

A National Programme for Dissemination of The Discipline `New Venture Creation` In Brazilian Universities: One Proposed Methodology.

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Abstract

The aim of this text is to relate how the discipline `New venture creation in software` was conceived in undergraduate computer science courses, to describe the pilot study where it was set up in UFMG, and the inbuilt strategies of the programme for its dissemination over the whole of Brazil. The importance of this report is due to results achieved in three areas: in the pilot study in the discipline in UFMG¹, when 17 companies² were set up after the discipline was offered over 3 semesters; in the fact that it has been included in the Reference Curriculum of SBC³; in the programme created for its dissemination, the Softstart project, which in its first edition promoted the implantation of the discipline in 45 Brazilian major universities⁴, with the aim for 1997 of expanding this to a total of 50 institutions. In this text, the author emphasizes the pedagogical methodology of the discipline, this being understood as the catalyst for co-operation between the university and the `support systems` (the forces of society), the only union capable of making viable a system which can stimulate the creation of technology- based companies.

I - Motivating Factors In Creating The Discipline.

Internal motivation from the SoftEx 2000 Programme⁵

To attain its main goal in increasing the export of Brazilian software, the SoftEx 2000 programme, of the CNPq (The National Council of Technological and Scientific Development), develops innumerable activities aimed at strengthening the national ability to create and export

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² The list of companies created through the discipline is in Annex 1

³ SBC - Brazilian Computer Society, most important scientific computer society in Brazil.

⁴ One call was sent out in May 96 to stimulate the discipline, and another in June 96 for the participation in the Workshop to train instructors. There will be another call in 1997 to stimulate the discipline, and two calls to the Workshop. The institutions which will implant them can be seen in item VIII.

⁵ SoftEx 2000 is a national programme for stimulating the export of software, which aims that Brazil will dominate 1% of the world software market by the year 2000, reaching the value of US\$ 2 billion annually.

software. Thus, one of its aims is to increase the number of companies in the sector, to form a critical mass with the volume and technical ability necessary to confront international competition. Among the principal conditions necessary for the success of a software industry, it is widely held that Brazil has already achieved the main one, that is, a sufficient number of people with high level technical knowledge. In fact, the technical training of Brazilian professionals, mainly those graduated in Computer Science from universities, is equivalent to that in first world countries, and therefore they have the ability to develop software of an international standard. On the other hand, the natural creativity of the Brazilian, improved and refined by constant exposure to the violent transformations of our society, provide a comparative advantage over other areas. In this way, the university student would only lack stimulus and support in order to set up his own business. Thus was born, within the industrial policy created by SoftEx 2000, an innovative proposal for the curriculum of university teaching of computer studies: the introduction of a discipline of creating companies.

Other motivating factors

Changes in work relations

The most marked changes on the job market in the last few decades have been identified as the lowering of the level of jobs and the change in the concept itself of employability. It is estimated that, in the next few years, a large part of the work-force in the industry will be working part-time, that is, if the present direct relation between the rise in productivity of companies and the laying off of staff continues. Countries such as the USA and France showed a rise in levels of unemployment between 1990 and 1993, levels which were extremely high in Great Britain (74.6%) and Spain (30.3%). These countries suffered a pronounced slump, both in rates of growth in public spending, and rates of sales of private companies⁶. In the USA, in 1993, the proportion of permanent workers compared to temporary workers dismissed was 4 to 1, more than during the periods of 1975 and 1982, also considered as recession. Furthermore, the temporary work-force, in its turn, has increased by 60% since 1980⁷. The economic changes are due to the restructuring of the worldwide means of organizing production, represented by the breakdown of the `welfare state` and the predominance of neo-liberalism, and by both technological innovations (mainly micro-electronic technology) and organizational innovations (shortening of the command chains, organizational downsizing and decentralization of decision-making). One further change is sub-contracting, which, as well as accounting for tasks peripheral to the production, has also now expanded to the central functions of companies (take the presence of suppliers of components of automobile production lines, for example), and contributes to changes in work relations. In the companies' search for a level of productivity which will allow them to enter and survive in a highly competitive market, the concept of a `job` is beginning to disassociate itself from the notion of a `position`, changing from something fixed, belonging to the company, to a set of activities which can be developed by people with no contract tie to the company. Fixed jobs, if this tendency does indeed persist, will give way to the contracting of services linked to a specific necessity of production and/or work. The countries of the third world, even though their social-economic situation is different from that of the central countries, are included in this general picture of change (take Brazil, where, between 1990 and 1993, unemployment increased by 25.6% at a time when participation in the formal sector of the

⁶ GARCIA, Fernando Coutinho. Neoliberalismo, Controle de Qualidade Total e Reengenharia: Instrumentos para o Desemprego e a Miséria Social. In: Encontro Nacional dos Programas de Pós Graduação em Administração, 19, 1995, Joao Pessoa. Revista Brasileira de Administração Contemporânea. Rio de Janeiro: ANPAD, 1995. p.29 - 48

⁷ Fortune, 12th June 1993, p.46-47

economy was reduced by 3.6%). Teaching in the area of entrepreneurship thus takes on such a fundamental role that led Timmons to state the following: `Summing up, we are in the middle of what could be called a `Silent Revolution` ... (the global effort towards entrepreneurship). It is totally possible that it will influence the 21st century as much as, or even more than, the Industrial Revolution influenced the 20th century.`

The student's education

The introduction of disciplines to create companies as part of university teaching seems revolutionary when one adds to the traditional vocational training of employees and academics that of entrepreneurship, but this is suitable for the work relations resulting from the restructuring of the world economy at the end of this century. Now that this new discipline has been taught, it has proved to have achieved other aims too, mainly in its application to undergraduate courses in the field of exact sciences. Research in the classroom has demonstrated, surprisingly, that the students consider the discipline fundamental, even for those who do not intend to open companies, and whose vocation is, for example, definitely academic. These results have led to investigations and analyses of the training of students in the areas of exact sciences, in the face of market demands. In fact, the conceptual reality worked on in the classroom is not the same as its application in the non-theoretical world. Surveys done together with entrepreneurs have shown that purely technological knowledge in the area of software may represent between 5 and 15% of the global solution. This means that the knowledge acquired on Computer Science courses in Brazil (some of these of the same level as their equivalents in the first world) represents a minimal percentage of the problems which will be faced with creating, developing and selling a product. This conclusion - confirmed to the extreme, mainly in the area of Computer Studies, in which there are frequent examples of technologically superior products failing, beside the almost routine commercial success of software with technical performance inferior to that of its competitors - inevitably leads to reflections about the curricular programmes in the area of Computer Science. The concepts covered are those which govern the reality of work relations: emotion (in companies the emotional quotient substitutes the intelligence quotient), the emphasis on ego, living with ambiguity and uncertainty, the contextual application of knowledge and the development of the visionary process. The discipline also deals with factors of a cultural nature, which determine the degree of entrepreneurship of a region or a community. There are also many discussions and examinations of the values which govern popular, intuitive perception of the company in Brazil, a context in which ethical principles have fundamental relevance. The discipline prioritizes behaviour (the person) over knowledge, as an end in itself. In this way, the final objective of the discipline is not instrumental. The aim is not to pass on knowledge, but the endeavor to develop the necessary personal characteristics for a successful entrepreneur. It is not the creation of successful companies which is aimed at, but the training of successful entrepreneurs. To this end, the occasional failure of a company is seen firstly as a result to learn from. Being enterprising, that is, identifying and constantly making the most of opportunities, is part of the routine of the entrepreneur.

Although still in a pre-paradigm phase as regards science, entrepreneurship already offers concepts which permit the identification of conditions of success in the creation and administration of business. Thus the teaching in this area is based on the analysis of some basic, fundamentally behavioural characteristics, which can be found in the successful entrepreneur. The emphasis on the construction of a profile of an entrepreneur (a profile which leads to an ability to pro-actively acquire technical knowledge) and not only on the acquisition of a stock of

knowledge, is illustrated in research reported on by Timmons⁸, in which risk capitalists, directed to technologically based companies, when choosing where to invest, give absolute priority to the entrepreneur, relegating to a secondary level the definition of the product and its viability on the market, as `if one has a good team, one can change the product`.

II - The Central Questions In University Teaching Of Entrepreneurship

Fundamental questions, some forming true paradoxes, rise as a challenge to a methodological proposal. The first question deals with investigations into how, and under what conditions the teaching in this area can be examined? What should be taught? Is it possible to teach someone to become an entrepreneur? How can this be done? If there is such a thing as a born entrepreneur, is this the result of favourable genes? These are investigations similar to those done in relation to the manager, 50 years ago. One conclusion derived from the research is that it is possible to learn to be an entrepreneur, but certainly not under the same conditions as those proposed by traditional education.

A second question emerges from the preceding discussion, and can be stated as follows: is the university capable of teaching entrepreneurship, considering its traditional teaching methods, the unstructured training period in this branch of knowledge, and taking into consideration the fact that entrepreneurship in the area of business is not practical in our university campuses.

A third central question refers to the profile of the teacher of this discipline. What is his role in a pedagogical programme where behaviour is the main aim, and in which knowledge is not passed on by the master, but generated by the students themselves, in a process of elaboration of their company vision, in self-evaluation of their behaviour, in the construction of their own methods of learning and in the pro-active form of acting? What is the role of the traditional teacher in his work of teaching entrepreneurship, an area in which relations with the natural environment of the entrepreneur make up the essential source of knowledge/learning? In this area, contact between the student and the world outside the university needs to be intense and with no intermediaries. The true `academic` atmosphere of the student-entrepreneur is the market, where productive, economic, social and political forces are joined. In this context, the stock of knowledge that the entrepreneur needs is ever-changing and highly dependent on circumstances. Knowledge is confused with the ability to understand the behaviour of the competition on the market, made up of sets of people, whose actions provoke its constant transformation, which, in its turn, generates the target which the entrepreneur tirelessly chases after: opportunity. How are we to understand and approach this reversal of the academic campus? How are we to overcome the paradox of university teaching of knowledge which it does not completely understand?⁹ The model of university teaching aimed at producing employees of large companies has fulfilled its mission. It has dried up, however, in the face of

⁸ Five important factors, according to risk capitalists, according to Timmons (1990)

- 1 - The lead entrepreneur and the quality of the team
- 2 - The lead entrepreneur and the quality of the team
- 3 - The lead entrepreneur and the quality of the team
- 4 - The lead entrepreneur and the quality of the team
- 5 - Market potential

⁹ It is estimated that, to pass beyond its present pre-paradigmatic phase and establish its own patterns, entrepreneurship, even though it is one of the most effervescent academic areas, still has various decades to go. Filion (1991)

the profound alterations in the relations between work and production. An emerging tendency, entrepreneurship requires new teaching methods, different roles for the teacher, alternative forms of interaction with the students.

Some researchers think it possible to learn to be an entrepreneur. Others think it possible to teach this. The methodology proposed for the discipline considers the problem of pragmatic form. While such questions are discussed among the academics, there is, in the whole world, a fever of creating companies and teaching entrepreneurship¹⁰. If the university, in its objectives and mission, does not venture into the area of business, this discipline will respond by inviting businessmen to take on the role of master, side by side with the professor. If the essential elements for an entrepreneur are his ability to create, to define starting from the undefined, to constantly learn from action, what should be emphasized on the course are the behavioural characteristics of creativity, of lateral thinking, of how the two sides of the brain work together, of pro-active self-knowledge, of learning how to learn. If what is important in this field is that it is better to be than to know, then the roles of teachers and students are reversed, as the flux of knowledge is reversed. The students are generating agents of individualized knowledge, of the adoption of suitable behaviour to realize their vision. The plans for the training of the entrepreneur are based more on motivational factors and behavioural abilities than on purely instrumental content. This characteristic will provoke, as will be seen later, radical changes in the educational approach, both in terms of the professional orientation, as our universities are aiming more at producing employees for large companies, and also in respect to the teaching methodology itself, as in the field of creating companies, the aim is not the transference of knowledge, the generation of knowledge by the performer in the process, the student. However, the roles of teacher and student are transformed: the former is only the instigating agent of the process of self-learning by the student, whose job is to develop behavioural abilities inspired by his own existential-psychological baggage (training). The specific, instrumental knowledge is a consequence of a way of being, of an attitude in the face of the aims of creating a business. The company is a projection and extension of the ego itself.

As for the teaching of entrepreneurship, the question is solved, once more, in a pragmatic way. Successful experiments, at all school levels (including first grade)¹¹ have been done over the whole world. It is known that fundamental factors for the development of the entrepreneurial spirit, depend, among other things, on such elements as motivation for self-realization, initiative and persistency, energy, leadership qualities, ability to develop a vision¹² (the idea of a company), supported by a network of personal relations.

¹⁰ In the USA, more than 400 universities were offering courses in setting up companies in 1988, as against 50 in 1975. Approximately 1.3 million new companies, with one or more people, were set up in 1988 in the USA. In the year 2000, specialists estimate that 30 million companies will exist in the USA, as against the 18 million existing in 1988. Virtually all the new evident jobs created in the USA come from these new expanding companies, not from the great companies which already exist. It was discovered that, between 1984 and 1987, the first 5% of all the new companies accounted for 87% of all the new jobs; the first 10% created 96%; and the first 15% created 98%. Also, between 1980 and 1987, the 500 largest companies of Fortune eliminated 3.1 million net employees from their payroll. At the same time, companies which do not belong to the Fortune list, predominantly small, new firms, created 17 million new jobs, and the public sector contributed with 1.3 million. Since the Second World War, 50% of all the innovations, and 95% of all radical innovations have come from small, new firms. These include, for example, the micro-computer, the pace-maker, overnight express packages, quick oil change, fast food, the oral contraceptive, the X-ray machine, etc.

¹¹ VARELA, R, Lozano, M., `Espiritu empresarial en la educacion primaria; la experiencia del C.D.E.E.` , V Congresso Latinoamericano sobre espiritu empresarial, Santiago do Chile, 1991

¹² Fillion, L.Jacques, `Visions et relations`, clefs du succes de l'entrepreneur`. Les editions de l'entrepreneur, Montreal, Canada, 1991

III - The Context of Entrepreneurship

Other motivating factors for the teaching of entrepreneurship, aside from the inductive nature aimed at by the SoftEx 2000 programme, justify the introduction of university teaching in this area on a large scale. Among them is the high infant mortality rate among emerging companies. These figures, checked worldwide, motivated Timmons¹³ to formulate the *bankruptcy rule*. The teaching would be aimed at reducing the level of inconsistency and inadequacy in the setting up of companies. It is important that the pre-entrepreneur understands that the idea is not the same as the opportunity, and that the latter should fit to the personal characteristics of the entrepreneur.

Another important motivating factor for teaching in the area of entrepreneurship is the development of the notion of the mechanisms which govern the market, and the relations between technological excellence and how a product and/or service is accepted by the consumers. Among students and professionals of computer studies, who have been introduced to the work market, it is common to see emphasis put on the technical aspects, and the other variables which determine the success of the product/service relegated to second place. It is also common, due to its infinite spectrum of applications, to take as computer businesses activities which only use computers as a means. These distortions often lead the business to failure. However, one of the most frequent errors in the area of software is doubtless the supposition that having developed a product that is better than the competition, success is guaranteed.

IV - The Project of The Discipline: An Experience of Interaction Between The Company, The University and The Support Systems

One of the great acquisitions of the SoftEx 2000 programme has been the process itself which was gone through to make its objectives viable, that is, the effective co-operation of the forces of society. The simple induction to this practice, which is still in its beginning stages in Brazil, provides a result with profound repercussions on industrial policy in the sector, and on the relationships between public power, the companies and the university. It must be remembered that the operationalization of SoftEx 2000 is done through local centres (20 at present), located in cities which have a suitable profile and potential for attaining the aims of the programme. To create a local centre, a formal partnership is required among the city and state councils, the businessmen and a university working in the area, as well as the participation of other support systems, such as SEBRAE¹⁴, Assespro¹⁵, etc. Only this joining of forces of society can offer any real support for the job of stimulating and supporting the setting up of companies. In its essence, entrepreneurship relates to growth and economic development, given the characteristics of income distribution of small companies.

The discipline `New venture creation in software` started off, however, because of an influence external to the university. The SoftEx 2000 Programme, through its local centre in Belo Horizonte, FUMSOFT, contracted the author of this text to develop the contents of this

¹³ Bankruptcy rates of new companies in the USA: (99% of bankruptcies were of small companies.) At the end of the first year: 40% bankrupt; at the end of the second year, 60%; at the end of the third, 90%. Timmons J., `New Venture Creation`, Irwin, 1991

¹⁴ SEBRAE is a national institution for supporting small and medium enterprises.

¹⁵ Assespro is a national association of software companies.

discipline, with the aim of establishing it on undergraduate courses in computer studies. The methodology of development of the programme of the discipline included collecting suggestions from managers of various SoftEx system centres. The contributions came in a variety of forms: meetings with FUMSOFT managers, discussions on recommendations from businessmen from other states, telephone calls and faxes, and the pioneer experience done in UFRS, where the discipline has already been taught for some years. The theoretical basis for formulating the contents of the discipline was mainly arrived at from results of research done by Professor Louis Jacques Filion, of the University of Montreal, Quebec, Canada.

V - The Proposed Methodology for Teaching Entrepreneurship at University

The biggest challenge in the preparation of the methodological proposal for the discipline was the need for putting forward solutions to the fundamental questions cited above, that is, to summarize:

- How can
- How can
- How can the spread of the discipline be controlled with teachers with such different academic

The methodology will now be presented in two parts: of the subject matter to be taught, and the methodological solutions themselves.

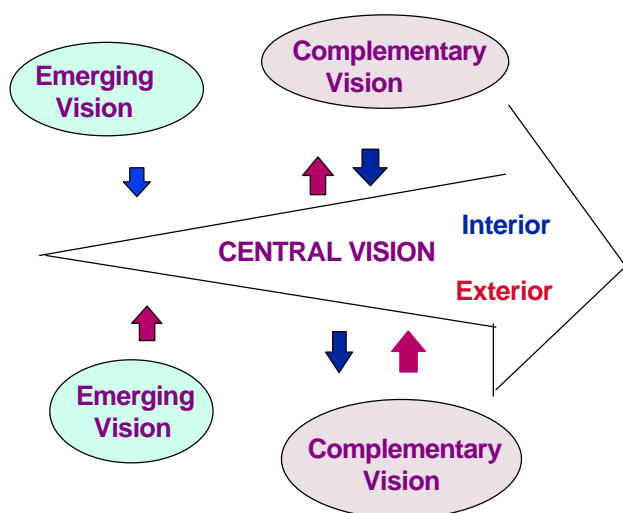
Motivation to be an entrepreneur

entrepreneurship, making them want to set up their own company or generate their own job. This discipline is finished. In fact, this would be a surprising result. What is intended is that the employment, and that he pursues this goal throughout his professional development. When he or his/her vision and perception, and making the most of an opportunity. There are entrepreneurs baggage (in terms of technical and market knowledge and making contacts), in order to open discipline presuppose a time will try to deal with is how far the professional guiding of the ex-student had been influenced by one's own company.

The visionary process

According to Filion, the entrepreneur is seen as someone who imagines, develops and realizes visions¹⁶. The development of a vision is one of the fundamental aspects of the course. The student is expected to develop his own visionary process, the result of which is the company, and exercise his capacity to project into the future by means of visionary exercises¹⁷.

Three Categories of Vision



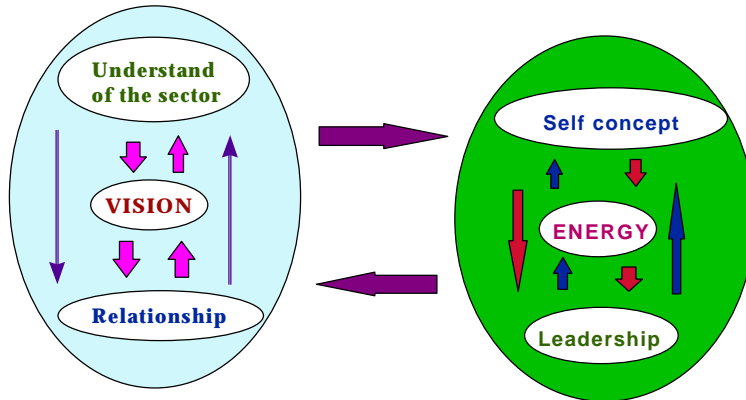
The four elements described by Filion, which support and interact dynamically among themselves, are worked on in exercises in the classroom. These make up the base elements for the modeling process, which consists in capturing, in a structured form, the experiences of entrepreneurs narrated in the classroom.

¹⁶ According to Filion, the `vision is an idea, often a set of ideas (images) which want to be realized (projected in the future)`. Filion mentions three categories of vision. The emerging (initial), the central, and the complementary. Emergent visions are formed around ideas and concepts of products and services imagined by the entrepreneur before starting up a company. The central vision is the result of a single, or a combination of emerging visions. The exterior central vision refers to the place the products/services occupy in the market, and the interior central vision is the type of organization necessary to attain the goals. The complementary visions are business visions aimed at supporting the central vision.

The vision is sustained by four elements. The principal support factor in both creation and development of the vision is, apparently, the systems of relationships of the entrepreneur. The other factors that influence the process of formation of vision are : leadership qualities, energy and self-image.

¹⁷ Idem

The visionary process



The behaviour of an entrepreneur

The main behavioural characteristics of entrepreneurs, described in research¹⁸, are presented and discussed with students. This module, together with the visionary process, which it complements, makes up the theoretical-conceptual framework of the course. As will be seen further on, the profile of the entrepreneur will be compared with the evidence from real experience, both from statements and interviews with and mediation from the `sponsor`. The student also has to undergo self-evaluation tests¹⁹, to gauge his own entrepreneur behaviour. The required abilities are emphasized in terms of what the student must know: why (attitudes, motivation, values), how (knowledge), who (contacts), when (opportunity) and what (business).

Creativity

Creativity is made up of the cycle of discovery, invention, innovation, improvement and the process of change²⁰. Creativity is fundamental in identifying new paradigms which could present a business opportunity. Creativity exercises are presented, and the students invited to follow the Oech approach²¹ of breaking mental blocks which inhibit creativity.

Ability to identify, analyze and make the most of opportunities

It must be remembered that ideas are not necessarily opportunities, even though opportunities are always the fruit of an idea. There are many more ideas than good business opportunities. One of the characteristics of opportunity is that it should suit the profile and characteristics of the entrepreneur. In this way, one idea could be an excellent opportunity for one particular entrepreneur, whereas for another, for various reasons, (competence, aptitude, availability, vocation, interest, monetary resources etc.) it could mean no business at all. New opportunities generally arise from changes in the economy, in the habits and profile of the

¹⁸ According to Timmons, 1978, the characteristics of entrepreneurs are: 1 - Initiative and energy, 2 - Self confidence, 3 - Long term approach, 4 - Money as a means of performance, 5 - Tenacity, 6 - Goal-fixing, 7 - Moderate risks, 8 - Positive attitude to failure, 9 - Use of feedback on one's behaviour, 10 - Initiative, 11 - Knowing how to obtain and use resources, 12- Non acceptance of imposed rules, 13 - Ability to internalize, 14 - Tolerance of ambiguity and uncertainty.

¹⁹ The test used was developed by Joseph Mancuso, president of the `Center for Entrepreneurial Management`, in New York, after analyzing questionnaires handed out to 2,500 members of this non-profit making organization, who had started up their own company.

²⁰ P.A.Schumann, Jr., Austin Creativity: `Key to the future`, Technical Symposium, 1982

²¹ Roger von Oech, `Um Toc na Cuca`, Livraria Cultura Editora Ltda

population, advances in technology, circumstances and in inconsistencies in the market. The opportunity is translated into a product or service which adds value to the consumer. It must be attractive, and have a life-cycle which permits a satisfactory return. The best idea does not always make the critical difference to success²².

The search for, and administration of, resources : the `Business Plan`

The `Business Plan` (BP) is the work of the course. It is an exercise in planning the setting up of a company. In order to be valid, it must be developed along realistic lines: a well-made BP should be ready to be used, to be transformed into a `company in incubation`, to sensitize partners and investors. In the preparation of his Plan, the entrepreneur could discover that the business would not work, that there are judicial or legal barriers, that the risks are uncontrollable, or that the income it would generate would be irregular, or insufficient to guarantee the survival of the company, or the new business. There is more than one way of arriving at the same goal, and more than one solution for different problems. It is better to make a choice that guarantees long-term success than to choose an immediate solution, which looks superficially successful. The **Business Plan** could also lead to the conclusion that the business should be postponed or put off, if it presents a high probability of failure. The **Business Plan** contains the principal managerial questions to be considered when setting up a business.

b - The methodological solutions

Enterprise way

The teaching methodology used in this discipline has been inspired by the learning processes used by the entrepreneur in his company. To teach effectively in the area of entrepreneurship, it is essential that the teaching be contextualized. The student pre-entrepreneur should be put through situations similar to those which he will face in practice. The learning process of the entrepreneur, in a small company, is essentially based on actions. According to Allan Gibb, (1992) he learns in the following way:

- Solving problems
- Working under pressure
- Interacting with partners or other people
- Through exchanges with the environment
- Making the most of opportunities
- Copying other entrepreneurs
- From his own errors: this is an area in which errors (small ones) can be made, as there is freedom
- From feedback from clients

²² Examples (Timmons, 1990)

- UNIVAC had more technology than IBM, but was not able to take up the emerging opportunities in the computer branch
- Between 1967 and 1968, the investor Fred Adler received more than 50 Business Projects from entrepreneurs who wanted to set up minicomputer companies. Many companies had better ideas and more advanced technology than the chosen one, DATA GENERAL'S, which had a greater market vision. In 1988, DG made US\$ 1.3 million.
- There are better spreadsheets than those of Lotus. However, to launch theirs, US\$5 million or more was needed, to attract attention and maintain distribution.
- Not always does being first on the market guarantee one's position, as in the case of Adam Osborn (creator of the first portable computer), who lost out to Compac and Visicalc (first spreadsheet produced by Lotus).

The course proposes to make the students frequently leave the confines of the university to understand how the market works, and, when they are in the classroom, submit them to work processes similar to those developed by entrepreneurs. This methodology is called *enterprise way*. The theory is preferably approached by its application to reality, favouring the characteristics of the market and the local economy. Testimonies from businessmen are indispensable. It is from these that the students will learn different experiences of setting up companies. The process of `modeling` is an instrument, which was created to analyze and assimilate the experiences others relate. The student should be led to a high degree of `explaining` during the course, in order to prepare him for negotiations. In this way, it is important that the roles of teacher and student should be intentionally reversed: the student is always called on to pass on (teach) to the whole group the knowledge that he himself has generated: his idea of a company, the product definition, his vision of the market, his business plan. An impartial, objective critical capacity is stimulated in the students, who change into evaluators of colleagues. Thus the first `test` of the student's company and product will be in the classroom: his colleagues take on the roles of clients, suppliers, financiers and partners.

Pedagogical resources often used in *enterprise way*:

- Seminars and group discussions
- Critical revisions
- Student presentations
- Teaching and advice-giving in pairs
- Solving real problems
- Debates
- Case-studies
- Analysis of critical incidents
- Role images and self-identification
- Project-based learning
- Counseling approach
- Experimental apprenticeship
- Personal and pair evaluation
- Investigation
- Brainstorming

Contents of the training

The contents of the courses in the area of entrepreneurship are defined according to the identification of the tasks faced by the entrepreneur in each critical phase of the setting up, developing and consolidation of a company. Training content is proposed according to the needs of each stage. A classification of the phases of the process of setting up companies can be shown as follows²³:

- a) Beginning of the motivation to set up one's own company
- b) Development of the idea. Visionary process
- c) Validation of the idea
- d) Defining the operations scale and identifying the necessary resources
- e) Complete formatting of the enterprise to serve as an instrument for internal and external negotiation (Business Plan)

²³ (22) Gibb (1991)

- f) Beginning of operations
- g) Consolidation, survival

The programme presented here covers the following phases mentioned above: b) from the first idea to a valid idea; c) from a valid idea to operations scale and identification of resources; d) from the scale to the Business Plan and negotiations; e) from negotiations to birth. Phases a), from motivation to the initial idea, and g), from birth to survival, require specific training programmes which are not covered in this present work. The content of phase a) has more to do with prospecting for ideas, while the content of f) is more instrumental, with an emphasis on administrative and managerial techniques. The proposed programme intentionally avoids the traditional form of teaching in the area of business administration. The technical contents relating to marketing, finance, organization and human relations are studied under a different lens. The basis for the discipline rests on the following:

- a) The activity of *setting up a company* is holistic and integrated, that is, it involves the business *and* the entrepreneur completely, and not in fragmented parts. It is fundamentally a creative human act.
- b) To quote Timmons (1990) once more, being an entrepreneur in the world of business presupposes the creation and construction of something of value out of practically nothing. That is, entrepreneurship is a process of creation, or making the most of an opportunity, and pursuing it in spite of controlled resources. It involves the defining, creating and distributing of effort and benefits to individuals, groups, organizations and society. It is rarely a means of getting rich quickly; rather the construction of long-term value and lasting cash flow.
- c) There is a tendency in courses such as these, to repeat, in an abridged form, the programme of a Bachelor of Business Administration course, which is unsuitable in both dimension and teaching methods. In fact, there is a great difference between training aiming at forming entrepreneurs, and that aimed at developing managers. Whereas `the training for an entrepreneur should enable that entrepreneur to imagine and identify visions, develop the ability to dream realistically`, the training for managers `emphasizes analytical abilities`. (Filion, Vision and Relations: Metamodels, 1990)
- d) A characteristic trait of an entrepreneur, and researchers agree on this aspect, is his ability to develop his own learning methods. It is this ability that gives his development its dynamic quality, that is, makes him able to learn while developing his plans, together with the plans, acquiring the ability to intervene in real time, and a well-developed power of anticipation and foresight. The teaching must be contextualized, giving emphasis to learning resulting from action.
- e) The main work of the course, (as well as the others), the `**Business Plan**` is proposed in this light. Any difficulties which may perhaps be met with in its development should be overcome with the use of initiative and ability to find answers to investigations in a pro-active way. It is an attempt to simulate the form of perception and apprehension used by the entrepreneur in real life.

Testimonies from entrepreneurs

Entrepreneurs should be asked to appear in the classroom to talk about their experience in the area of business, mainly covering the personal aspects of their involvement. These testimonies from entrepreneurs are thought very important, as their familiarity with the area will be one of the most valuable pedagogical components. It is essential that the entrepreneur begin by getting to know what those who have been successful, and also those who have failed, have passed through. The testimonies are indispensable to the training and/or the enriching of the

vision of the student as to the profile of the entrepreneur, and what he understands by entrepreneurship. An entrepreneur should be chosen who has set up his own business, as the subject matter to be taught is just that formation of the vision, the idea of the company, of the first product, the first client, market coverage, of crossing the line between not being an entrepreneur to creating one's own business. It is very important to talk about the effects on one's private life: new personal relations, the reaction of the nuclear family, uncertain income. The interdependent relationships with both internal and external environments should be emphasized: with co-workers, employees, clients, suppliers, competitors and partners. To enable these testimonies to be taken in and perceived in a structured way, in that a common structure allows for analysis and comparison, a specific methodology for this discipline has been created. This methodology uses two tools:

- a *script* for the person making the testimony, which suggests a series of information connected with the course. Facts about the **person and what he has done**, in contrast to the traditional coverage of the teaching of administration, are emphasized, facts which look at **what is done and how it is done**.
- a *model* guide for the student to extract what is necessary from the testimonies in a structured way. The student puts himself in the position of the entrepreneur and tries to absorb the essence of behaviours, attitudes and practices which could be incorporated into his entrepreneurial way of working.

Practice has shown that testimonies about entrepreneurial failures are extremely useful, due to the possibility of identifying the objective causes which caused the failure.

Judging the `Business Plan`: the Jury

After the end of the course, a **Jury** is created, made up of representative people from the world of business, to evaluate the best `companies`. The Jury will evaluate the final piece of work of the discipline, the complete planning of a company, done through a **Business Plan**. The objective of the **Jury** is to integrate the new entrepreneur into the business community. The prizes given to the companies are also stimulating them to open their own business. The judgement should preferably prioritize projects which seem more immediately viable. Other evaluation categories can be created too. It must be checked that prizes are given to legally constituted companies (and not individual people), and these should directly contribute to the setting up of the business. It is important that the teacher of the discipline, and the institution to which he belongs, research different ways of awarding prizes to the best pieces of work²⁴.

²⁴ One example of prize-giving which has had excellent results is the participation in FENASOFT and INFORUSO (fair in Minas Gerais), awarded to students of the Federal University of Minas Gerais by SEBRAE-MINAS and SUCESU-MG, respectively. The four first positions win a stand at the fairs, and are motivated to speed up the development of their products. The calendar, in the case of UFMG is the following: the Jury sits once a year, in December. The participation in the fairs has the following time-scale: INFORUSO is in May, and FENASOFT is in July of the following year. Another important prize is that of the Development Bank of Minas Gerais, BDMG, which offers financial resources for starting up the company placed first, according to the Jury. Significant representatives from the computer community and the university, as well as from all levels of government and councils should be invited onto the Jury. The aim of calling all these representatives is to involve the support systems in the setting up of new companies, and to obtain pledges to guarantee their consolidation and growth. The solemnity of the Jury is a moment of reflection and proposals on the initiatives for growth in the sector of software and services.

An example of the make up of the Jury at UFMG: National Co-ordinator of SoftEx 2000; Secretary of SEPIN; President of FUMSOFT (local centre for SoftEx); Minas Gerais and National President of ASSESSPRO; MG President of SUCESU; Head of Department of Computer Science; representative of the Municipal Chamber of Industry and Commerce; representative of the State Chamber of Science and Technology; Director of SEBRAE-

Experience has shown that awards given to companies produce a strong stimulus and good support for the new entrepreneur.

The 'Godfather'

It is important that the new entrepreneur's network of relations help him from the moment he starts planning his company. One step in this direction is the choice of a 'godfather', an experienced company, from which he can obtain advice and orientation. This does not necessarily have to be of the same line of interest; what is important is the experience in the field of setting up new companies. The 'godfather' will act as adviser during the whole process of conception and elaboration of the 'Business Plan'. He should analyze the Business Plan model together with the student, help him fill it in, and be the first person to examine it when it is ready. The student should present the BP to his godfather before presenting it in class. The choosing of the godfather is also the pre-entrepreneur's first step in forming his network of relationships. The 'godfather' should help the student in his pro-active process of learning, indicating sources and paths, so that he can look up answers and doubts at all levels, principally in the content relevant to financial and market planning of the new business. He should not act as an instant 'problem-solver', but as someone who helps in forming the correct questions.

The profile of the teacher-instructor

The instructor takes on the role of facilitator, organizing the process of learning. He is not acting as a specialist, precisely because there is no 'correct version'. He should not be in the position of a traditional teacher in the sense of being a source of all the knowledge connected with the discipline. He needs to be in close contact, not only with the academic side, but also with the business and political-economical environments (support systems), and to bring his network to the classroom. In this light, the functions of the instructor are seen mainly as a link between the student and the world of business. He must also have a multi-disciplinary vision, bringing together specialists into the discipline, and creating an atmosphere in which it is possible to learn through action, as the student has to learn in a pro-active way, like the entrepreneur. The teacher-student relationship is also viewed from another angle: the main actor, and the future businessman. The figure of the godfather, created by the methodology, serves to complement the role of the instructor.

VI - The Evaluation of the Discipline: A New Proposal.

The evaluation methods proposed for the discipline do not follow the usual pattern, as only part of it is done during the course. In fact, at the end of the discipline, the work is only just beginning. It is essential to accompany the student after he leaves university, and annually, over a period of five years, to know whether the discipline influenced his professional orientation. What will be measured is the ex-student's intention against the actual setting up of his own company, and the energy that he is willing to use in this direction. Through this mechanism, it will be possible, over time, to evaluate the results of the work, and to create means of feedback with a view to improvements and corrections. In this case it is fundamental that the institution accompany the steps of the student to becoming a professional. A systematic accompaniment of ex-students is extremely simple, is updated annually, and can be done by the administrative

section of the teaching department, academic centres, junior companies and study centres. The following are some indicators for the evaluation, and when each should be applied.

1. Survey of expectations from the model suggested in the discipline programme. This is done in the classroom, at the beginning of the discipline, and registers the hopes of the students regarding both his professional future and the discipline itself.
2. The usefulness of the discipline, the pedagogical process, the motivation of the students during the course and the degree of dedication and participation.
3. The degree of learning, from the model suggested in this manual. Done in the classroom. Behaviour. Does the behaviour change after the course? Can be done by questionnaires/interviews, asking oneself what one intends to do and what one's plans for the future are. Can be done four weeks after the course, and repeated annually.
4. New companies.
The stage at which your company is?

Done months after the course. Mechanism: entrepreneurs` club. Twice yearly updating.

- Global impacts. Income, survival, profits.

Done three years later. Twice yearly updating.

It should be noted that the evaluation becomes progressively more difficult.

A data base with informations of all students and new companies will be created to support the analyses required. It is expected that after 3 years the database will contain around 3,500 ex-students.

VI - The Test of the Discipline - Results of the UFMG Experiment

From its implementation at UFMG in the second semester of 1993, the discipline, lasting one year, has been offered three times up to 1995. In this period, 131 students have taken the discipline, and 17 companies (see Annex) have been opened, which started normal operations of production and sales. Of this total, 12 companies participated in FENASOFT²⁵, with a complete stand, through prizes offered by SEBRAE, resulting from their participation on the Jury. More than 50 ex-students of the discipline are directly involved in the process of entrepreneurship.

The evaluation of the discipline by the students.

The students' evaluation of the discipline, through questionnaires, confirm the necessity of starting up the discipline, and the suitability of the methodology adopted. Here follow some results.

Regarding the necessity of starting up the discipline:

- How important is it in the students' education, independent of their chosen career?

Useful only for those who want to be businessmen	24%
Useful for all students	76%
- What did students know about setting up companies before the discipline?

Little, or almost nothing	86%
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²⁵ FENASOFT is the biggest brazilian software fair

- Some 14%
- Was the discipline motivation for entrepreneurship?
 - Yes 95%
 - No 5%
- Should the discipline always be included in the curriculum of an undergraduate course?
 - The discipline should be permanently on offer 100%

Regarding the methodology:

- What level of knowledge was acquired in the area of entrepreneurship?
 - Very high 73%
 - Systematized knowledge already held 27%
- How important and valid were the classroom entrepreneurs' testimonies?
 - Very important 100%

How valid was the process of modeling for the analysis and assimilation of the entrepreneurs' testimonies?

- An effective process 90%
- Not very effective 10%
- What were the most positive characteristics of the course?
 - The methodology and atmosphere of the course 40%
 - The entrepreneurs' testimonies 38%
 - Self-learning 13%
 - Business plan 9%
- Problems with the discipline
 - Little time. Ideally it would run over two semesters 58%
 - Too many exercises 22%
 - Students who had not worked on an idea of a company before the beginning of the course found it difficult 20%

VIII - The National Programme of Implementation of the Discipline: The Softstart Project

After the test period of the discipline, the necessity was noted of adopting an effective, national policy to sensitize and stimulate its implementation in other undergraduate computer studies courses. With this objective, among others, the SoftStart Project was created at the beginning of 1996. The context showed that the discipline, created in 1993, had not yet been adopted by most universities, although it had been relatively widely publicized within the scope of SoftEx. Two basic necessities were noted, and these composed the strategic action plan of SoftStart:

- Sensitizing the universities to the necessity of the discipline, considering the new manifestations of the world economic profile, principally regarding change in work relations
- Setting up means of offering the discipline for institutions which desire to do this, principally regarding the methodology and training of teachers

In joint action with Project Genesis, which stimulates the creation of pre-incubators within the scope of undergraduate and masters courses, SoftStart sent out a call summoning computer studies teaching institutions (universities and technical courses) to conclusively adopt the discipline, offering the following incentives:

- Teaching material, made up of the teacher's manual, student's manual, exercise manual and supplementary texts;
- A budget of US\$ 900.00 for paying specialist guest speakers (mainly in the area of marketing, finance and company law)
- Air tickets and accommodation for 3 specialists from other states,
- A monitor, from the ITI-A grant
- A prize for the company the Jury decide is best, made up of air ticket and accommodation for the participation of a representative of the company at FENASOFT
- A budget of US\$ 2,000.00 for services and consumption
- Participation at the workshop `Training the trainers`, to be presented with the contents and methodology of the discipline

A specific invitation was made too to the `Training the trainers` workshop, aimed at the institutions which had not participated in the first call. Conditions for participation in the workshop include the agreement to implement the discipline in the institution.

Results of the Softstart Project Up To October 1996

Institutions which are implementing the discipline

1	CEFET - PR - Centro Fed. de Educação Tecnológica - Paraná - Pato Branco
2	CEFET - RJ - Centro Federal de Educação Tecnológica do Rio de Janeiro-RJ
3	Centro Educacional EIT de Taguatinga - DF (*)
4	COTUCA- Campinas - UNICAMP - SP
6	Faculdade de Ciências Gerenciais da UNA - Belo Horizonte-MG
7	Faculdades Integradas Newton Paiva - Belo Horizonte-MG
8	Fundação Estadual Norte Fluminense-RJ (*)
9	PUC - Campinas - Pontifícia Universidade Católica de Campinas-SP
10	PUC - Minas - Pontifícia Universidade Católica de Minas Gerais-MG (*)
11	PUC - Pontifícia Universidade Católica do Rio Grande do Sul-RS
12	PUC - Rio - Pontifícia Universidade Católica do Rio de Janeiro-RJ (*)
13	SENAC - Serviço Nacional de Aprendizagem Comercial São Paulo - SP
14	UFAL - Universidade Federal de Alagoas - AL
15	UFC - Universidade Federal do Ceará- CE
16	UFES - Universidade Federal do Espírito Santo - ES (*)
17	UFF - Universidade Federal Fluminense- RJ
18	UFGO - Universidade Federal de Goiás -GO (*)
19	UFJF - Universidade Federal de Juiz de Fora - MG (*)
20	UFMG - Universidade Federal de Minas Gerais - MG
21	UFMS - Universidade Federal de Mato Grosso do Sul - MS
22	UFOP - Universidade Federal de Ouro Preto - MG
23	UFPA - Universidade Federal do Pará - PA
24	UFPB - Universidade Federal da Paraíba - PB (*)
25	UFPE - Universidade Federal de Pernambuco - PE (*)
26	UFPR - Universidade Federal do Paraná - PR
27	UFRJ - Universidade Federal do Rio de Janeiro RJ
28	UFRN - Universidade Federal do Rio Grande do Norte - RN
29	UFRS - Universidade Federal do rio Grande do Sul - RS (*)
30	UFS - Universidade Federal de Sergipe - SE
31	UFSC - Universidade Federal de Santa Catarina - SC
32	UFSM - Universidade Federal de Santa Maria - RS
33	UFU - Universidade Federal de Uberlândia - MG
34	UFV - Universidade Federal de Viçosa - MG

35	UnB - Universidade Nacional de Brasília (*)
36	UNISINOS - Universidade do Vale do Rio dos Sinos - São Leopoldo RS
37	UNIVALI - Universidade do Vale do Itajaí - São José - SC
38	Universidade Católica de Pelotas - RS (*)
39	Universidade Estácio de Sá - RJ
40	Universidade Estadual de Londrina - PR (*)
41	Universidade Estadual de Maringá - PR (*)
42	Universidade Regional de Blumenau - SC (*)
43	URCAMP- Universidade da Região da Campanha - Bagé, RS
44	USP - São Carlos - Universidade de São Paulo em São Carlos - SP
45	USP - Universidade de São Paulo - Escola Politécnica - SP

(*) Institutions which received incentives for the discipline

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Annex 1

Companies created through the discipline in UFMG²⁶

	Name	Creation date	Partners	Product(s) / Service(s)	Area
1	I2 Software	Dec./93	2	Product: Termilite (Support) Service: access purveyor	Data Communication Internet
2	Easy Systems	Mar./94	6	Products: Easy Tour . Service: multimedia training	Software for tourism Educational software
3	Textual Informática	Apr./94	2	Product: Correto	Software for correction of texts
4	Fábrica de Software	May/94	2	Product: Bio-controle - Services: installation & logical planning of computer networks	Development of software Network consultancy
5	Sirius Informática	Apr./94	4	Product: Doctor Vision	Software for the medical area
6	WEB	Mar./95	5	Product: The Internet Disk	Internet
7	Futura Software	June/94	2	Product/service: Ponte Certa programme for access servers	Communication between access servers
8	Multimedia House	Feb./95	4	Product: Animated Alphabet	Educational software
9	EveryWare Multimedia	June/95	4	Product: Futemática Service: business multimedia	Business multimedia
10	Sinapse	Feb./95	3	Product: SPPA - Programming system for producing final touch	Optimization by modern heuristic methods
11	BMN Informática	Nov./94	3	Service: development of software to order	Providing service to order
12	Hard Point	Oct./95	3	Product: reselling IBM Service: network consultancy	Selling solutions (through equipment and consultancy)
13	QuickSoft Informática	Nov./95	2	Service: development of systems to order	Administrative Systems
14	Kinesis	Jan./96	4	Product: Body Manager	Physical education software
15	Quadra Informática	June/96	4	Product: Class Organizer	Auxiliary software for control of school hours
16	Doctor Sys	Mar./96	2	Product: Doctor Case	Tools and products for software developers
17	Expert Solutions	Apr./96	3	Produto: Expert Home Page	Internet

²⁶ From 1993 to 1995, 131 students. More than 50 ex-students involved with entrepreneurship