entrance examination. However, true to traditional beliefs and deeply engraved, through the ages, in the grain of Chinese national identity and conscious, there is a deep-rooted principle in the mind of the Chinese people that “there is nothing more noble and enriching than to gain profound intellectually stimulated knowledge through studying”. As a result, diplomas and certificates

have become extremely important in Chinese society.

In order to enter a good school, performance in the joint university entrance examination was of vital importance. The students’ performance was closely related to the teachers’ performance in class. Unfortunately, this led to an unhealthy, unbalanced, and abnormal situation in the total education process, where too much emphasis was placed on primarily coaching students to pass and perform well in the entrance examination. It also placed a heavy burden on students and parents alike. The academic pressure on students led to enormous pressure. Attending so-called private cram schools and acquiring personal tutors after normal school hours and at great cost became the norm rather than the exception. This led to an outcry from the public at large, politicians, and the mass media, who revolted against this practice. To counter the criticism and satisfy the public demand for action, the education authorities initiated a new system. This new initiative became top priority and was aimed at liberalizing the nation’s education system, enhancing the learning culture and positively relieving the pressure on the students caused by the joint entrance examination designed for entrance into a 4-year general university, 4-year technical–vocational university or 2-year technical–vocational university/senior or junior college.

Therefore, in 1998, the Ministry of Education became actively involved in designing a new form of joint entrance examination university school enrollment system to relieve student stress and pressure, and by doing so increase students' academic achievement. The student enrollment method has thus been changed to include three distinctive categories, namely, admission via recommendation and screening, admission application and examination distribution. Consequently, we would like to analyze and research the impacts on student learning condition and performance of this new type of entrance system. Burnout and academic achievement will be studied under multiple enrollment programs.

The impact of multiple enrollment programs has been a focal point for the media, public, educators and researchers on general universities since 1998. However, little attention has been devoted to exploring student burnout and its antecedents, especially to examining student burnout in technical–vocational college/university under the multiple enrollment programs. In reality, public and private technical–vocational colleges/universities provide over half of the higher education needs of Taiwan. To date, there are in total about 151 (still increasing) public and private general, technical–vocational and other types of colleges or universities (Ministry of Education Site, 2003). There are currently 47 general universities and 92 technical–vocational colleges/universities, including both public and private ones (Ministry of Education Site, 2003). The number of technical–vocational colleges/universities is nearly double that of general universities. From the above statistical data, it can be seen that technical–vocational colleges/universities have the highest percentage in Taiwan. The impacts of multiple enrollment programs on technical–vocational colleges/universities should not be ignored. For this reason, the technical–vocational college/university was chosen as a research field for closer investigation.

The main purpose of this research is to examine student burnout and academic achievement under these three types of multiple enrollment programs in technical–vocational colleges. In addition, this research project attempts to employ

the conservation of resource (COR) theory and social cognitive theory (SCT) as a basis, to examine the differences between the factors influencing the burnout phenomenon and academic achievement of technical–vocational college students under multiple enrollment programs. A COR theory has been presented as a model for understanding the nature and influence of all levels of stress (Hobfoll, 1988, 1989; Freedy and Hobfoll, 1995; Hobfoll et al., 1995). SCT (Bandura, 1977b, 1978, 1982, 1986) is a widely accepted and empirically validated model of individual behavior. In COR, social support and course load are two important environmental factors that explain the burnout phenomenon (Jackson et al., 1986). Self-efficacy, the belief that one has the capability to perform a particular task, is an important dimension in SCT. Hence, two major factors of burnout among technical–vocational college students were studied in this research. These include three external environmental factors, viz. social support, course load, and fairness, and one internal factor, namely self-efficacy. The Maslach burnout inventory (MBI)—general burnout scale modified by Meier and Schmeck (1985) is used to measure burnout by having students complete a questionnaire. A more general contribution is to examine the predictive power of student burnout in explaining student academic achievement. It is anticipated that the results will provide some help or indications in understanding the performance and application of multiple enrollment programs.

2. Literature review and research model

2.1. Multiple enrollment programs

In 1998, the Ministry of Education became actively involved in designing multiple enrollment programs for university school systems in an attempt to reduce student stress and provide students with more opportunities to learn and choose the school or field they are interested in. Meanwhile, it provides chances for schools to establish their own identity and have autonomy in selecting suitable students, and also provides a mechanism to balance the development of general

high school and high school technical–vocational education. Student enrollment has been changed to include three distinctive types, namely admission via recommendation and screening, admission application and examination distribution. Recommendation and screening is aimed at technical–vocational senior high school students whose grades are among the top 25 in a 50 student class, and who in addition have the qualification to apply to the school they want to study at or are interested in. The recommendation and screening method consist of an oral test and a personal record assessment. The personal record assessment includes reference to academic performance, social relations in a school environment, competitiveness, technique certification, letter of recommendation, etc. The committee of each school decides the grading ratio of the oral test and personal record assessment.

Examination distribution, similar to the traditional joint university entrance examination, caters to senior technical–vocational high school students. When students fail the recommendation and screening assessment, they still have a last chance to enter a school based on their entrance examination score. Students cannot freely choose the school or the major that they are interested in or like. They are allocated seats by the school or by the government test center depending on their entrance examination score.

The admission application option is only for general high school students who want to transfer to study at a technical–vocational college, instead of a general university. If the grade of an applicant is in the top 25 in a class of 50 students, then they are qualified to apply for the school they like or that they are interested in. The admission application assessment also includes an oral test and a personal record evaluation. The process and documents prepared for the admission application are similar to those of the recommendation and screening evaluation.

3. Conservation of resource theory

The COR theory may be applied as a theoretical model that explains the etiology of burnout

and the processes likely to accompany chronic work-related stress (Schaufeli et al., 1993). COR has thus been developed as a general stress theory that helps delineate both why certain circumstances are stressful and the process of people's reactions to stressful circumstances (Hobfoll, 1988, 1989; Freedy and Hobfoll, 1995; Hobfoll et al., 1995). A basis of the COR theory is that individuals strive to obtain and maintain that which they value, termed resources. When circumstances at work or otherwise threaten people's ability to obtain or maintain resources, stress ensues. Psychological stress often occurs when there is the threat of significant resource loss, actual resource loss or significant resource gain. When considering the concept of burnout, it must be stated that physical exhaustion or work overload (Shirm, 1989) is likely to make people feel insecure about their abilities to support the motivational process. Therefore, the greater salience of loss postulated by COR theory is accentuated during periods of physical or psychological overload. COR theory also predicts that chronic, intermittent stress will cause resource loss and eventually partially or fully depletes (Freedy and Hobfoll, 1995). For instance, social relations are seen as a resource to the extent that they provide or facilitate the preservation of valued resources. As an individual's social support wanes, psychological distress increases.

3.1. *Social cognitive theory*

The differences in individual behavior in an environmental setting, sometimes, are hard to recognize and interpret. Many previous widely cognitively based motivation theories associated with expectancies often fail to specify a process-oriented analysis of the factors influencing the relationship between human action and environment outcomes. However, SCT overcomes this problem by clearly specifying factors by which human action is determined (Stajkovic and Luthans, 1998). Drawing from SCT, Bandura and others (Bandura, 1977a, 1977b, 1986) have advocated the concept of self-efficacy, which deals with how individuals' beliefs or confidence in

their capabilities to affect the environment and control their actions in ways that produce the desired outcomes (Stajkovic and Luthans, 1998). Self-efficacy, therefore, plays a pivotal role in SCT. SCT suggests that people's behavior can be predicted not only on the basis of contingent consequences, but also on the basis of personal self-efficacy. For instance, a person with low self-efficacy doubts his or her capabilities to overcome an uncertain situation and is also easily frustrated.

3.2. *Student burnout*

Burnout has been a popular topic of research in psychology and associated disciplines in the past three decades. Burnout is always more likely when there is a major mismatch between the nature of the job and the nature of the person who does the job. The major factors of burnout include work overload, lack of control, lack of reward, lack of community, value conflict, and lack of fairness, which are obvious indications that the person and the job are mismatched (Maslach and Leiter, 1997). Burnout may lead to mental distress in the form of anxiety, depression, frustration, hostility or fear. Prior research has shown that burnout can lead to lower commitment, higher turnover, absenteeism, reduced productivity, low morale, and lower human consideration (Cordes and Dougherty, 1993; Maslach and Pines, 1977; Maslach, 1978). Burnout is a syndrome of emotional exhaustion, depersonalization, and diminished personal accomplishment that usually occurs among people helping professionals (Maslach and Pines, 1977; Maslach, 1978; Schwab and Iwanicki, 1982; Jackson et al., 1986; Firth et al., 1985; Lahoz and Mason, 1989; Golembiewski et al., 1995). Maslach and her colleagues (Maslach and Pines, 1977, 1978) synthesized the burnout literature, which resulted in a conceptual definition. The term burnout refers to a state of emotional exhaustion, a tendency towards depersonalization, and a feeling of low personal accomplishment among human service employees. Emotional exhaustion is caused by excessive psychological and emotional demands made on people assisting pro-

fessionals who lack energy, and usually coexists with feelings of frustration and tension. Depersonalization refers to treating people as objects; employees display a detached, emotional callousness, and are insensitive and cynical toward their customers or colleagues. Diminished personal accomplishment occurs when a person displays a tendency to evaluate him- or herself negatively, a decline in feeling of job competence and an increase in feelings of inefficacy.

Some evidence exists to support the presence of burnout in college students (Meier and Schmeck, 1985). Pines et al. (1981) examined and compared burnout in nurses, counselors, educators, and undergraduate students and found that students ranked in the middle to upper levels of the burnout scale. This indicates that students have some degree of burnout during their school learning period. Based on prior research, the syndrome of student burnout is similar to that in service employees. Student burnout can lead to higher absenteeism, lower motivation to do required course work, higher percentage dropout and so on (Meier and Schmeck, 1985; Ramist, 1981). Hence, in this study, we define student burnout thus: "students in the learning process, because of course stress, course load or other psychological factors, display a state of emotional exhaustion, a tendency to depersonalization, and a feeling of low personal accomplishment."

Although burnout has been a focus of educational concern and research on teachers for decades, and has resulted in various strategies to address the negative effects of burnout, fewer empirical studies have focused on technical-vocational college student burnout. According to SCT, emotional stimulation or self-efficacy influences students' perception of their own ability to perform a function or task, as well as burnout. Based on COR theory, workload and social support are the most important factors influencing burnout. Most previous research regarding college student burnout has focused on descriptive and demographic analysis. Others have focused on instruments that have been measured and verified (Meier and Schmeck, 1985; Pines et al., 1981). However, existing research displays that if burnout results through expecting the environ-

ment to offer no valuable rewards or opportunities, then students and their teachers may burn out (Meier and Schmeck, 1985).

3.3. *Academic achievement*

Academic achievement problems have been focal points for educators and researchers for decades, because problems in the performance and achievement of students' school careers predict school dropout (Ekstrom et al., 1986) and delinquent behaviors (Tremblay et al., 1992). Much of the previous academic achievement research has focused on the psychological mechanism (Fortier et al., 1995; Normandeau and Guay, 1998), self-efficacy (Mitchell et al., 1994), and family factors such as parental response to grades are proven to contribute to academic achievement (Grolnick and Slowiaczek, 1994; Ginsburg and Bronstein, 1993). On the other hand, autonomy-supporting family styles have been found to be associated with higher academic performance. Guay and Vallerand (1997) presented evidence that the use of autonomy-supportive techniques by teachers and school administrators has been associated with academic achievement. Hymel et al. (1996) also provided evidence that peer support may also contribute to children's achievement because it has a profound influence on their day-to-day behavior in school. For instance, Frentz et al. (1991) showed that students who were rejected by their peers had lower academic achievement scores than more popular students.

Intense emotional arousal was predicted to interrupt the performance of work (Maslach, 1993). If students have serious emotional exhaustion, they will be emotionally fatigued, used up, irritable, frustrated, or even worn out (Maslach and Jackson, 1981), and they will have lower academic performance. Cohen (1980), in his research, clearly showed that a person with higher stressors would show negative emotions and low work performance. McCarthy et al.'s (1990) research showed that there is a negative relationship between student burnout and academic achievement.

3.4. *Self-efficacy*

In the past decade or so, researchers have utilized the self-efficacy theory to explain the burnout phenomenon (Schaufeli et al., 1993). Bandura (1977a) adopted the SCT to explain the concept of self-efficacy. Bandura (1977b) defined self-efficacy as "people's judgment of their capabilities to organize and execute courses of action required to attain designated types of performances". It is recognized that self-efficacy is a strong predictor of subsequent task-specific performance, and the definitions of the construction ultimately refer to what a person perceives their capabilities to be, with regard to a specific task. Bandura (1977a) found that self-efficacy positively correlates with behavioral changes both vicariously and emotively. Once self-efficacy had been formulated and established, it was shown to influence behavioral patterns as regards the magnitude of effort a performer would exert. Based on the concept of Bandura (1977a), efficacy expectations were determinants in choosing activities. On the other hand, self-efficacy is an important determinant of task motivated behavior and subsequent performance.

Self-efficacy belief has received increasing attention in educational research, primarily in studies of academic motivation and self-regulation (Pintrich and Schunk, 1995). In this arena, self-efficacy researchers have focused on three areas. The first area has explored the link between efficacy beliefs and college major and career choices (Lent and Hackett, 1987). The second area suggests that efficacy beliefs of teachers are related to their instructional practices and to various student outcomes (Ashton and Webb, 1986). The third area has reported that students' self-efficacy beliefs are correlated with their academic performances and achievements (Multon et al., 1991; Pajares, 1996; Schunk, 1989, 1991).

Otherwise, Bandura (1977b) has also identified three major categories of experiences stimulated by efficacy beliefs: (1) choice behavior: people engage in tasks in which they feel competent and confident and avoid those in which they do not; (2) effort expenditure and persistence: how much effort people will expend on an activity, how long

they will persevere when confronted with obstacles, and how resilient they will prove in the face of adverse situations—the higher the sense of self-efficacy, the greater the effort, persistence, and resilience; and (3) thought patterns and emotional reactions: efficacy beliefs also influence the amount of stress and anxiety individuals experience as they engage in a task and the level of accomplishment they realize. Self-efficacy has been shown to influence both goal level and goal commitment (Locke et al., 1984). In sum, self-efficacy influences individual choices, goals, emotional reactions, effort, coping, and persistence. Describing the relationship between burnout and physiological states, some previous researchers proved the relationships between self-efficacy and burnout (Cherniss, 1992, 1993; Hallsten, 1993; Hobfoll and Freedy, 1993). They proposed that people with no sense of mastery (i.e. self-efficacy), who were easily burned out, usually lacked the capacity to adapt. Based on the theory of self-efficacy and the previous research cited above, we concluded that the greater the self-efficacy, the lower the burnout.

Additionally, in the past decades, the concept of self-efficacy has played a major role in consideration of task performance (Mitchell et al., 1994). High self-efficacy helps create feelings of serenity in approaching difficult tasks and activities. Conversely, people with low self-efficacy may believe that things are tougher than they really are, a belief that fosters stress, depression, and a narrow vision of how best to solve a problem. Patrikakou's (1996) study showed that students with high self-complacency have repeatedly been associated with academic achievement. Several previous researchers concluded that self-efficacy was positively related to academic performance (Campbell and Hackett, 1986; Mone et al., 1995; Schoen and Winocur, 1988; Wood and Locke, 1987). Therefore, we concluded that the greater the self-efficacy, the greater the academic achievement.

3.5. *Social support*

In COR, social support is one of the important environmental factors in explaining the burnout

phenomenon (Jackson et al., 1986). When people express the negative emotion of burnout, social relationships are devastated (Maslach and Leiter, 1997). Social support is usually defined as the existence or availability of people on whom we can rely, people who let us know that they care for, value, and love us (Sarason et al., 1983). Social support has been identified as a resource that enables individuals to cope with stress (Russell et al., 1987; House, 1981). Support from one's co-workers and supervisors has frequently been identified as both a preventive mechanism and a remedy against burnout (Cherniss, 1980; Pines and Maslach, 1978). Perceived adequacy of social support has repeatedly been found to relate positively to mental and physical health (Hirsch, 1980; Barrera, 1981; Fiore et al., 1986). Previous research suggested that increasing social support to teachers might be a useful strategy for preventing teacher burnout (Russell et al., 1987). Schwab and Iwanicki (1982) pointed out that burned out teachers and students may influence each other, creating a downward spiral of decreasing satisfaction because students may possess the same feelings and expectancies of burnout as experienced by their teachers (Schwab and Iwanicki, 1982). However, no empirical evidence concerning the impact of social support on burnout among technical-vocational students was found.

Additionally, Meier and Schmeck (1985) pointed out that burnout students often lacked concern and are bored by the routine of class. Russell et al. (1987) demonstrated that people who lacked social support were easily affected by stress. Prior empirical research also found that people with higher social support tend not to have psychological or health problems, but have more job satisfaction (Vaux et al., 1985; Compas et al., 1986). Parental involvement, teacher attitudes, and peer relationships do play important roles in a student's academic achievement (Keith and Keith, 1993; Peng and Lee, 1993; Grolnick and Slowiaczek, 1994; Ginsburg and Bronstein, 1993; Guay and Vallerand, 1997; Guay et al., 1999; Hymel et al., 1996). Hence, we conclude that the greater the social support, the lower the burnout, and the higher the academic achievement.

3.6. Course load

In COR, workload is an important environmental factor to explain the burnout phenomenon (Jackson et al., 1986). From an individual's perspective, workload means time and energy (Maslach and Leiter, 1997). When individuals feel that their own valued resources are threatened, their physical and psychological conditions have some degrees of change. Workload implies that if a person, within the limited time, faces many problems and cannot solve them, he/she will feel role overload (Kahn et al., 1964). Load affects a person's health and work quality (Kirmeyer and Dougherty, 1988). Previous research argued that load has a positive relationship with tobacco addiction, cholesterol, excessive nervousness, and heart rate (Cobb and Rose, 1973). Overload not only affects the health of employees, but also affects the way of doing tasks and employees' attitudes towards their work. Especially, overload causes greater job dissatisfaction, poor work quality, tension, anger, and a sense of failure (Beehr et al., 1976; O'Connell et al., 1976; Sales, 1970). Consequently, this concept was applied to the student's learning environment. When students perceive course overload, they experience tension, a sense of failure, lower satisfaction, or even lower academic performance. Hence, in this study course load is defined thus: "when students in the learning process, because of limited time, face many course problems cannot solved them, they feel overload."

Most previous research regarding the influence of workload and burnout indicates a positive correlation. Additionally, prior research also found that course load is the biggest factor of student stress (Johnson, 1978; Villanova and Bownas, 1984). Hence, we apply this concept in the student's learning environment. If students perceived a heavy course load, they would have a high burnout rate and low academic achievement. Thus, we conclude that the higher the course load, the higher the burnout and the lower the academic achievement.

3.7. Fairness

Equity theory and social-exchange theory are usually used to explain the sense of fairness among employees and the relationship between attitude and behavior (Adams, 1965; Blau, 1964). For instance, Adams (1965) pointed out that when employees perceive that they do not receive fair and just treatment from their employer, they feel uncomfortable and consequently lower their work performance. Moorman (1991) also applied equity theory in his research and got a similar result, which showed that when employees perceive that they are treated unfairly and unjustly in their organization, then they automatically limit or curtail their corporate behavior and responsibility. Social exchange theory also explains this phenomenon as follows. When employees perceived that they were appreciated or recognized by their managers, they displayed a more positive response, which increases their job satisfaction and lowers their turnover rate. Maslach and Leiter (1997) synthesized the sources of burnout. Lack of fairness is one of the important sources. When the work environment showed transparency and respect, then it was considered fair. This sense of fairness is one of the most important factors to invoke individual dedication and devotion to the workplace. On the contrary, when individuals perceive unfairness at their workplace, they display low motivation and commitment to their work. This sense of unfairness would be apparent in the evaluation and promotion process. Consequently, we applied this concept to the students' learning environment. When students perceive that they are in a transparent, just and fair environment, they display greater emotional stability and achieve better academic performance. However, if students perceive that they are treated unfairly or with disrespect, they despise school and avoid going to class, which causes lower academic performance and emotional depression, even leading to bad interpersonal relationships (Finn and Rock, 1997).

Hence, we conclude that when the students perceive that they are treated fairly, they have lower burnout and better academic achievement. If not,

they have higher burnout and poor academic accomplishment.

Based on the analysis of previous literature and hypotheses generation, we also set out to test the moderating effect of multiple entrance programs including self-efficacy, social support, course load, and fairness, on student burnout and academic achievement. Students who enter school by means of different entrance systems should have different amplitudes of self-efficacy, perceptions of social support, senses of course load and a sense of fairness regarding academic achievement and burnout.

The research framework is shown in Fig. 2. The research hypotheses in this study are summarized as follows.

H1a. Multiple enrollment programs have a significant impact on student burnout.

H1b. Multiple enrollment programs have a significant impact on academic achievement.

H2a. Self-efficacy has a significant negative effect on student burnout.

H2b. Multiple enrollment programs exhibit a moderate effect on the relationship between self-efficacy and student burnout.

H3a. Self-efficacy has a significant positive effect on academic achievement.

H3b. Multiple enrollment programs exhibit a moderate effect on self-efficacy and academic achievement.

H4a. Social support has a significant negative effect on student burnout.

H4b. Multiple enrollment programs exhibit a moderating effect on social support and student burnout.

H5a. Social support has a significant positive effect on academic achievement.

H5b. Multiple enrollment programs exhibit a moderating effect on social support and academic achievement.

H6a. Course load has a significant positive effect on student burnout.

H6b. Multiple enrollment programs exhibit a moderating effect on course load and student burnout.

H7a. Course load has a significant negative effect on academic achievement.

H7b. Multiple enrollment programs exhibit a moderating effect on course load and academic achievement.

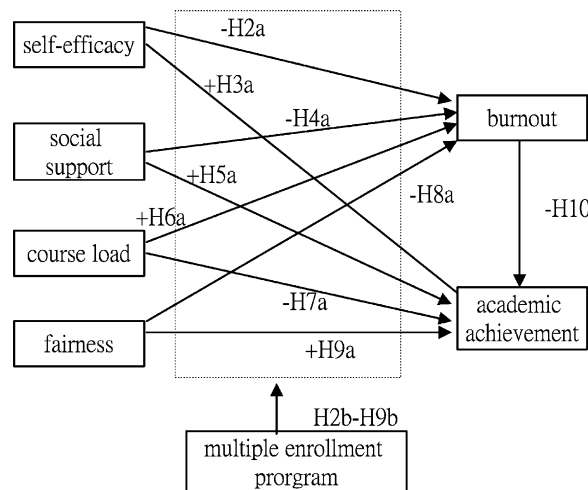


Fig. 2. Research model.

H8a. *Fairness has a significant negative effect on student burnout.*

H8b. *Multiple enrollment programs exhibit a moderating effect on fairness and student burnout.*

H9a. *Fairness has a significant positive effect on academic achievement.*

H9b. *Multiple enrollment programs exhibit a moderating effect on fairness and academic achievement.*

H10. *Student burnout has a significant negative impact on academic achievement.*

4. Methodology and results

4.1. Data collection and samples

The target samples for this study were freshmen in technical–vocational college, who had just experienced the detrimental effects of examination under the multiple enrollment programs in Taiwan. In order to avoid sampling bias between city and rural schools, the target samples were stratified by area to include the north, center, south, and east of Taiwan. One to three schools were chosen as the sampling target, depending on the density of schools in each area. Therefore, three schools were chosen from the north and middle, respectively; two schools from the south and east, respectively. Totally, 10 public and private schools were selected. This comes to at least one public school in each area.

Prior to data collection, the researcher met with 4- or 2-year vocational-technical junior or senior college teachers privately to lobby their voluntary help to arrange students participating in this study. A questionnaire using the self-administered technique to collect data for the variables described was developed and randomly pilot tested with 50 freshmen. The pilot test resulted in some revisions in the format and wording of questions for clarity. The survey was then mailed to 10 schools, 32 classes, and 1545 samples were administered. Participating schools were located from the north to the far south and

the east of Taiwan: this was done to avoid sampling bias. Completed questionnaires were then mailed back to a college address. 1034 responses were useable, giving a response rate of approximately 66%. The useable samples included 525 male students and 509 female students ($n = 1034$). The number of respondents from 4-year vocational-technical universities, 2-year vocational-technical senior colleges and 2-year vocational-technical junior colleges are 392, 159, and 483, respectively. The number of respondents through recommendation, application, and joint examination are 294, 255, and 485, respectively. The numbers of respondents among Management Information System (MIS), Industrial Engineering and Management (IE), Business Administration (BA), Electronic Engineering (EE), Mechanical Engineering (ME), Electronic Mechanical (EM), and Leisure Management (LM) major students are 234, 152, 109, 179, 121, 117, and 122, respectively.

4.2. Reliability and validity of the measurement instrument

Scales were required for each of the constructs in the research model. A review of literature was undertaken to identify construct definitions and existing measures. The wordings of previously developed and validated instruments were modified slightly to fit the present research. Each of the measures used in the study is described below.

Burnout was defined by scores on three dimensions of the MBI called general burnout scale (Maslach et al., 1991, 1993, 1996), namely the 5-item emotional exhaustion subscale, 5-item depersonalization subscale, and 6-item diminished personal accomplishment subscale. Each item, measured on a 7-point scale, was from 1 (never experienced) to 7 (experienced daily) for each subscale. Maslach and Jackson (1981) reported acceptable internal consistency and validity for each subscale. For the current sample, the reliability analysis using Cronbach's coefficient alpha was quite acceptable for overall burnout ($\alpha = 0.82$), emotional exhaustion ($\alpha = 0.83$), depersonalization ($\alpha = 0.85$), and diminished personal accomplishment ($\alpha = 0.74$).

Social support was measured by 28 items in four subsections: peer support, teacher support, family support, and general support, to estimate the student’s own perceived degree of social support. This scale was originally a 23-item instrument (Vaux and Harison, 1986), to determine whether a person believes he or she is loved by, esteemed by, and involved with family, friends, and others. An additional five items of teacher support were designed in this study to fit in the school environment. For the current sample, Cronbach’s coefficient alpha was quite acceptable for the overall social support ($\alpha = 0.81$).

Self-efficacy contained eight items to estimate students’ efficacy level from 1 (never agree) to 7 (completely agree). These items were revised from the Jones scale (Jones, 1986). On this scale, subjects were rated for general self-efficacy, not for a specific domain’s self-efficacy, because the sources of samples were students from different majors in technical–vocational colleges. Cronbach’s coefficient alpha was acceptable for self-efficacy ($\alpha = 0.77$). Course load contained four items to estimate a student’s course load level from 1 (never agree) to 7 (completely agree). These items were revised from Caplan’s workload scale (1975). Cronbach’s coefficient alpha was quite acceptable for course load ($\alpha = 0.84$). Fairness contained nine items to examine student’s perception of fairness in the school. These items were revised from Greenberg’s organizational justice theory scale (Greenberg, 1987). Cronbach’s coefficient alpha was quite acceptable for fairness ($\alpha = 0.83$).

Academic achievement refers to the academic performance of students at school. This study adopted the definition of Brown et al. (1989) to define academic achievement. Academic achievement was measured by the total average score at the end of the semester.

Based on the previous value of Cronbach’s coefficient alpha in each scale, all are over 0.7 (Nunnally, 1978); hence, it is proved that these scales are all quite trustworthy.

Discriminant validity was checked by means of factor analysis (Kerlinger, 1986). The measurement model using exploratory factor analysis (EFA) was assessed to check discriminant val-

Table 1
EFA of burnout

Components	% of variance	Cumulative	Items deleted
Emotional exhaustion	19.796	19.796	None
Depersonalization	19.362	39.158	None
Diminished accomplishment	15.860	55.018	None

idity. The steps of EFA were, in the beginning, using principal component analysis to process factors, then using varimax as orthogonal rotation and an eigenvalue equal to 1 to get factor loading, which should be greater than 0.5 (Kaiser, 1958). If an item with factor loading values is not greater than 0.5, then the item should be deleted and abandoned from further analysis. The result of the burnout construct was displayed in Table 1. Among them, no item related to emotional exhausted, depersonalization and diminished personal accomplishment had a loading of less than 0.5 and was deleted. The results of each independent construct of social support, fairness, course load and self-efficacy are displayed in Table 2. Six items related to social support, one item related to fairness, and one item related to self-efficacy have a loading of less than 0.5 and were deleted to fit the literature supported (each item factor loading >0.5).

4.3. Analytical procedures

Statistical methods used for the analysis included the *t*-test, ANOVA, multivariate multiple regression, and multiple regression analysis. ANOVA was used to test the relationship between student burnout and academic achievement.

Table 2
EFA of independent variables

Components	% of variance	Cumulative	Items deleted
Social support	20.375	20.375	6
Fairness	13.060	33.0	1
Course load	11.470	51.189	0
Self-efficacy	7.284	56.070	1

Multivariate multiple regressions were used to examine the direct and moderator relationships between the response and predictor variables. To illustrate the interactions, we followed techniques suggested by Cohen and Cohen (Cohen and Cohen, 1983; McInley, 1987). This technique uses a complete regression equation to estimate the slope for independent and dependent variables at representative values of moderator variables. Meanwhile, regression analysis was used to examine the relationships between student burnout and academic achievement. An alpha level of 0.05 was used for all tests of significance.

5. Results

Most of the respondents' parental incomes fall within the low-income family bracket, about 76% of the total samples (under 370,000 NT\$ and between 370,000 and under 990,000 NT dollars per year; the exchange rate of US\$ and NT\$ is about 1:34.14). Parents with a primary school, junior high and senior high school education made up the bulk, with a high percentage of about 89% of the total samples. Additionally, the *t*-test was also used to examine the differences between student burnout and academic achievement under different types of enrollment programs using gender as a criterion. These data are shown in Table 3. The strongest difference was between male and female students on the burnout scale ($F = 15.215$, $P < 0.001$), whereas there is no significance difference between male and female students on the academic achievement scale ($F = 8.059$, $P > 0.05$). Male students have a higher level of burnout than female students. This

Table 3
t-Test for male and female students in burnout and academic achievement

Variables	<i>F</i>	<i>t</i>	<i>P</i>	Mean
Academic achievement	8.059	0.005	-2.743	Female: 76.39 Male: 75.03
Burnout	15.215	2.275	0.000***	Female: 57.03 Male: 60.07

*** $p < 0.001$.

result is not consistent with previous research (Pines et al., 1981; Ryerson and Marks, 1981; Maslach and Jackson, 1981). Future studies are necessary to find out why male students have higher burnout than female students.

ANOVA was used to examine the bivariate relationships between student burnout and academic achievement under different types of enrollment programs. These data are shown in Table 4 and indicate that different enrollment programs have significant effect on academic achievement ($F = 18.041$, $P < 0.001$) as well as student burnout ($F = 4.846$, $P < 0.01$). The results provide support for hypotheses H1a and H1b. Namely, students in different types of enrollment programs are likely to have different degrees of student burnout and academic achievement.

The multivariate multiple regression results of Hypotheses H2a–H9a for student burnout and H2b–H2b for academic achievement are presented in Tables 5 and 6 for the direct effect and moderator effect. Multivariate Pillai's *F* statistics were significant for moderator variables on student burnout and academic achievement. The moderator effects of multiple enrollment programs on social support and perceived fairness are only significant for academic achievement, but not on student burnout. The moderator effects are not significant on course load and self-efficacy for both student burnout and academic achievement under multiple enrollment programs. The significance of the interaction terms shows that only two of the eight hypotheses—the moderating effects of H5b and H9b—were supported. The direct effect of independent variables for academic achievement is significant on fairness and self-efficacy. All of the independent variables except fairness are significant regarding student burnout.

Regression analysis is used to examine the relationships between student burnout and academic achievement. The data are shown in Table 7 and indicate that student burnout has a significant negative effect on academic achievement.

Summarizing the results as a whole, the findings of this study provide partial support for COR and SCT on student burnout and academic achievement under multiple enrollment programs.

Table 4
ANOVA for H1a and H1b

Variables	F-value	P	Scheffe	Means
Ways of entrance vs. academic achievement	18.041	0.000***	Apply > recommend	Recommend: 74.99
			Exam < recommend	Apply: 79.06
Ways of entrance vs. burnout	4.846	0.008**	Apply > exam	Exam: 74.76
			Apply < recommend	Recommend: 62.40
			Exam > recommend	Apply: 58.37
			Apply < exam	Exam: 59.12

** $p < 0.01$.

*** $p < 0.001$.

Table 5
Multiple regression for student burnout

Dependent variable	Variables	SD	Beta	t	P
Burnout ($R^2 = 0.161$; $F = 10.971$; $P = 0.000$)	<i>Main effects</i>				
	Way of entrance (WE)	3.825	-0.039	-0.112	0.911
	Social support (SS)	0.065	-0.117	-0.2330	0.020*
	Fairness (F)	0.185	0.053	0.945	0.345
	Course load(CL)	0.214	0.366	8.144	0.000***
	Self-efficacy (SE)	0.187	-0.101	-2.005	0.045*
	<i>Interactions</i>				
	SE × WE	0.405	-0.219	-0.920	0.358
	CL × WE	0.390	0.080	0.583	0.560
	F × WE	0.383	0.371	1.222	0.222
SS × WE	-0.132	-0.279	-0.974	0.330	

* $p < 0.05$.

*** $p < 0.001$.

Table 6
Multiple regression for academic achievement

Dependent variable	Variables	SD	Beta	t	P
Academic achievement ($R^2 = 0.110$; $F = 7.553$; $P = 0.000$)	<i>Main effects</i>				
	Way of entrance (WE)	2.155	-0.111	-0.307	0.759
	Social support (SS)	0.036	0.008	0.166	0.868
	Fairness(F)	0.102	0.163	2.832	0.005**
	Course load(CL)	0.119	-0.044	-0.960	0.337
	Self-efficacy (SE)	0.105	0.102	1.966	0.050*
	<i>Interactions</i>				
	SE × WE	0.194	0.217	0.887	0.376
	CL × WE	0.214	-0.305	-1.742	0.082
	F × WE	0.162	0.555	2.065	0.041*
SS × WE	0.073	0.672	2.285	0.023*	

* $p < 0.05$.

** $p < 0.01$.

Table 7
Multiple regression for H10

Variables	SD	Beta	<i>t</i>	<i>P</i>
Constant	1.079		72.260	0.000
Burnout	0.18	−0.070	−2.153	0.032*

Dependent: academic achievement; *F*: 4.634.

* $p < 0.05$.

We concluded that these data generally partially support our study of how independent variables and multiple enrollment programs affect student burnout and academic achievement separately.

6. Discussion and implications

Three research questions were posed at the outset of this study: (1) to examine student burnout and academic achievement respectively under these three types of multiple enrollment programs in technical–vocational colleges. Meanwhile, (2) this research also attempts to examine the moderating effect of multiple enrollment programs among the influencing (determining) factors for burnout and academic achievement. Finally, (3) does student burnout significantly affect academic achievement? These questions are addressed below in light of the results of the data analyses.

6.1. Burnout and academic achievement under multiple enrollment programs

The results in Table 4 suggest that student burnout and academic achievement under multiple enrollment programs are all significant ($P < 0.01$). Based on the Scheffe test, students who enter school via admission application have the best academic achievement, students who enter school via recommendations and screening come next, and students who enter school via examination distribution have the worst academic achievement. However, students who enter school via examination distribution have the highest student burnout, students who enter school via recommendations and screening come next, and students who enter school via admission application are least likely to be burned out. From the aforesaid descriptions, this result indicated that

type of school entrance does affect student burnout and academic achievement. The results showed that students who entered by examination distribution have the highest burnout and lowest academic achievement, whereas students who entered by admission application have the lowest burnout and highest academic achievement. Students who entered by recommendation and screening have medium burnout and academic achievement.

Since the traditional entrance examination system has been a hotly debated issue for educators, the public and parents for the past decade, the results of this research confirm that the deficits of examination distribution (similar to the traditional joint entrance examination) affect student burnout and academic achievement. This result indicates that the transformation of the traditional joint entrance examination into multiple enrollment programs is a right policy of the Ministry of Education. Student's interest is a key point of concern while choosing the major or school. Students choosing the major they really liked or were interested in did reduce burnout and increase academic performance. Thus, this result gives the Education Bureau or schools some directions. In order to reduce student burnout and increase academic achievement, the Education Bureau should be more actively involved in the designing and modifying the multiple enrollment programs to replace the traditional entrance examination. Schools or the Education Bureau should reduce the quota of examination distribution students and increase the number of students applying directly, who show the lowest student burnout and best academic achievement.

6.2. Direct and moderating effect of multiple enrollment programs

As presented in Tables 5 and 6, the interaction of multiple enrollment programs and independent factors was partially significant for academic achievement but not at all for student burnout. The direct effects of independent variables on student burnout and academic achievement are partially supported. The findings of this study provide partial support for COR and SCT regarding stu-

dent burnout and academic achievement under multiple enrollment programs. Course load has a positive direct effect on student burnout. Social support and self-efficacy have a negative direct effect on student burnout. The results provided further validation and replication of prior research investigating burnout (Archer and Laminin, 1986; Lee and Ashforth, 1996; Cherniss, 1993; Russell et al., 1987; Jackson et al., 1986). Based on the said results, how to reduce student's course load, provide suitable social support to students and raise student's self-efficacy become the critical points for school teachers and education bureau. What kind of factors caused students to feel that the course load was heavy? Does it happen because of too many examinations, reports, reading assignments and so on? Teachers should find out problems to overcome student burnout. Additionally, teachers should also provide suitable social support such as verbal encouragement to reduce student burnout during their learning process. Based on Bandura's (1977a) concept, self-efficacy positively correlates with thought pattern and emotional reactions. Once self-efficacy had been formulated and established, it was found to influence the behavioral patterns of students connected to the amount of stress or anxiety as they engage in a task. Therefore, teachers should try to increase students' sense of mastery to reduce student burnout.

Table 6 indicates that fairness and self-efficacy have a positive direct effect on academic achievement. The results provided further confirmation of prior research exploring academic achievement (Finn and Rock, 1997; Campbell and Hackett, 1986; Mone et al., 1995; Schoen and Winocur, 1988; Wood and Locke, 1987). In sum, self-efficacy has a positive effect on academic achievement. Based on this result, fairness is positively related to academic achievement; so schools should provide an open and fair environment for students to increase their academic achievement. Teachers should treat every student fairly to improve academic achievement.

In this study, the multiple enrollment programs were also applied as a moderator to test the relationship between independent variables and dependent variables. The data partially failed to

support the moderator effect on independent variables and dependent variables. Only fairness and social support have significant impact on academic achievement with multiple enrollment programs as a moderator. Others are not supported for student burnout. This result indicates that it is not really clear whether factors affect student burnout and academic achievement under multiple enrollment programs. This finding is not consistent with arguments to the effect that the multiple enrollment programs are the gatekeepers for student burnout and academic achievement. Further research is necessary to explore other factors to prove this relationship.

6.3. *Student burnout and academic achievement*

Table 7 reveals that student burnout has a negative significant effect on academic achievement. This result provides further validation and replication of prior research investigating the relationship of burnout with performance (Bandura, 1986). Previous studies have shown burnout to be associated with performance (Motowidlo et al., 1986; McCarthy et al., 1990). The data from this study support this finding for a sample of technical–vocational college students. Student burnout was significantly negatively related with academic achievement ($t = -2.153$, $P < 0.05$). This finding suggests that as students have higher burnout they have lower academic achievement or performance. As a consequence of this finding, it is obvious that it is necessary to control student burnout in order to improve student academic achievement and learning motivation. In order to improve student academic achievement, controlling student burnout becomes a critical point for schools. Schools and teachers should carefully plan and design courses, tests, or even career planning to reduce student burnout, and therefore increase academic performance.

6.4. *Limitations*

Although the results provided full or partial support for the hypotheses, three limitations should be taken into consideration when interpreting the findings. It is important to emphasize that the data from this study were gathered at

one point in time, which was a kind of snapshot research that did not consider the feedback effect of student burnout and academic achievement over time. This research is categorized as a cross-sectional survey research, and, we therefore cannot infer that our findings are integrated. Future research should try to avoid this important limitation and should focus on a longitudinal study over time to get integrated data and reduce the bias of the research. Secondly, we used a convenient, not a random, sample to select schools as testing samples, which may cause sampling bias, even though we try to avoid sampling bias between city and rural schools. Thirdly, the results of our study may have to be carefully interpreted, since the sample was only restricted to 4- and 2-year technical-vocational university/junior or senior college students, who focus on skill-oriented base training. The results probably cannot be generalized to all higher school system students, especially to general university students, who focus more on theory-oriented base training.

7. Conclusion

Overall, the pattern of reported results is partially consistent with those presented in other published burnout studies. Multiple enrollment programs did affect student burnout and academic achievement. This result is consistent with the policy of the Ministry of Education, which has been actively involved in designing the multiple enrollment programs to reduce student stress and to improve learning performance. This result provides some indications or implications for educational bureaus to set up education policies and teaching strategies to increase student learning motivation. Especially, the course plan and design and teaching content arrangement can match with students' intrinsic and extrinsic properties to reduce student burnout and educational resources waste.

In general, based on these results, environment and psychological factors are fully or partially linked to student burnout and academic achievement. Moreover, it is not clear whether these particular environment and psychological factors

are indeed relevant to student burnout. Consequently, the data only partially support the moderator effect on academic achievement in this study. Further research is required to understand the reasons for this unsupported result and to try to find other independent variables in the context of similar studies.

Although multiple enrollment programs are a hotly debated topics recently in Taiwan, this new initiative is still changing. Till now, there has been a scarcity of research on this issue, discussing the impact of multiple enrollment programs. More future study is needed to follow up on the development and results of this new system. This paper represents only an early attempt to investigate the impact of multiple enrollment programs. Experimental and longitudinal studies are required to address this issue in future research because it is insufficiently to rely on a cross-sectional survey to interpret causality problems.

Acknowledgements

This work was supported by the National Science Council of Taiwan, ROC, under Grant No. NSC-90-2511-S-167-001.

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