Innovation Explore of Entrepreneurship Education Based on Extenics

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Abstract

According to Extenics principle, analyzed several contradictions that exist in entrepreneurship education in China. Using conjugate reasoning and transforming methods to convert the conjugated of issues dealing with conflicts, and propose effective alternatives evaluation to develop new strategies to enhance the level of entrepreneurs education.

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Entrepreneurship Education; Extenics: Entrepreneurship Education Methods: Innovation:

1. Introduction

Entrepreneurship education is an educational activity formed in the process of economic and social value creation accompanied by modern social production and consumption. According to Chinese studies, it was said that the concept of entrepreneurship education still lags behind, only a few universities bring the university student into systematic learning and curriculum system (Su Xiaohua; Dong Xuesong, 2012); The discipline position of university entrepreneurship education is illegibility and wildly, the course content system is not perfect, many schools lack of professional teachers and other issues (Baohua, Tang Shaoxiang, 2010; Liu Qiang, 2010); The pedagogy for entrepreneurship should be established in order to develop entrepreneurship education with mature discipline. Schools must solve the problem of courses unbalance between its practical functions and theories; build an effective quality standards and system of organizational entrepreneurship

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According to incomplete statistics, the success rate of students' entrepreneurship is about 1%, while the world average is about 10%. Since there are many entrepreneurship education problems in both the college and university, changes should be done to enhance the ability of college students venture.

2. Typical Contradictory Problems of Entrepreneurship Education in China

According to the basic requirements of personnel training and education, the educational goals are: good hardware environments, better services of quality education, student's adaptability in society, a sound education system. However, it is found in literatures that there are many contradictions between the needs of human resource in society and the level of entrepreneurship education. It seems that university entrepreneurship education devote to cultivate innovation and entrepreneurial ability, but in fact students still have weak capacity for innovation and entrepreneurship, it mainly due to the relatively backward of entrepreneurship education in schools. For example, the basic hardware conditions including classrooms in most colleges are not as bad as before, there are many new offices or studios for students starting their businesses. On the other hand, more and more teachers engage in entrepreneurship education. According to incomplete statistics, most of faculties of entrepreneurship education in schools are counselors, and there is minority ratio of professional teachers in schools. Most of teachers who implement the entrepreneurship education are academic experts who only worked in school after they graduated. The vast majority have no systematic entrepreneurship education and lack of business experience or entrepreneurial ability of practical guidance. They are not familiar with the operation of enterprises, development and management of business, so they talk about theories from the books not from the practice. So the confusing constitute of teachers and lack of experiences in business lead to inefficient entrepreneurship education. There still has no uniform standard for the design of teaching content for entrepreneurship education in various universities and colleges, and the choice of content depends on business management courses with less of innovative thinking and methods advising. Meanwhile, the schools choose more aspects of theoretical for teaching than practice. Many cases are outdated and the analyses of problems are lack of professional and practical depth, especially lack of efficient skills to deal with the entrepreneurial contradictions.

In a word, the main issues of entrepreneurship education contradiction are:

1. Structure of teachers is somewhat irrational. Educators in school have no entrepreneurial experience but people who have entrepreneurial experience are lack of teaching qualification.

2. Teaching content is not comprehensive. There are less of teaching theories, antiquated business cases, less of innovative techniques.

3. Students have weak innovative ideas, can't understand social correctly, lower degree of participation in entrepreneurial, less finite strain ideas and methods

3. Expand Analysis by Using Extension Conjugate Analysis Method

Since entrepreneurship education is large and complex system engineering with intricate relationship among all these problems. If you cannot sort out the problem systematically in an orderly manner and find why it happens, you ultimately cannot really solve the problem or even cause more and more problems. Extenics is a Cross-discipline of Philosophy, Mathematics and Engineering. Extenics is such a science that it uses formal model to research the extension possibility of things, the rules and methods of innovation, and applies all of them to solve contradictory problems. Extensible theory describes the extension of all things. It establishes model by the basic element that can describe all matters, affairs and relations. Conjugate theory describing the structure of matters. Extension logic is transformation and reasoning science that transforms contradictory
problems into non-contradictory problems. When we changing objectives or conditions of issues with extensibility and expand all possible options, evaluation and implement will be done. Entrepreneurship education involves multiple factors. So it’s difficult for teachers to make decision or strategy for all kinds of conditions. In the case, it’s the new way to use extension methods to describe each issue or relationship originally as logic cell. By expanding reasons and transforming logic cells or relationships, we can make strategy using existing information and knowledge as to deal with contradictory problems.

From matter’s physical, systematic, dynamic and antithetic properties, Extenics correspondingly proposed conjugation and four pairs of concepts: imaginary and real, soft and hard, latent and apparent, and negative and positive to describe a matter’s constitution. So we may understand structure of issues more completely and reveal the essence of the variations in the world. In this perspective, it will provide a new method for us to solve contradictory problems. Thus we should study relation between all conjugate parts and try to transform them. Here we do some research on entrepreneurship education using the Conjugate Analysis Methods, based on analysis of status and contradictions as we said.

Firstly, everything is composed of material part and non-material part from its physical property. For example, the material part of entrepreneurship education includes campus, classrooms, training rooms, business offices and teachers, etc. The non-material part includes culture, class, software, business practice, teaching, etc. The non-material part must be combined with the material part tightly in order to play the role of entrepreneurship education efficiently. In other words, a good campus environment and entrepreneurial culture should include best classroom and best teaching. We shall have advanced simulation software in practical training rooms which allows students to experience. There should be rich entrepreneurial venture in the business office in schools so as to improve student’s entrepreneurial capability. Meanwhile, teachers should have good teaching ability to help students improve their creative and practicability.

Secondly, a matter has soft part and hard part. Hard part is one of components of a object. Soft part refers to the sum of the linkages of an object. All matters are composed of soft part and hard part. Soft part is valuable. For example, for entrepreneurship education, it’s hard part is campus including classroom, training room, business office, faculty, student, lesson plan, teaching content and materials constitute. On the other hand, the plan, systems, policies, incentives measures on entrepreneurship education in schools become Soft Part. Without the supports of Soft Part or Hard Part of entrepreneurship education, both of the teachers and students will have less activity in working and studying, and the quality of teaching and learning will be worse.

Thirdly, human and matter both have latent part and apparent part. A matter is composed of its latent part and apparent part. Everything are changing and the situation will keep forever. In the view of dynamic regularity, we consider the nature of things made of two parts: Latent Part and Apparent Part. For entrepreneurship education, it is evident to teach the students. Teachers and students enter the classroom on time to complete their works in accordance with the requirements of the school assessment. It turns to be Apparent Part. But how about the quality of teaching—whether teaching contents are appropriate and students improving the ability to adapt to changes in the business environment—is hidden and considered as Latent Part. Perhaps students with good test scores are not good as those with lower scores because they have different personal abilities.

Fourthly, things are results from interaction between the positive parts and negative parts of themselves. All matters are composed of negative part and positive part. People tend to focus on the positive part, while ignoring the negative part. In the view of opposition, we consider everything has two opposite facts. For example, the curriculum and objective of entrepreneurship education is to develop students' creative and entrepreneurial abilities. In particular, the learning process requires a lot of time to practice in order to master the skills effectively. However, the existing education system doesn’t allow university students have enough time neither in entrepreneurship courses nor in practice. It is difficult to get good results without enough time and effort in whether professional learning or business study. As college students, if they put most of the time in entrepreneurial learning might reduce the time and effort in professional learning. Therefore, if students
spend much more time and effort as before, it is positive in terms of the quality of entrepreneurship education. On the contrary, it is negative.

4. The Solution Based on Conjugate Extension Transformation Method

Understanding matters from their physical, systematic, dynamic and antithetic properties can let us completely understand matters’ structure. In certain condition, change of certain conjugate part of an object will cause conductive transformation of the corresponding part that is related with it. As these typical contradictory problems existing in entrepreneurship education in China, we establish the formal models describing all matters, affairs, and relations. Then we identified major basic-element with its attributes and characteristics after expansion. Then we transform each of these basic–elements in order to find solutions to deal with the problems. In the end, the conjugate transformation will be applied for conversion of the main basic–elements.

Generally, in the case without considering the intermediary unit, the issues($O_m$) can be divided into four pairs of conjugate parts from issue’s physical, systematic, dynamic and antithetic properties. Non-material Part $im(O_m)$ and material Part $re(O_m)$, Soft Part $sf(O_m)$ and Hard Part $hr(O_m)$, Latent Part $lt(O_m)$ and Apparent Part($O_m$), Negative Part $ngc(O_m)$ and Positive Part $psc(O_m)$.

Each of the conversion of eight parts is referred to as a conjugate part conversion.

The conversion of basic–elements formed in conjugate is marked as:

\[
T_{im} M_{im} = M'_{im}, T_{re} M_{re} = M'_{re},
T_{sf} M_{sf} = M'_{sf}, T_{hr} M_{hr} = M'_{hr},
T_{lt} M_{lt} = M'_{lt}, T_{ap} M_{ap} = M'_{ap},
T_{ngc} M_{ngc} = M'_{ngc}, T_{psc} M_{psc} = M'_{psc}.
\]

How to make transformation of conjugate part is based on the study of conjugate transformation. Conversion method of the conjugate part is the same as issues, including the replacement transform, deletions transform, scaling transform, decomposition transform and arithmetic transform.

Suppose $\Gamma \in \{O_m, c_m, \nu_m, O_a, c_o, \nu_o, O_r, c_r, \nu_r, M, A, R, Co, k, U\}$, wherein, $Co$ indicates compound-element, $k$ indicates dependent criterion, $U$ indicates universe of discourse and others.

$\Gamma$ Indicates one of basic transformations.

Specific examples are:

(1) Structure of teachers is somewhat irrational. Educators in school have no entrepreneurial experience but people who have entrepreneurial experience are lack of teaching qualification.

As teachers, the teacher qualification is material part and teaching ability is non-material Part. But no entrepreneurial experience may affect the teacher’s teaching level. Here, we can take the additions and deletions transformation to the material Part through transformation of conjugation part. Due to limitations of the education system, there is no one who can become a full-time university teacher without qualified. But there should be someone with entrepreneurial experience who allowed becoming business mentors to help teachers guiding students in practice. Therefore, faculty structure should be strengthened and optimized while the system requirements remained. So we can make scaling transform about the Non-material Part, allow the teachers without business experience working in companies for months, while they have practiced in business they can come back for teaching.

For example, we use increasing transformation to improve the structure of teachers. The increasing
transformation refers to increase certain attributes of the element. For example, as to matter-elements $M_0= (\text{teacher} A_1, \text{number}, 1)$, $M= (\text{mentor} A_2, \text{number}, 2)$, $M$ is increasable matter-element of $M_0$, we make $TM_0= M_0 \oplus M= (\text{teacher} A_1 \oplus \text{mentor} A_2, \text{number}, 3)$, then $T$ is increasing transformation of $M_0$.

(2) Teaching content is not comprehensive. There are less of teaching theories, antiquated business cases, less of innovative techniques.

For the arrangement of curriculums, teaching plans and teaching materials is Apparent Part. Economy development, entrepreneurial environment changes and technical knowledge updates are its latent part. It is difficult for students to truly adapt to changes in the development of society no matter how teaching methods diverse and how to explain seriously, while the teachers cannot impart knowledge and skills as society demand. Therefore, we can make replacement transformation for the latent part. In addition to updating teaching programs, choosing the right materials, adding the latest social information in time and giving advanced innovative techniques are important. For example, few people know about Extenics even it is one of the advanced innovation theories in the world. We shall let those hidden become dominant. It can be added into textbooks, as well as the latest cases of entrepreneur. Meanwhile business managers should be invited to write the textbooks, help to collect the entrepreneurial cases and practical issues, and they also can becomes mentors.

For example, we use substitution transformation to change the editor of textbooks. $TT’=T’$, i.e. As to basic-element $B_0(t)= (\text{textbook}, \text{editor}, \text{teacher of university})$, if there is certain transformation $T$ that transforms $B_0(t)$ to $B(t)= (\text{textbook}, \text{editor}, \text{manager of company})$, i.e. $T B_0(t)= B(t)$, then the transformation $T$ is referred to as substitution transformation of basic-element $B_0(t)$.

(3) Students have weak innovative ideas, can’t understand social correctly, and lower degree of participation in entrepreneurial, less finite strain ideas and methods.

Many students spend much time in learning knowledge about majors, preparing for examinations, and pay less attention on outside of schools. It’s not good for them to master the skill in dealing with any problems in entrepreneurial activities. In addition to the guidance of existing education system, it forces students do hard in studying theories so as to achieve a good score. So it is no useful for students do more practice and exercise in business operation. It is hard for student to enhance their analyze abilities and creative abilities. Thus the more time spend on social entrepreneurship issues the better for students. When the participate in learning entrepreneurship is prime cell, the time on learning entrepreneurship is called position potion. According to Extenics, it will result to the change for position potion when transform the basic-element of negative part. Meanwhile it’s same as negative part impacted by change of position potion. This transformation is called Negative-Positive Conjugate Transformation. It can be symbolized as follows:

$$T_{ng} \Rightarrow T_{ng_c} T_{ps} \Rightarrow T_{ps_c} T_{ng}$$
Here, $T^c_{ng}$, $T^c_{ps}$ are described as the initiatives transformation of negative part $M_{ng}$ and positive part $M_{ps}$ on the characteristics $C$ of things $O_m$. $T^c_{ng}$, $T^c_{ps}$ are described as the transformation of positive part $M_{ps}$ and negative part $M_{ng}$ on the characteristics $C$ of things $O_m$ from $T^c_{ng}$, $T^c_{ps}$.

Many students spend a lot of time surfing on the internet since the development of the Internet and the popularity of computers. In terms of the basic--element for students to participate, the time and energy the students spent on surfing online, chatting and playing games become negative part of basic--element. In fact the behavior of students play on computers has no helpful to their entrepreneurial ability, so we should do something to transform the situation. Because we cannot forbid the students not surf on the internet, we may design courses and assignment online so let students learning by computer. When the website is working, it will help the students to understand the issues in society and collect more information from the market. It will also build connection between teachers and students online, they can discuss on the website and save more time for face to face. According to the principle of negative-positive conjugate transformation, it can be transformed through some ways from the negative part into a positive part.

We use decomposition combination transformation to tell students how to find a business idea.

\[ TT = \{ \Gamma_1, \Gamma_2, ..., \Gamma_n \}, \text{wherein, } \Gamma_1 \oplus \Gamma_2 \oplus ... \oplus \Gamma_n = \Gamma, \text{ i.e.} \]

\[
T = \begin{bmatrix}
\text{decomposition, } & c_{T1}, & \Gamma \\
\text{decomposition, } & c_{T2}, & \Gamma_1 \oplus \Gamma_2 \oplus ... \oplus \Gamma_n = \Gamma \\
\text{decomposition, } & c_{T3}, & \{ \Gamma_1, \Gamma_2, ..., \Gamma_n \} \\
\vdots & \vdots & \vdots \\
\end{bmatrix}
\]

Decomposition transformation refers to divide one object or attributes into several pieces. For example, one action can be executed in several steps. Students can read some articles from newspapers, learn some methods from textbook, ask for mentors, discuss with other people, search information on the internet and so on. There can be many steps for students to find a new idea or opportunity in the market.

5. Steps to improve the teaching in entrepreneurship education by Basic Transformation Methods

**Step 1.** Build basic-element model as the base for transformation by methods. For example, a teacher can be described in a matter element and an affair element as following:

\[
M_s = \begin{bmatrix}
teacher, & age, & v_1 \\
gender, & v_2 \\
major, & v_3 \\
educaiton, & experience, & v_4, v_5 \\
knowledge, & teaching, & A_w = \begin{bmatrix}
teaching, & read, & v_1 \\
write, & v_2 \\
discuss, & v_3 \\
investigate, & v_4 \\
talk, & v_5 \\
meeting, & v_6 \\
think, & v_7 \\
\end{bmatrix}
\end{bmatrix}
\]

**Step 2.** Collect as many as values for certain attributes.

For example, the value of major $V_1$ and work experience $V_m$ may have such values:

\[
\begin{aligned}
\text{major: } & \text{Computer Science, Engineering} \\
\text{work experience: } & \text{1 year, 2 years} \\
\end{aligned}
\]
Step 3. Try to do five basic transformations on each attributes one by one, and write down new skills.

For example, using the value of majors $V_s$ and experience $V_m$, we can obtain several skills by substitution transformation:

$$M_0 = [\text{teacher}_o, \text{major}, \text{human resource}]$$
$$M_1 = [\text{teacher}_o, \text{major}, \text{marketing}]$$
$$M_2 = [\text{teacher}_o, \text{major}, \text{business management}]$$
$$M_3 = [\text{teacher}_o, \text{major}, \text{technical innovation}]$$
$$M_4 = [\text{teacher}_o, \text{major}, \text{electronic commerce}]$$

A teacher whose major is human resource can teach students how to manage team work together. When a new business starts there should be some staff accomplish different tasks. It’s important to cooperate together and let everyone work hard.

A teacher whose major is marketing can teach students how to analyze the requirement of consumers, how about the future of the marketing. As for the experience,

$$M_0 = [\text{teacher}_o, \text{experience}, \text{recruit}]$$
$$M_1 = [\text{teacher}_o, \text{experience}, \text{train}]$$
$$M_2 = [\text{teacher}_o, \text{experience}, \text{marketing investigate}]$$
$$M_3 = [\text{teacher}_o, \text{experience}, \text{research}]$$
$$M_4 = [\text{teacher}_o, \text{experience}, \text{counting}]$$

We can let teacher work in companies. When a teacher whose major is human resource has a job in marketing department, he will practice in dealing with several problems related to marketing. His experience can be used in teaching.

Meanwhile, a teacher whose major is marketing has an opportunity work in a company, his job is about management of human resource, it will help him know how to look for employee and train them to master career skills. His experience also can be used in teaching.

By combination transformation and conjugate analysis, we can have a teacher who has major of marketing and has experience in counting as following.
By increasing transformation, we can add a new job to the teacher, which will help
teacher grasp more skills. Also, different experience will display by different pisiotion.

Similarly, by five basic transformations, we can improve structure of teachers:

1) Teacher has different major can teach different courses , 2) Different job in company
can help teacher know more about reality and have more skills than before, 3) Teacher
whose major is human resource management has counting skills , 4) Teacher whose major is
marketing can conduct in recruiting affair. Other teaching ways are described in affaire
element as following:

6. Basic Principles of Evaluating the Effectiveness of Program

We should evaluate the merits of the program when it is selected and choose the best answer. Therefore, we establish evaluation from several aspects:

Firstly, the purpose of the evaluation. We shall select the index of measure according to the purpose
of the evaluation. The purpose of entrepreneurship education innovation is to strengthen faculty
structures, enrich curriculum and methods, and improve participation of students in class.

Secondly, a comprehensive evaluation. You can go to establish evaluation from several aspects in
order to evaluate whether the innovation reach its purpose. One is the proportion of professional
teachers, business mentors and students; the other hand is the novelty of curriculum and understanding
of the social dynamics which can be measured by annual. Innovative techniques diversity, case studies
and feasibility of solutions help people to solve practical problems. It can be carried out in cooperation
with business management consulting projects with the number of units and economic cooperation as
quantitative indicators; Meanwhile we shall pay attention to the proportion of students entrepreneurial
practice, advanced and innovation of entrepreneurial projects, quality and quantity of the student’s
patents, visiting of website, the quality of the assignments, the analysis and response capability of
students.

Thirdly, the feasibility of evaluation. Some of these metrics can be directly obtained such as the
number of patents, site visits; Some can be result from evaluate such as the ability test which. All of
them need the appropriate human and material resources to improve the evaluation system. It is better
for us have pre-program such as employing a number of business mentors or arranging teachers work in companies, meanwhile we should consider about the cost-effective.

In the end, the stability of evaluation. There are different requirements for different stages in different environments because of the entrepreneurial process changing forever. However, the thinking method and analytical tools is stable in terms of innovation and entrepreneurship in a given period. The evaluation indicators should be set according to the common environment. Both the ratio of student entrepreneur and the amount of student entrepreneur are indicators. Relatively, the former is more stability and comparability. The timeliness should be considered because some programs are effective in a short term but not for long-term.

7. Conclusions

Here we mainly use the Extenics method to analyze and explain some common problems for entrepreneurship education in detail. But the choices and decisions depend on the circumstances and goals. Extenics is a methodology which provides a very effective analytical tools and methods to deal with the issue of innovation and contradictions. There are more theoretical resources will be developed to deal with more practical problems in a subsequent research.

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