

# *Research on the Influence of Ecological Civilization Education on College Students' Green Behavior Based on SEM Model*

Xinyu Wang\*, Peilu Li

*School of Economics and Management, North China University of Technology, Beijing, China*

*\*Corresponding author*

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**Abstract:** As the environmental problems and climate issues change and deteriorate, the idea of green behavior gradually wins support among the people. College students are the main group of the young generation, so the green behavior of contemporary college students and the construction of ecological civilization education have received an increasingly attention. Based on the theory of planned behavior, a framework is constructed to identify the factors that affect green behavior, including ecological civilization education, subjective norm, perceived behavioral control, behavioral attitude, and behavioral intention. By using Structural Equation Modeling, empirical research was carried out to identify the influencing factors of students' green behavior, the path and rules of ecological civilization education on different factors. Finally, the corresponding suggestions were put forward. Results show that ecological civilization education has profound positive impact on the green behavior of college students. Moreover, there is a direct path and an indirect path of the impact of ecological civilization education, which are respectively ecological civilization education—green behavior and ecological civilization education—subjective norm—green behavioral intention—green behavior.

## 1. Introduction

Since the Industrial Revolution, with the continuous progress of manufacturing technology, it has brought about the rapid development of society. At the same time, the discharge of pollutants and the over-harvesting of resources have also led to the deterioration of the ecological environment, restricting the next development of my country's economy. Actions to improve the ecological environment are imminent.

In recent years, people have put forward the concept of green behavior from the perspectives of environmental protection and ecological civilization construction. Steg and Vlek (2009) [1] defined green behavior as “the behavior that damages the environment as little as possible, and even benefits the environment.”, which can effectively alleviate the current situation of environmental damage and resource shortage. Green behaviors cover all activities in our daily lives, from home to

work and commute, from personal leisure activities to organizational corporate practices. As a guiding ideology at the theoretical level, ecological civilization education plays an important role in establishing people's ecological awareness and values. College students, as an important representative group of the younger generation, are a generation who carry the hope of the motherland for the future. It has become an important part of educating college students on ecological civilization construction and establishing a sense of responsibility for college students' ecological civilization. Under the framework of TPB, this paper conducts empirical research through the SEM model, identifies the external influencing factors of students' green behavior and the path and laws of ecological civilization education on different factors, and puts forward corresponding suggestions.

## 2. Literature Review

### 2.1. The Oretical Model

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The Theory of Planned Behavior (TPB) began in 1980 with the theory of rational action (Martin Fishbein, Ajzen, 1980) [2] and was proposed by Icek Ajzen (1985) in his chapter "From Awareness of Action: A Theory of Planned Behavior" , which is a psychological theory that links belief to behavior [3].The brief relationship is shown in the figure1. The theory seeks to explain all the behaviors in which people are capable of self-control. A key component of the model is behavioral intention; behavioral intention is the closest determinant of human behavior, while behavioral intention is influenced by attitude about the likelihood that the behavior will produce the desired outcome, and subjective evaluations of the risks and benefits of that outcome. That is to say, the three core components of behavioral attitude, subjective norm and perceived behavioral control jointly shape an individual's behavioral intention. In general, attitude, subjective norm, and perceived behavioral control are related to behavior; behavioral intention is related to actual behavior [4].

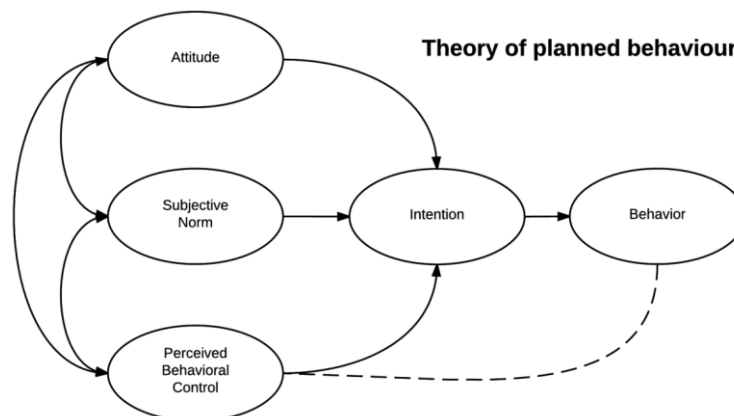


Figure 1: The Theory of Planned Behavior

Further research on TPB shows that attitude is influenced by perceived benefits and perceived risks (Mehrens, Cragg & Mills, 2001) [5]; subjective norm is influenced by normative beliefs and moral obligations; PBC is influenced by the control strength and control beliefs (Ajzen, 2001). [6]. All of these factors together determine behavioral intention and actual behavior.

The Theory of Planned Behavior is a theoretical system used to explain how individuals change

their behavior patterns in social actions. Education, as a guiding ideology at the theoretical level, influences people's behavior patterns by establishing people's consciousness and values. Based on the TPB, this paper adds education as an element that affects human beliefs and thus changes behaviors, and explores how human behaviors change more comprehensively.

The Theory of Planned Behavior has been applied to many areas of research, including health-related behavior, environmental psychology, and voting behavior. In a study by Sweitzer [7], the behavioral constructs associated with TPB guided the development of intervention strategies. The application of TPB is to encourage parents to include more fruits, vegetables and whole grains in the lunches they pack for preschoolers. Another application of TPB is in the field of environmental psychology. Another application of TPB is in the field of environmental psychology. In general, environmentally friendly behaviors carry positive normative beliefs. That is, behaviors consistent with environmental sustainability are widely publicized as positive behaviors. However, while there may be behavioral awareness to practice such behaviors, constraints may hinder perceived behavioral control [8].

## 2.2. Research Review

Nowadays, with the construction of ecological civilization becoming the goal of my country's development, ecological civilization education has gradually become an important part of ideological education in colleges and universities. Studying the current situation of ecological civilization education is of great significance for contemporary college students to form ecological civilization awareness and implement green behaviors. Wang Han (2021) [9] scholars discuss the model innovation of ecological civilization education in colleges and universities from the perspective of TPB, and provide theoretical guidance for the construction of ecological civilization education in colleges and universities; Wu Xuan et al (2015) [10] scholars from the perspective of institutional culture, material culture, spiritual culture, and behavioral culture to explore the path of integrating ecological civilization education into campus construction; Yu Qiang (2013) scholar [11] divided ecological civilization education into three parts: education operation mechanism, education guarantee mechanism, and education evaluation mechanism. Dimension. In recent years, people have put forward the concept of green behavior from the perspectives of environmental protection and ecological civilization construction, but there is no clear definition yet. Chang Hao et al (2010) [12] scholars divided green behavior into four levels: green behavior awareness, green behavior habits, green practice activities and green public welfare actions.

At present, the research on the impact of ecological civilization education and green behavior has made great progress. Most scholars directly study the impact of ecological civilization education on green behavior, but lack to analyze the internal path relationship from the perspective of unlocking the black box. The research focus of this paper is to innovatively add ecological civilization education as a latent variable based on the Theory of Planned Behavior, identify the influencing factors of students' green behavior and the path of ecological civilization education on different factors, and study the impact of ecological civilization education in colleges and universities on students' green behavior.

## 3. Theoretical Analysis and Research Assumptions

At present, the research on the impact of ecological civilization education and green behavior has made great progress. Most scholars directly study the impact of ecological civilization education on green behavior, but lack to analyze the internal path relationship from the perspective of unlocking the black box. The research focus of this paper is to innovatively add ecological civilization education as a latent variable based on the Theory of Planned Behavior, identify the influencing

factors of students' green behavior and the path of ecological civilization education on different factors, and study the impact of ecological civilization education in colleges and universities on students' green behavior.

Since its inception, the Theory of Planned Behavior has been widely used in various fields of research on human behavior. Combined with previous research [13,14], based on the logical assumptions of TPB theory, it is based on behavioral attitude, subjective norm, perceived behavior control, and ecological civilization education. Starting from six elements, green behavioral intention and green behavior, this paper analyzes the influence mechanism of green behavior of college students in Beijing-owned universities. The overall hypothesis is shown in the Figure 2.

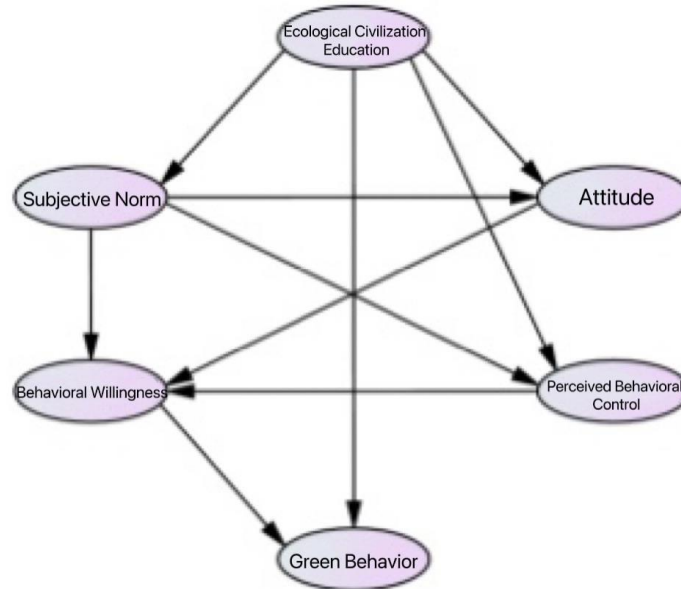


Figure 2: A Framework for Research on the Impact of Students' Green Behaviour

Behavioral attitude refers to people's positive or negative evaluation of green behavior, including correct understanding of the results and value of green behavior. For example, students can recognize that diligence, thrift, energy saving and emission reduction can promote environmental protection; recognize that protecting the environment and maintaining ecological civilization is very meaningful. If they correctly recognize the results and values of green behaviors, it will enhance students' intention to implement green behaviors, and their awareness of ecological civilization will increase, thus proposing hypotheses:

H1: Green behavioral attitude has a significant positive impact on green behavioral intention.

Subjective norm include normative beliefs and moral obligations. Normative beliefs are individuals' views on social green behaviors, such as whether students recognize the green behaviors produced by social subjects around them. Moral obligations are whether personal green behaviors are affected by the judgments of other social subjects, such as whether students are supported and encouraged by other social subjects to conduct green behaviors. If students can recognize the green behaviors of others, or be encouraged by others to green behaviors, they will enhance their intention to protect the ecology. Subjective norm, behavioral attitude, and perceived behavioral control are all based on beliefs. If other social subjects around students believe that they should engage in green behaviors, students' conformity psychology or influenced by others' judgments are more likely to produce positive green behaviors attitude, more likely to prepare for green behavior. Hence the hypothesis:

H2: Subjective norm has a significant positive impact on green behavioral intention.

H3: Subjective norm has a significant positive impact on behavioral attitude.

H4: Subjective norm has a significant positive effect on perceived behavioral control.

Perceived behavioral control is the degree of difficulty an individual perceives to perform a specific behavior, that is, the ability of students to think they can do green behaviors or the barriers to green behaviors. Green behavior will be constrained by certain objective conditions. For example, the more ways students conduct green behaviors, the stronger the students' intention to conduct green behaviors. Perceived behavior control is also affected by students' own abilities, such as whether students clearly know the specific knowledge of garbage classification, and if students have rich experience with them, then students will have a stronger intention to conduct green behaviors. Hence the hypothesis:

H5: Perceived behavioral control has a significant positive effect on green behavioral intention.

Ecological civilization education includes two parts: theoretical education and practical education. Theoretical education is mainly reflected in classrooms, lectures, publicity activities, etc., integrating ecological civilization education into ideological education, through the teaching of students' theoretical knowledge, increasing students' knowledge about ecological protection, encouraging students to protect ecological civilization, and realizing ecological civilization construction is to improve students' ability to implement green behaviors. Practical education is mainly reflected in daily management norms and social practice activities, such as CD-ROM activities, tree planting and weeding activities, etc. By encouraging everyone to protect the ecological civilization within their ability, it affects students' daily life. Green behavior in life. Based on the above, hypotheses are made:

H6: Ecological civilization education has a significant positive impact on green behavioral attitude.

H7: Ecological civilization education has a significant positive impact on subjective norm.

H8: Ecological civilization education has a significant positive effect on perceived behavior control.

H9: Ecological civilization education has a significant positive impact on green behavior.

Behavioral intention is the closest determinant of human behavior. In general, the clearer the students' motivation to protect ecological civilization and the stronger their intention to conduct green behaviors, the more likely they are to implement green behaviors. Hence the hypothesis:

H10: Green behavioral intention has a significant positive impact on green behavior.

## 4. Research Design

### 4.1. Questionnaire Design

The target group of this questionnaire is the students of Beijing municipal colleges and universities. Except for the simple demographic characteristics, the rest of the questions are based on the five-level Likert scale. Among them, ecological civilization education is divided into theoretical education and practical education. A total of 5 items are designed. The score represents the frequency of schools holding or implementing ecological civilization education, that is, "no" = 1, "rarely" = 2, "general" = 3, "more" = 4, "many" = 5. Combined with previous research [12], green behavior is divided into green behavior habits, green public welfare activities, and green practice activities, and a total of 9 items are designed; 3 items are designed for green behavioral attitude, subjective norm, and perceived behavior control. 4 items are designed for green behavioral intention, and the score represents the student's recognition degree, which is "Very disagree" = 1, "Disagree" = 2, "Generally agree" = 3, "Agree" = 4, "Very good" = 5. The design and analysis of the scale are shown in the following Table 1.

Table 1: Design of the scale

Latent Variable	Measurement Content
Ecological Civilization Education	theoretical education
	practical education
Green Behavior	Green public welfare activities
	Green Practice Activities
	Habits of Green Behavior
Subjective Norm	Recognition of the green behavior of other surrounding subjects
	Social pressure from other surrounding subjects prompts green behavior
Behavioral Attitude	Correctly recognize the results of green behavior
	Correctly understand the value of green behavior
Perceived Behavioral Control	Barriers to Green Behavior
	Ability to do green behavior
Green Behavioral intention	Green behavior and awareness of ecological civilization protection

#### 4.2. Questionnaire Collection

This study will carry out a questionnaire survey from April to May 2022. A total of 357 questionnaires were distributed, and the students who filled out the questionnaires came from 27 municipal colleges and universities in Beijing. Excluding the invalid questionnaires with short filling time and wrong simple verification questions, a total of 328 valid questionnaires were recovered, and the recovery efficiency was 91.88%.

#### 4.3. Reliability and Validity Test

In order to test the quality of the questionnaire, before constructing the Structural Equation Modeling, this study used SPSS26.0 statistical software to test the reliability and validity of the measurement data. The test results are shown in the following Table 2. Statistical analysis shows that the Cronbach  $\alpha$  value of the total questionnaire is 0.939; the Cronbach  $\alpha$  value of each latent variable after deleting items is greater than 0.93, indicating that the indicators of the questionnaire have good consistency and the questionnaire has good measurement reliability. Secondly, exploratory factor analysis was used to test the validity of the scale. Bartlett's sphericity test had a chi-square value of 5557.457, a degree of freedom of 351, a p value of 0.000, and a total KMO value of 0.935. Among the 27 indicators, 23 indicators had factor loading values. Greater than 0.6, indicating that the scale has good validity.

Table 2: KMO and Bartlett's test

KMO Sampling Suitability Quantity	0.935
Bartlett's sphericity test Approximate chi-square	5557.457
Degrees of freedom	351
P-value	0.000

## 5. Results and Analysis

### 5.1. Model Fit Test and Model Correction

Amos26.0 was used to conduct statistics on the fit between the model and the data, and it was found that the model fit index before the revision was reasonable, but only reached the acceptable basic standard. After correcting the observed variables whose factor loadings did not meet the standard in the model, the fitting index PCMIN/DF was less than 3, and the RMSEA was less than 0.08, and the model fit reached the general standard, indicating that the overall fit between the model and the data was good. The specific results are shown in the following Table 3.

Table 3: Model Fit Index

Fit index	Before correction	After correction
PCMIN/DF	3.735	2.787
RMSEA	0.091	0.074
GFI	0.782	0.855
AGFI	0.737	0.82
CFI	0.840	0.907

### 5.2. Path Analysis

Table 4: Path Analysis Results

Path	Normalized Path Coefficients	P	Result
Subjective Norm <--- Ecological Civilization Education	0.293	***	Established
Perceived Behavioral Control <--- Subjective Norm	0.940	***	Established
Behavioral Attitude <--- Ecological Civilization Education	-0.121	***	Not Established
Behavioral Attitude <--- Subjective Norm	0.961	***	Established
Perceived Behavioral Control <--- Ecological Civilization Education	-0.058	.115	Not Established
Green Behavioral intention <--- Subjective Norm	0.383	.009	Established
Green Behavioral intention <--- Perceived Behavioral Control	0.373	***	Established
Green Behavioral intention <--- Behavioral Attitude	0.329	***	Established
Green Behavior <--- Green Behavioral intention	0.714	***	Established
Green Behavior <--- Ecological Civilization Education	0.165	***	Established

Using Amos26.0 to test the hypothesis, Table 4 shows the results of the model's impact path. The results show that except H6 and H8 are not established, the rest of the assumptions are established, which indicates that the model has a good degree of interpretation.

Behavioral attitude, subjective norm and perceived behavioral control have a significant impact on green behavioral intention, then: H1, H2, H5 are established. Subjective norm has a significant

positive impact on behavioral attitude and perceived behavioral control, so H3 and H4 are established. Ecological civilization education has a significant impact on subjective norm; it has no significant effect on perceived behavioral control; it has a negative impact on behavioral attitude, which does not meet the hypothesis. Ecological civilization education has a significant positive impact on green behavior, so H9 is established. Green behavioral intention has a significant positive impact on green behavior, then H10 is established.

## 6. Conclusion and Suggestion

### 6.1. Conclusion

Based on the Theory of Planned Behavior, this paper introduces the variables of ecological civilization education to explore the impact of ecological civilization education on the green behavior of students in municipal colleges and universities, and concludes that there is a direct path and an indirect path, which are respectively ecological civilization education—green behavior and ecological civilization education—subjective norm—green behavioral intention—green behavior. When students have a more positive attitude towards green behaviors and have a sense of identity with the value of green behaviors, students are more willing to engage in green behaviors such as environmental protection, energy conservation and emission reduction, and thus engage in green behaviors. When students have stronger green behavior ability, more ways to conduct green behavior, and more abundant green facilities around, then students will be more willing to conduct green behavior, and thus conduct green behavior.

When there are more people around students who are doing green behaviors, the more people around them recognize their green behaviors, then the students will have a more positive attitude towards green behaviors, they will be more aware of the value of green behaviors, and they will be more able to improve themselves. The ability to implement green behaviors.

The implementation of ecological civilization education has a positive impact on students' green behavior, and can improve students' intention to conduct green behavior through the cultivation of some beliefs, and then subtly affect students' green behavior. Ecological civilization education can directly promote students' green behavior through some practical education, such as organizing tree planting activities and voluntary activities for garbage sorting. In addition, ecological civilization education can also encourage and recognize students' green behaviors, create a good and strong green campus atmosphere, and enhance students' intention to green behaviors, so as to encourage students to conduct green behaviors.

However, excessive ecological civilization education will affect students' attitudes toward green behaviors, which will lead to negative attitudes toward green behaviors; inappropriate ecological civilization education will affect their initiative and enthusiasm. In general, the more comprehensive and better the implementation of ecological civilization education in a university, the more consciously the students in this university will conduct green behaviors.

### 6.2. Suggestion

In view of the research conclusions and research objectives, this paper puts forward the following suggestions:

(1) Colleges and universities need to explore a new model of ecological civilization education, combine theoretical teaching with practical guidance, and guide students to green behavior.

The ecological civilization education in colleges and universities in my country started late and developed for a short period of time. At present, the ecological civilization education in most colleges and universities is relatively single and limited, which leads to the weak participation of



students and the small effect of ecological civilization education. Explore a new model of ecological civilization education, open up the pattern of ecological civilization education, and combine theoretical teaching with practical guidance. Pay attention to the way of ecological civilization education and avoid over-education, which may cause students to have conflicting or rebellious emotions. In addition to integrating ecological civilization education into ideological and political courses in class and holding lectures and publicity after class, colleges and universities can also offer some courses on ecological civilization according to students' needs, so that students can learn from the perspective of absorbing extracurricular knowledge, which can improve the effect of ecological civilization education. In ecological civilization education, interactive and experiential practical education can increase students' direct understanding of ecological civilization, guide students to visit ecological civilization bases, hold tree-planting activities, etc., so that students can get in touch with nature, and can also stimulate students' interest in ecological civilization construction. Deep understanding.

(2) Colleges and universities need to grasp the new concept of ecological civilization education, combine management constraints with positive incentives, and promote students' green behavior.

According to the research, the more social subjects who engage in green behaviors around students, the higher the recognition of their green behaviors, and the more interested students will be in green behaviors. Combine the management constraints and incentives and guidance of ecological civilization education in colleges and universities to improve students' enthusiasm for green behavior. In terms of management constraints, the behavior of students is restricted by establishing campus norms and management indicators. In terms of incentives and guidance, encourage students to carry out green behaviors into their daily lives, and set up incentive mechanisms, including awards, material rewards, etc., to reflect the school's social subject's recognition of students' green behaviors, and to increase students' interest in green behaviors.

(3) Colleges and universities need to improve the school's green infrastructure, do a good job of green environment planning, build a green behavior platform, and create a "green campus".

The premise of carrying out ecological civilization education is to create a good ecological civilization campus atmosphere and create a green campus. First of all, to do a good job in green environmental planning, in addition to implementing campus greening, it is also necessary to establish a complete campus pollution prevention, energy saving and emission reduction system, and set a green example. Secondly, improve the campus green infrastructure, such as garbage sorting bins, energy-saving appliances, etc., to increase the ways for students to conduct green behaviors, provide opportunities for students to conduct green behaviors, and enhance students' intention to green behaviors.

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