Sequential course of information tecnology: the role of higher education institutions in the students' expectations

Curso sequencial de tecnologia da informação: o papel da maioria das instituições na expectativa dos estudantes

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Abstract

The aim of this study is to show the role of Higher Education Institutions when they implement Information Tecnology Sequential Courses. Sequential courses were implemented with the objective of developing specific job skills in students. The methodology consists of the literature review about vocational education and data gathering of a Higher Education Institution. The statistical data from the Ministry of Education show that in 1999 there were 178 courses being offered all over Brazil, whereas at the end of 2002 there were 612, which shows that sequential courses have been well accepted by Brazilian students. Thus, this research considers that the main education elements involve the Information Technology Sequential Courses, the first one being implemented in this public university.
Keywords: Vocational education. Sequential courses. Information tecnology.

Resumo

O objetivo deste estudo é mostrar o papel da Instituição de Ensino Superior quando implementa Curso Seqüencial de Tecnologia da Informação. Os cursos seqüenciais foram implementados com o objetivo de desenvolver nos alunos habilidades específicas para o trabalho. A metodologia consiste na revisão bibliográfica junto ao MEC e coleta de dados junto a uma IES. Os dados do Ministério da Educação mostram que eram ofertados 178 cursos seqüenciais, em 1999, e 612, em 2002. Esses dados mostram que os cursos seqüenciais vêm sendo aceitos pelos estudantes brasileiros. Assim, esta pesquisa considera que os principais elementos de formação envolvem os cursos seqüenciais de tecnologia da informação, o primeiro implementado nesta universidade pública.
Palavras-chave: Educação profissional. Cursos seqüenciais. Tecnologia da informação.

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Introduction and justification

The national higher education system constitutes a referential landmark for the creation of educational policies designed for higher level education in Brazilian universities and in such a context of flexibility and diversity, the so-called sequential courses are included as a form of meeting a social demand. The objective of this assignment is to identify how sequential courses are included in tertiary education and whether they meet the students' expectations regarding progression in their professional careers.

For an educational system of the complexity and magnitude as there is in Brazil, and considering the need to increase the number of places in short term Sequential Courses, it can be said that both the existing programmes on offer as well as their dynamic and set of values are below the current demand for Occupational Studies and Complementary Studies.

Considering that the area of vocational education in Brazil is still in need of many different analytical studies, this study sets out to analyse the occupational studies in Information Technology at the Ponta Grossa State University, Paraná, Brazil. The State University of Ponta Grossa has institutional autonomy and public funding. It has 15 teachers and 40 students.

The occupational studies of Information Technology was chosen because it is impossible to imagine any company in which Information Technology is not important for its success. In the future information will be less an accessory and more a person's mental extension that acts as one of the main agents of information transfer and as an instrument of social transformation.

This research is divided into two phases. The first consists of an analysis of the guidance documents own sequential courses setting the procedures for the Brazilian Education system with emphasis on sequential courses in the context of the higher education system. The second phase is a document analysis of Information Tecnology of the University. The analysis of the guidance documents for the sequential course will take into consideration the technological and global influences affecting the process of tertiary education.

Brazilian higher education institution in a global technological context

The role of the university in relation to vocational training needs redefining in order to catch up with the technological transformations currently defining the exercise of contemporary vocational activities. Such redefinition must necessarily consider that academic formation and technological innovations happen at a different pace. In addition, it is no longer conceivable to work in an unchanged way throughout the whole period of one's vocational activity (BRASIL, 1999).

From the viewpoint of higher education and, in particular, with regard to vocational instruction, in a time of rapid, constant and deep changes, there arises a need for attentive consideration by the university. Normally, it seems that this process involves the adoption of a new approach, aiming to provide student concluding the ability to investigate and "learn how to learn". This objective requires control over the ways of producing course of study, thus creating the necessary conditions for a permanent process of continued education.

The first question posed to the university about redefining its role is what model or development strategy is the university adopting. Two extreme alternatives can be outlined here: 1) the concentrated model, seeking to bring the country up to an international standard by revitalising science and technology in certain sectors of society and forcibly accepting the exclusion of large social areas; and 2) the including model, advocating that development must be equalising, centred on the principle of citizenship as a universal asset, seeking to allow all citizens to take part in the achievements (BRASIL, 1999).

In either case, an important responsibility is imposed onto the contemporary university and its role in response to social demand. Furthermore, in the context of this new society of knowledge, the university encourages the democratic expansion of access to such knowledge. The university will be guided, at first, not only by technological challenges, but also by ethical questions regarding the wealth of human existence. Thus, it seems fundamental that the university, through all its actions, should seek a balance between the technical or scientific and humanistic vocations. In this intersection there seems to be a broad role for the institution as a promoter of culture.

Higher education level

The technical and humanistic aspects at the higher education level must necessarily assume that, behind what is purely technical, there are projects, power strategies and economic interests. The scientific community must take responsibility for the results of its work, thus building a space where ethical or political problems are not treated in the same way as those of a purely technical order.

Brazilian university autonomy

Academic freedom, as a principle, and university autonomy, as its counterpart in the institutional plan, both already constitute, in democratic societies, a paradigm, in the sense that they are seen as essential pre-requisites for the development of higher education. It is perceived that only the existence of a space where true freedom to think, criticise, create and propose alternatives to prevailing conceptions would allow the existence of enough dynamism for monitoring and representing a reality in constant transformation (BRASIL, 1999).

However, Brazilian society has built such an environment in higher education, where the regulatory power of the State has, in different ways, excessively prevailed over university autonomy. This option of imposing rules and regulations not only translates the authoritarian tradition of the Brazilian State but also reflects, in part, the technocratic and corporative vision of Brazilian society and the attempt, by the directing elite, to perpetuate the privileges of their social position. The social reality outlined from the viewpoint of the interests of unions or even by new market changes, has forcibly led to union regulation and its effects on the academic side, such as the adoption of a minimum curriculum and the accreditation of courses, as two of the most expressive examples of State imposed policies (BRASIL, 1999).

Existing within this framework, the Brazilian university begins to realise that, concerning higher level education, such academic freedom and autonomy are translated, in concrete terms, into the possibility of presenting its own solutions to the problems posed by higher education and not reproducing pre-determined formulas. These solutions include, necessarily, experimenting with alternative courses and curricula, concurrently with the introduction of new didactic and pedagogical strategies.

Institutional assessment for higher education level

The university has autonomy to decide its direction. Academic freedom, while desirable and indispensable, must have its counterpart in a continuous assessment process. Such assessment must include indicators that give value to the dynamics of transformation at the same time as giving priority and permanent consideration to social implications. (BRASIL, 1999). The question of assessment does not have easy or simplistic answers. Such difficulties have been ignored, by the governmental actions, which have relied on technocratic solutions, which have stressed quantitative measures to the detriment of less obvious approaches relating to quality.

There is no intention, here, to completely discard the possible positive impact of quantitative indices for the assessment process, but rather, to put them

in relative perspective, as long as the indispensable aspect of qualitative approaches is preserved and the process achieves success and legitimacy. So, the transforming role to be played by the university must be reaffirmed, pointing out the fact that quantitative measures are better adjusted to prevailing paradigms, by welcoming the innovative actions expected for a fertile relationship between educational processes and social reality.

Thus, without denying the importance of incorporating quantitative results, an adequate context must be built for the analysis and evaluation of the performance of educational institutions, when seeking to define dynamic standards of institutional quality.

Sequential course: a new modality of higher education system

Undergraduate courses must offer basic theoretical referential enabling multi-directional exchange as an instrument for the individual to perform creatively in unforeseen situations. Graduation must not be restricted to the perspective of a strict, specialised professionalism. It must also provide for the "long term acquisition of competences", the dominion of analytic methods, of multiple codes and languages, in sum, an intellectual qualification of a sufficiently broad and abstract nature, which constitutes a solid basis for the continuous and efficient acquisition of course of study (BRASIL, 1999).

Therefore, knowledge acquisition must go beyond the immediate application, encouraging the individual, in social and personal dimension, to create and respond to challenges. Instead of being only the user, he/she must be able to generate and perfect technologies. It becomes important, then, to develop the skill of constantly learning and re-creating, exercising a continuous process of education. In order to meet this expectation, undergraduate must cease to be only the space for transmission and acquisition of information and be transformed into the locus of sequential course for construction/production of knowledge, where the student is the active subject of the learning process.

Learning, as well as constantly re-creating, or "learning how to learn", as a pedagogical concept deriving from new challenges of contemporary society, are not exhausted in the field of introduction to science or methods of knowledge reproduction. All knowledge has a historical context, as well as all human activity takes place within a social context, thus meaning that the role of the university and the ethical contingency of the need to integrate everyone in the material and cultural heritage produced by the whole of society, are both situated among the highest interests of a technological society. The pedagogical process characterised as "learning how to learn", in this context, includes equally the role of university extension, the one which develops partnerships with social groups in the context of a society that integrates its citizens. This is education and research being articulated according to social demands.

The new type of higher education course – the one created by LDB – represents, by its strong links with the undergraduate structure, a new challenge in the perspective of articulation of the system as a whole. Through the flexibility and diversity of graduate formation and the institutionalisation of non-permanent courses, a possibility arises to expand the spaces and opportunities for meeting local demands and creating new didactic-pedagogical experiences, thus allowing qualitative gains to the structure of graduation (BRASIL, 1999).

The preservation of the relationship among various degrees of teaching means strengthening the understanding that there is a need to consider the system as a whole, thus avoiding the expense of energy in the application of isolated measures and weakening the dimension of teaching as a whole. Such a relationship enables the perception of how dynamic the education process really is, picturing it as non-linear and projecting it on the level of diversity, establishing dialogical relationships

where public spaces are expanded for negotiation of meanings, which are built separately within each different field of specific occupation.

Public and private higher education institutions

The sequential courses are offered by public and private higher education institutions. A higher education level project cannot be the prerogative of one of the segments making up the national system of higher education alone, whether they are privately or publicly funded. The fact is that the demands imposed by this pedagogic project founded on the association on teaching, research and extension are of great complexity: this is true both of the demands of teaching itself and those related to the physical infra-structure where the process takes place (BRASIL, 1999).

A higher education level project is articulated with accumulated historical experiences. If the Brazilian university is too young, it is the public segment, that is, the one funded by the State, which is, generally, the pioneer in the country, having become the quality reference for the rest of the national system.

If there are quality differences between the distinct public universities and if some have become national references, all of them are references of quality at the regional level. The privately funded universities were, in general, created very recently, and therefore do not constitute a homogeneous body which can serve as a reference for the national system as a whole. Between these two extremes there is the community university funded by local municipalities and this group presents a few important quality references for the articulation of the national system.

There is a need to keep and improve accredited institutions as a reference. In order to meet these demands, it is fundamental to achieve an improvement, both of the public and community sectors, if the aim is towards the concretisation of a national system of higher education. The national system of higher education requires general responsibility on the part of the State with relation to the whole, as well as demanding a specific responsibility, also of national proportion, with relation to the needs of financing the public segment and this constitutes a reference of quality, which is mandatory to the system as a whole.

Sequential course: expanding the current courses offered by higher education

The Sequential Courses offered by higher education, although tripled since the 1970's, are still insufficient to meet the new demand deriving from the great expansion in secondary education. (BRASIL, 1999) The most relevant fact about the expansion of higher education is that it happened, predominantly, in private education institutions, inverting the proportion of entrants between those and the public institutions. Currently, the higher education institutions that are government funded, teach just over a third of all higher-level students in the country. It is important to highlight that in the last decade, thanks to the increase in the number of vacancies offered by state funded higher education institutions, the proportion between the public and private segments has altered in favour of the public ones.

Elevating the Brazilian population's schooling standard, including the expansion of higher education, is a key strategy because it is needed in order to develop the national competence in science and technology – essential for development – as well as to ensure the upgrading of living standards of the population, thus reducing social and cultural exclusion. The urgency to increase the number of vacancies offered in higher education institutions in the next ten years, requires political will on the part of all agents involved in the process, investment in teacher training and material resources, as well as definition of programmes to make this process viable.

Assessment of higher education courses

The adoption of an assessment policy by the higher education institutions in the whole country demands a critical analysis of the assessment process currently operating only with quantitative indicators or with pre-conceived indicators, elaborated without any direct relation to the institution's objectives. Although it must be admitted that this type of reduction has had its merits in the history of evaluation, the very nature of higher education institutions demands that the evaluation process give light to the qualitative aspects on which is founded much of the life and work of the university. There must not be incompatibility, obviously, between the quantitative indicators and the qualitative assessment. What must be avoided is as much the reduction to the quantitative as the temptation of biasing (BRASIL, 1999). An important point to be observed, resulting from the adoption of a procedural evaluation, is concerned with the temporary nature, not definitive, both of the indicators of the evaluation process and of the values attributed to them.

The evaluation must not be reduced to a process of self-assessment. The higher education institutions need to be externally assessed. It is for higher education institutions to submit the data, results and analysis of the internal assessment process for external appreciation, so that society, through its appropriate agents, contributes both to the design of institutional projects as well as to the criticisms of their general production. The external assessment should be conducted by a commission of assessors outside the institution, consisting of members of both the academic and non-academic communities. This way a reduction of internal factors often devoted only to the creation of a favourable institutional public image will be ensured thus constructing a validation process bringing greater recognition to the work of the university

In this same context, it is understood as fundamental that the commissions and evaluation nuclei constituted in the higher education institutions make public the interpretations generated in the evaluation process, presenting with clarity its parameters, criteria and reference standards.

The principles of this evaluation should be: Globalised, that is, the evaluation should not be restricted to one or only a few activities. Comparatively, a principle that requires some standardisation of concepts and indicators. The subject respect to the identity of courses, a principle that relates to the need for the "pedagogic project". The course evaluation needs to be compatible with its characteristics and aim to obtain a quality gain from them. The evaluations should have both non-punitive and non-rewarding characters. They should also have voluntary adhesion, which requires the construction of a culture of evaluation so that the evaluating action becomes a routine exercise within the university's functions. Legitimacy, requiring the adoption of methodologies and construction of indicators capable to confer significance to the given information. On the other hand, the information constructed as a result of the evaluation process needs to be trustworthy to the point of being welcomed by the university community as relevant data. The process of creating sequential courses within the Brazilian universities should not be treated in a different way (BRASIL, 1999).

Evolution of the sequential course

Legal requirements

When Law No. 9.394 came into enforcement in December 1996, the Superior Chamber of Education of the National Council of Education initiated studies resulting in considerations of regulations regarding the new certificates and diplomas. One of these considerations, nº 670/97, dealt with Sequential Courses in higher education (BRASIL, 1997). It was approved in November 1997, submitted for agreement to the Minister of Education and Sports, and later was returned for re-examination by the Superior Chamber of Education.

Then, Consideration No. 672/98 was elaborated and expanded and explained the scope of sequential courses, basing itself largely on Parecer No. 670/97 (BRASIL, 1998). Afterwards, some councillors presented their views referring to the implementation of sequential courses, recommending the alteration of Parecer nº 672/98.

Sequential courses and higher education level

The Law of Directives and Basis for National Education – LDB, when it laid down the scope for courses and programmes of higher education, brought innovations as to the models to be offered. In addition to the courses and programmes covered by the then most recent regulation, namely undergraduate, post-graduate and extension courses, there appeared the new element of "Sequential Courses for Occupational Studies". Therefore, there are now four different types of higher education courses, according to what is prescribed by law, in the terms of Article No. 44. Art.44 (BRASIL, 1996, p. 18) higher education level will cover the following courses and programmes:

> 'I – sequential courses at different levels according to discipline, open to candidates who meet the pre-requisites established by the education institutions;
>
> II – undergraduate courses, open to candidates who have completed secondary school or equivalent and have obtained successful classification in a selective process;
>
> III – post-graduate courses, covering programmes of master's and doctorate degrees, improvement and specialisation courses and others, open to candidates holding a diploma from an undergraduate course who meet the pre-requisites specified by the educational institution;
>
> IV – extension courses, open to candidates who meet the pre-requisites specified in each individual case by the educational institutions'.

Article 44 should be interpreted in the light of the prevailing pattern of the majority of existing courses. The legislator stresses the flexibility that all institutions and educational systems should have in their forms of organisation and ways of performing. The principle of flexibility is reflected both in the letter and in the spirit of the Law. This may be noticed in several of its recommendations, which often admit more than one form of enforcement, as well as in the open characteristics, intentionally left unfinished, as it transpires from many of its articles. The same spirit should prevail in the letter of the regulation that may be arising from its implementation.

The new element of Sequential Courses is a typical result of such a spirit. The absence of a specific outline for this new element invites innovations to meet the demand for post-secondary and higher education originating from many different social sectors, opening avenues for the indispensable diversification of the Brazilian higher education system, thus permitting the expansion in the number of vacancies. In the long term, levels of intake will be comparable to those of other countries in Latin America with a socio-economic level of development similar to Brazil.

The new element is characterized, initially, as a separate model from the other higher education courses as they are currently understood. While being a specific type of course, it is quite distinct from undergraduate courses and should not be confused with them. Sequential courses are not undergraduate courses. Both courses, sequential and undergraduate, are entered into after secondary education and are, therefore, at the higher education level. However, they are different from each other in the sense that undergraduate courses require a longer period of study which is both academically and professionally denser than that of Sequential Courses.

Sequential Courses can be taken prior to, concurrently or after undergraduate courses, permitting, rather than demanding, that the student entrants be holders of a higher education diploma. This means, therefore, that sequential courses do not

get confused with courses and programmes of post-graduation, which are referred to in the annex III of the same Article. Neither do sequential courses get confused with extension courses, as the latter are referred to in annex IV of that same Article.

Disciplines versus courses of study

Article 43 (BRASIL, 1998) Describing the objectives of higher education refers to "áreas de conhecimento" – literally "areas of Knowledge" but better translated as "disciplines" – because it refers to traditional academic subjects studied in tertiary education, for example chemistry, physics, linguistics etc.

Article 44 Annex I in describing the objectives of Sequential Courses refers to "campo de conhecimento" literally "fields of knowledge" but will be referred to in this assignment as "courses of study" because it refers to vocational courses traditionally conducted by training centres or in apprenticeship schemes, for example fashion design, hairdressing, and other technical skills (BRASIL, 1998).

The LDB project by the Federal Senate

The version of the LDB project, which initially circulated in the Federal Senate, prior to its approval by the National Congress in December 1996, contained a certain conception of Sequential Courses. According to this conception, in the Sequential Courses then foreseen, the student would obtain approval in six interrelated subjects. The idea of six interrelated subjects prevailed in the original project until it was altered during its passing into Law, which dilated the limits of its original notion.

The author of the aforementioned LDB project, the late Senator Darcy Ribeiro, submitted a document to the headquarters of UNESCO in Paris, in 1996, presenting his project for the "Brazilian Open University" and making a reference to Sequential Courses. In his document he used the equivalent expression "Sequence Courses" and illustrated its meaning. In his words, a student would conclude "a Sequence Course in any branch of knowledge… through the approval in six interrelated subjects, for example, Labour Rights, Syndicalism, Arts and Education, Enterprise Management, Parliamentary Technology, Multimedia etc." (BRASIL, 1998).

On another occasion, in that same year, while giving a speech at the CESGRANRIO Foundation, in the city of Rio de Janeiro, according to information provided by Councillor Carlos Alberto Serpa de Oliveira, the aforementioned Senator, defining sequential courses, said that the onus would be on the student to find a higher education institution and present it with a proposed study programme according to her/his interests. The programme could include subjects in various disciplines- articulated in sequence, the use of the terms course of study. Such proposal would not depend on the existence of places (i.e. going through the so-called "vestibular" entrance exam) and the successful completion of the programme would allow the conferment of a diploma. (BRASIL, 1998).

Imagine, he said, illustrating the composition of a that a student who is interested in English Literature would wish to become familiar with the history and the dominating school of thought during a certain time in western civilisation. This student would be able to choose subjects related to Languages, History and Philosophy, articulated in sequence. The student's obligation, when making such choices, would be to respect the organisational structure of the educational institution (certainly regarding the rules guiding the chosen subjects). The student's option would represent the liberty of someone being able to choose, not an undergraduate course, but rather, a multi-disciplinary sub-field in which she/he wishes to get a deeper knowledge. Such a possibility is open to any person who meets the pre-requisites established by the higher education institutions. Finally, the Senator said that the

proposal of Sequential Courses could be compared to a freer and more modern vision of the community colleges in the United States of America, and this could culminate in professionalism or not, but certainly with a strong national tendency, therefore the Senate did not interpret, quite correctly, that the concept of Sequential Courses was the subject of such a vision.

Sequential courses in the approved LDB

The formulation of a programme of studies according to the interests of the student and articulated in sequence would only be possible if the institutions would inform the potential candidates what subjects were on offer and on what terms. As it was stated by Councillor Bernadete Gatti, of the Education Council of the State of Sao Paulo, in a work document informally submitted to the author of the current Consideration, the new LDB already states that this information must be provided to all students interested in higher education courses. Effectively, the Law 9394, dated 1996, in its Article No. 47, says:

> Art 47 – P.1st – The institutions will inform to the interested parties, before each academic year, what are the course programmes and other curricular components, their duration, pre-requisites, qualification of teachers, available resources and assessment criteria, being obliged to follow the respective conditions (BRASIL, 1996, p. 19).

The dissemination of such information by the educational institutions, more than being a requirement for enabling the candidates to Sequential Courses of a specific type to make their choices, also represents the signature of a term of public responsibility on the part of the institution towards its potential students and towards the State, which will be performing a supervisory role. Such public term of responsibility, implicit in the letter and explicit in the spirit of the LDB, shall certainly be taken into consideration in the evaluations for accreditation and re-accreditation of the said institutions and for the periodical renewal of course recognition.

The matter being referred to in the first paragraph of Article 47 was regulated by Act No. 971/98. It must be furthermore observed that in the LDB, besides Article 47, there is another regulation articulated with the idea of a certain type of sequential course. It is, namely, Article 50:

> Art.50. The higher education institutions, when having vacancies, will open the registration procedures for the subjects in their courses to outside students who can demonstrate the ability to study them with profit, by means of undergoing a selective process (BRASIL, 1996, p. 20).

At a first glance, the legal requirement seems to refer only to the already familiar element of special students, from outside, who obtain access to registering for subjects of her/his interest within undergraduate courses, for example, without submitting to the traditional selective exams – the so-called entrance exams. However, the Law goes further, in that it makes it mandatory that institutions be open for registration of students in those subjects where there are vacancies.

The familiar drop out from undergraduate courses, meaning that groups which were initially quite large, by the time they reach the end of the final year have their size greatly reduced, has generated considerable sub-utilisation of the capacity of higher education institutions. Such under-utilisation can be reversed exactly by the admission of students who are interested in specific types of Sequential Courses. In the conception of such courses, according to what is described in the LDB project under consideration by the Senate, those people who have at least certificates of conclusion of secondary education, wishing to follow an articulate sequence of six subjects within a field of specific knowledge, and being able to demonstrate enough aptitude, according to the requirements of the institution, could be admitted for Sequential Courses integrated by those subjects, provided there were places.

What is described in Article 50 means, therefore, to indicate one – just one – of the ways in which that type of could take place.

Sequential courses: conception, destination and variations

The conception of Sequential Courses made by the LDB (BRASIL, l996) project was expanded in the promulgated Law. The version finally approved of the Annex I of Article 44 gave a new dimension to these courses. In keeping with the principle that they would have different levels of coverage with regard to courses of study, there was no longer the restriction to only a group of six interrelated subjects. Effectively, even before the LDB approval, this new notion seemed to be already present in the allusion, or indirect reference, to a possible, but not necessary, similarity with a freer and more modern vision of the community colleges in the United States of America, culminating or not in professionalism, but certainly with a strong national tendency. Therefore, it can be considered that the concept of Sequential Courses by the course of study is very open. Therefore, before dealing further with this subject, it is convenient to discuss the notion of courses of study.

It has been demonstrated that courses of study in the sequential courses, while a new concept in the Brazilian educational legislation, are not identified with the traditional disciplines, its applications nor with the technical or professional areas in which Brazilian students traditionally get their diplomas. The definition of the Annex I of Article 44, that courses of study would have different levels of coverage, suggests that courses of study may be made up of elements from more than one discipline, by more than one of its applications, or from more than one of the professional areas; courses of study may also be contained in one of these disciplines, one of its applications or one of its vocational areas.

The advancement of contemporary knowledge through interdisciplinary, allied to the character of flexibility and of invitation to the present innovation in the new Law, allow – or rather, recommend – that both interpretations be adopted. It is not the case, of course, of understanding that sequential courses serve to diffuse interdisciplinary knowledge produced on the edges, because such work, when admissible, would be typical of doctoral and other programmes. Rather, it is understood that the conception and implementation of sequential courses may include elements from more than one or from only one discipline, as long as they can demonstrate an internal logic (BRASIL, 1998).

Sequential Courses may serve the interests of all those who, having a leaving certificate from secondary school, seek to expand or update, in various degrees of extension or depth, their intellectual horizons in the fields of humanities or the sciences, or even their professional qualifications, attending higher education without necessarily being registered on an undergraduate course. In any circumstance, one must always remember that anyone can attend several sequential courses in a lifetime. Thus, Sequential Courses can be included in the notion of continuous education after secondary school.

A sequential courses can be proposed by someone wishing to study subjects in an undergraduate course already on offer by the educational institution. If there are places in the desired subjects, if the group of chosen subjects has an internal logic – making a coherent course of study – and if the educational institution, using whatever means it judges to be appropriate, considers the candidate to be capable of following the proposed studies, the pertinent registration or admission can be granted to the candidate.

According to the regulations in Article 44, annex I of the new LDB, such courses are open to candidates who meet the requirements established by the educational institutions. Thus, the requirement for a student already belonging to an institution to take a vocational education at that same institution can be simply that she/he must have an up to date registration or it may also include further requirements.

Courses like this can allow the future graduate to obtain a complementary certificate in the disciplines he/she already follows. It can be imagined, for instance, that a student of Engineering who wishes to work for commercial companies, if he/she judges useful for academic purposes and for future vocational opportunities, may also study an articulated group of subjects in the Business Administration course. The successful completion of this group of subjects will allow that student to obtain a certificate as well as her/his undergraduate diploma (BRASIL, 1998).

A may vocational education, as another possibility, be conceived by an education institution. As such it will be a new course, experimental or regular, of a shorter duration than an undergraduate course, and will be offered to all those who may be interested in it, thus meeting demands of the most varied types. In such cases it is said that the is institution designed by students. It will cover a course of study, that is, a specific piece of a discipline, or its applications, or an occupational area, or still, an articulation of elements of one or more of these. Obtaining approval in this group of subjects would mean obtaining a diploma.

Countless examples of this type of courses could be imagined. For mere illustration let us imagine a course, possibly, in Post-Modernism and Economic Globalisation, with six subjects introducing the student to: 1) Contemporary Art; 2) Modern Society; 3) Economic Globalisation; 4) Consumerism; 5) Regional Polarisation; and 6) Social Apartheid.

Still as a mere example, another course could be imagined, maybe of a similar duration, in Tourism in Environmental Preservation Zones, combining the basic formation in Tourism and Ecology; or yet another example, a course in the Management of IT Shops, combining principles and practices of business administration with basic knowledge of hardware and software. In any of the above examples, successful completion of the course would allow the right to a diploma.

In the above examples it is suggested that the courses would have a relatively short duration, maybe equivalent to two academic semesters (or 400 days). However, the examples could also be used for other courses whose courses of study had the same thematic formation, however being approached with the depth of something bigger, being treated in a denser way, and, therefore, having a longer duration, supposedly two academic years. In this case, once certain pre-requisites are met, the students who completed those courses would have the right to a diploma.

The flexibility in the conception of courses like these allows them to serve the purpose of facing the challenges of new social demands for higher education, albeit in an experimental way. Some of the courses that may come to achieve success in answering to such challenges may eventually become the embryos of future undergraduate courses, not yet being envisaged.

The offer of courses like these may be the answer to the much-needed diversification of the Brazilian higher education. As an answer to the increasing demand for this level of education as yet not in search of an academic formation at the undergraduate level, there must be perspectives which are being opened with ever increasing speed in the social practices of contemporary society – as those in the fields of humanities, arts and sciences, or those of a professional characteristic, mainly in the area of services.

Thus it can be seen that the notion of Sequential Courses has several variations, resulting in distinct modalities. It can be said that the individualised Sequential Courses with individual destination meet the objective of complementing (BRASIL, 1998): studies which were done in secondary school); or studies which are being done by an undergraduate student; or a return to university by those graduate students wishing a professional update or an expansion of their intellectual horizons in certain fields of knowledge.

The higher education institutions designed courses of group destination, with varied periods of duration, from just a few weeks to several academic months, may also be sequential courses which complement before were done at secondary school level, expanding intellectual horizons or which providing vocational training. In both cases success in the course of study composing the will must give the right to a higher education course certificate.

As there are several purposes being met by Sequential Courses, it is convenient to make a distinction between them, by using different names. Those of individual and institution design with a duration of less than two academic years (or 400 days), leading to a certificate, will be denominated for complementary studies. Those of institutions designs with a duration equal to or higher than two academic years (or 400 days), leading to a diploma, will be denominated for occupational studies

For complementary studies

The individualised sequential courses for complementary studies depend on the existence of vacancies in subjects already being offered as part of recognised undergraduate courses. The higher education institutions wishing to receive proposals for courses of such type will divulge the list of subjects with availability of vacancies and the candidates will indicate the sequence they wish to follow. The institution will approve or not the candidate's proposal depending on its coherence, which must make up a course of study.

The minimum number of subjects making up a course of this type, the minimum and maximum time limits to complete them, as well as the specific criteria for approval of the candidate's proposal will be left to the discernment of each higher education institution, however, keeping to the general principle that the course of study to be followed must have an internal logic. The requirements for admission into a sequential courses of this type will be determined by the higher educational institution.

The institution designed for Complementary Studies may be created without previous authorisation and will not be subject to recognition. They will, however, be linked to one or more recognised undergraduate courses being offered by the educational institution and including subjects interrelated to those making up the sequential course. Higher education courses for complementation of studies will be assessed periodically, by sample, and the assessment results will be taken into consideration at the time of renewing the recognition of the undergraduate course to which it is linked. The curricular proposal of courses of this type, the correspondent number of hours and the time limit for its completion will be determined by the education institution which offers it. Such Sequential Courses are not required to follow the regular academic calendar, but are subject, however, to the same general normative regulations applied to undergraduate degree, such as verification of attendance and scholastic achievement (BRASIL, 1998).

The inherent flexibility of the institution designed for complementary studies allows the offer thereof to fulfil the existing vacancies in subjects comprised by recognised undergraduate courses. Furthermore, it allows the studies carried out by non-completing undergraduate students to be no longer considered a waste of time. Students who did not complete their undergraduate studies, if approved in subjects composing a course of study, can be entitled to a corresponding higher education certificate, according to the institution's criteria. There are several implications arising from such potential, including the certification of competencies or abilities in the areas of humanities, the arts, sciences, or vocational training.

The Sequential Courses for Complementary Studies also serves an additional purpose besides those already mentioned. The studies being completed may, at the institution's criteria, in the future be used by the student who returns to study an undergraduate degree, as long as the subjects

were completed with approval and are an integral part of or equivalent to those subjects comprising the curriculum of such undergraduate degree.

For occupational studies

The sequential courses for Occupational Studies may be offered by a higher education institution that has one or more recognised undergraduate courses. They are exempt from following the normal academic calendar in the same way as the Complementary Studies, and may be finished at any time, at the criteria of the institution, provided that the opportunity to conclude the studies as part of the course itself is guaranteed to the students enrolled in it. These courses do not necessarily have to be linked to a department, institute or specific college, even because the new LDB (BRASIL, 1996) does not prescribe any internal organisational model for higher education institutions or universities.

The(?) for Occupational Studies – leading to diplomas – contrary to sequential courses for complementary studies – leading to certificates – are subject to processes of authorisation and recognition following specific procedures which safeguard the quality of the offered studies. The exemption of previous authorisation is exceptionally given to institutions that have the prerogatives of university autonomy, according to the terms of current legislation. With a view to guaranteeing an adequate basic formation in a course of study, the number of hours of this type of course cannot be less than 1600 hours, to be completed within a time limit not less than 400 academic calendar days (BRASIL, 1998).

The studies carried out in occupational studies may be used for an undergraduate course, at the criteria of the higher education institution, as long as the subjects followed with approval are an integral part of its curriculum or equivalent, and that the candidate is submitted to the selective process usually applied to candidates to the desired course.

In the case of institutions where undergraduate courses are offered in modules, the different modules may become and be offered as for Occupational Studies, in case they are conceived as such, thus extending the flexibility of the offer of such courses.

Criticisms of sequential courses

The sequential courses introduced by Article 44 of Law 9.394/96 had norms established by Resolution nº. 1/99 of the Superior Chamber of Education and are integrated into modalities of courses on offer by the higher education institutions (BRASIL, 1999). With a view to providing a reflection and further positions regarding this new modality, this study shows, in a more precise form, the particularities presented by the whole of the document. This study does not have the aim of presenting a finished thought regarding sequential courses but rather, just to place them for discussion. Some of the regulations of the Resolution relate to the structuring of Sequential Courses, others relate to their concept.

On 27 January 1999, Resolution nº1 of the Superior Chamber of Education – of the National Council of Education – was published, regulation for Sequential Courses of higher education, in the terms of Article 44 of Law 9.394/96. As already predicted, that Resolution followed the indications the Councillor for the CES, Jacques Velloso, in the Consideration 672/98. Sequential courses for occupational studies are a new model mentioned in the LDB alongside the other higher education courses. Thus, they constitute an innovation in higher education and study and discussion to better understand its spirit becomes necessary, with a view to its implementation by the universities.

Sequential courses, as normalized by this Resolution, have the objective of offering and developing diversified alternatives of attendance to higher education studies, meaning to give social answers to the demands for a better personal

formation and/or access to higher education. This is a model of course of great flexibility, serving the different purposes of those facing the challenges of social demand. As far as they can be structured comprising subjects, curricular activities and stages of different courses, they perform a role of exchange, of circulation, of linking different disciplines needed for vocational exercise, as well as the opportunity to all citizens to expand their culture and vocational training. Sequential courses are not undergraduate degrees nor in the least can they be characterised as extension or specialisation.

The Article 1 of the said Resolution defines sequential courses as a group of systematic activities of development considered as higher education and organised with different levels of coverage. The objective of these courses is as much the one of "intellectual horizons in fields of sciences, humanities and arts" as the obtaining or updating of: technical qualification, vocational qualification, and academic qualification

It is important to note that sequential courses do give qualifications but that these are not universally recognised. They propose that these activities may be alternative to the undergraduate courses. Another characteristic is that of being activities developed by course of study not restricted to a course, college or institute. Sequential courses are open to candidates holding a secondary school certificate who are selected by pre-requisites determined by each institution.

Sequential Courses are structured according to the coverage as defined in each case, and they may comprise part of one or more fundamental course of study or of the technical or professional applications of these areas (mathematical sciences, physical, chemical, biological, geosciences, humanities, philosophy, letters and the arts).

According to the Resolution (BRASIL, 1999), Sequential Courses can be of two different types: complementary studies and occupational study and lead to a certificate and diploma. They will have a minimum of 1600 hours and 400 academic calendar days, including trainee stages or professional or academic practices. There should be in the institution's prospectus a mention of the conditions for offering the course and the institution should provide MEC other relevant information.

Sequential courses are exempt from obeying the regular academic calendar year, and may be finished at any time, the conclusion of the studies being ensured. As the LDB does not prescribe an internal organisational model for higher education institutions, these courses do not need to be linked to a department, institute or specific college. Sequential Courses of this type – Occupational Studies – are subject to the authorisation and recognition processes in the same way as undergraduate courses. According to Jacques Velloso (*Parecer* 672/98) the institutions that have prerogatives of university autonomy are exempt from these demands (BRASIL, 1998).

The institutions that have their undergraduate courses organised in modules will be able to constitute their different modules as Occupational Studies. The diplomas, issued by the institution offering them, will be entitled Occupational Studies and will mention the course of study referred by the studies, the number of hours and the date of conclusion of the course. The register of these diplomas will be carried out according to the terms specified in the Resolution nº 3/97 of the Chamber of Higher Education (BRASIL, 1997).

As to frequency and scholastic achievement, the norms are the same as those for undergraduate courses. The Complementary Studies courses may be institution designed or individualised. They may be offered by higher education institutions with one or more recognised graduate courses and do not depend on previous authorisation neither will they be subjected to recognition. In the case of group destination, the proposed curriculum, the number of hours and the time limit for completion will be determined by the institutions.

These institutions must mention in their prospectus the conditions for their offers indicating which undergraduate courses and sequential courses are interrelated. According to paragraph 4 of Article 6 of the Resolution being analysed, these complementary studies will be periodically assessed by Ministry of Education, by means of samples, and the results thereof will be taken into consideration when renewing the recognition of the undergraduate courses related to them.

In the case of individualised complementary studies, they will be proposed by the candidates who are interested in taking subjects configuring a course of study and having open places. The proposal of studies will be analysed by the institution, which will also determine the requirements for the admission of that student. Even though the Resolution is silent regarding the number of subjects which must comprise a(?) for complementary studies of individual destination, the consideration by Councillor Jacques Velloso indicates that the number of subjects, the minimum and maximum time limits to complete them as well as the specific criteria for the approval of the candidate's proposal will be subject to the judgment criteria of each institution. However, the general principle that must be followed is that the group of studies must have internal logic.

Once admitted to the classes, the students will have to fulfil the same criteria specified for the others taking the same subjects. Attendance and successful completion in the courses for complementary studies will allow the right to a certificate of complementary studies to be issued by the Institution. The certificate must mention the course of study, which the studies refer to, the number of hours and the date of completion. The studies carried out as sequential courses for occupational studies or for complementary studies may be accepted as valid for undergraduate courses, when these are equivalent to the subjects comprised in those undergraduate courses curricula. The students leaving sequential courses are not exempt from the selective process to be undertaken in order to be admitted into regular courses.

It is extremely important to note Article 11 of Resolution CES nº 1/99 which prescribes that "the students enrolled in recognised undergraduate courses and did not fulfill the requirements for the respective diploma, may be entitled to a certificate of complementary studies (BRASIL, 1999). For such certification, there may be considered the subjects, the academic or occupational practices as well as other studies which were successfully completed and which make up the course of study. This is a way of recognising the studies carried out with success by students who have quit subjects comprising a course of study.

The Resolution allows an exception to the requirement of a certificate of completion of secondary education in Article 12: "When more than half of the number of hours demanded by the complementary studies is comprised by subjects in the area of the Arts, in exceptional cases and according to the judgment criteria determined by the education institution, the candidate for admission may be exempt from presenting a certificate of completion of secondary education". The sequential courses will be structured according to a defined coverage for each case, and may include part of one or more fundamental disciplines or technical or occupational application of such areas (mathematical, physical, chemical and biological sciences, humanities, philosophy, letters and the arts).

National curricular directives for higher education level

Determining general directives for the elaboration of curricula is the basic action for the national teaching strategy. The Law of Directives and Regulations for National Education defines as goals of higher education (BRASIL, 1999): to stimulate cultural creation and develop scientific spirit and reflexive thought; to educate diploma students in the different disciplines, who are apt

for entry into occupational sectors and for taking part in the development of the Brazilian society, as well as for co-operating in its continuous formation; to encourage scientific research and investigative work, with a view to developing science and technology and the creation and diffusion of culture, thus developing the understanding of man and the environment in which he lives; to promote the disclosure of cultural, scientific and technical knowledge which constitute an asset of humankind and to communicate knowledge through teaching, publications or other forms of communication; to sustain the permanent wish for cultural and professional improvement as well as making possible the corresponding concretisation, integrating the knowledge that is acquired in an intellectual structure which systematises the knowledge of each generation; to stimulate the knowledge of the present world's problems, in particular the national and regional ones, to pay specialised service to the community and to establish with it a relationship of reciprocity; to promote the extension, open to popular participation, with a view to diffusing conquests and benefits resulting from cultural creation as well as scientific and technological research generated by the institution

The proposed parameters for the curricular directives indicate: a pedagogical plan collectively constructed; flexibility, allowing the absorption of transformations occurred in the different frontiers of science; an integral formation which allows the comprehension of work relations, of socio-political alternatives of society transformation, of background issues relating to health and environment as a perspective for the construction of a sustainable society; graduation as an initial phase, of a formal nature, constructing the basis for the permanent and necessary process of continuous education; incorporation of complementary activities related to the fundamental axis of the curriculum; interdisciplinary predominance of formation over information; articulation between theory and practice; promotion of educational activities of a scientific nature and of extension; the association between teaching, research and extension.

Educational plan

A reformulation of the general policy for graduation is required, having as its foundation the compulsory nature of methodological planning as a basis for the academic-administrative management of each course. Such a project must be directed to (BRASIL, 1999):

- The offer of quality teaching, promoting activities which encourage investigation and stimulate constructive criticism, ensuring scientific updating, integral formation and the fulfilment of social demands;
- The promotion of research practices in all undergraduate courses, adopting institutional research policies meeting the new undergraduate demands, maintaining the programme with adequate teacher dedication and institutional support to the students in the way of scholarships for scientific initiation and/or other strategies;
- To promote the practice of extension in higher education as an indivisible component of the pedagogical project of the course, with a view to a more appropriate formation of citizenship. This programme will be maintained with teacher dedication and institutional support to the students;
- To organise each curriculum allocating a percentage of the total number of hours for the realisation of academic activities in line with content, competencies and abilities predicted in the pedagogic project of the course;
- To offer a perspective of continuous formation for successful students, teachers and technicians, as a new pedagogical procedure.

Educational plan of sequential courses on offer

The national curricular directives for the Sequential Courses are linked to the vocational and scientific formation in each discipline and include a target public, selective process, social demand, course origin, diploma or certificate, profile of the successful student, competencies and abilities, types of studies (basic contents), course duration, complementary activities with an aim to dialogue between theory-practice, recognition of extra-curricular competencies and abilities, general course structure. Research conducted through the Internet already finalised suggests that the methodological plan of sequential courses offered in Brazil have the following characteristics:

a) Target – The sequential courses is aimed at those students who have completed the secondary school or those who completed undergraduate courses, mainly in the same area of knowledge, who intend to acquire specific knowledge in that technical field, thus increasing her/his chances to enter the job market.

b) Entrance Process – The Selection Process will include three phases: written exam, of multiple choice, including Maths, Physics and English of the secondary education level, to be taken on specified date, hour and place; interview with the best candidates from phase number one; evaluation of the candidate's historical grade statement or her/his result at the National Exam of Secondary Education (ENEM).

c) Social demand – The Specialists Teaching Commission of some disciplines has not been placing restrictions to offer of new courses of study in the vocational education in some disciplines due to the number of entrances process of the Sequential Courses. This Commission understands that new courses indicate candidates' existence or have a competition.

d) Course origin – The sequential courses was initially created from an agreement with local enterprises. It was designed as an instrument for the development of human resources with a deep technical knowledge, thus meeting the market demand for a workforce with skills in specific and updated technologies in the field of manufacturing and construction. This was then combined with the predisposition of Higher Education Institutions to become a centre for development of knowledge in the area of Civil Engineering.

e) Diploma or certificate – this agreement enables the student, upon successful completion of the course of study, to obtain an appropriate certificate or diploma in an occupational studies.

f) Profile of the successful student – common profile: solid vocational and scientific formation enabling the individual to absorb and develop new technologies which allow to generate, analyse and interpret products of this specific field with a view to their application in the various fields of science, taking into consideration social demands and having a critical, creative, ethical and humanistic view of reality. Additional specific profiles may be accepted, according to the curricular organisation of higher education institutions, as well as the description of the academic project of the course.

g) Competencies and Abilities – Study topics – Basic content; Study topics – Specific content

h) Course duration – The minimum duration of the course will be two years and the maximum will be determined by the higher education institution, which will take into account for completion of the course, the different possibilities of occupational studies and/or complementary studies.

i) Complementary activities with a view to theory-practice interaction – the higher education institutions must incorporate in their curricula activities designed to embed the learning achievements as well as allowing the student to become aware of his occupation. The following instruments are to be used: training for research, which will serve to help the student choose

the specific curricula for research (i.e. to have research as a career). This must be implemented from the second year and must be integrated with scholarship programmes of research initiation carried out by the higher education institution. The continuity of such programmes will depend on the students' choice, that is, from the third year this instrument will only continue existing for those students who chose research; instruments of teacher training, learning to teach, which will serve to help the student choose the specific curricula for teaching, i.e. to have teaching as a career. In this instrument, even though the course is specific for bachelaureate, the higher education institutions should contemplate the possibility of the student to take up teaching of topics such as Environmental Science, Climatology, among other pertinent ones, in the primary and secondary levels of education.

j) Recognition of extra-curricular activities and competencies – the higher education institutions may create mechanisms for the utilisation of knowledge acquired by the student in independent studies and training stages, in a distance learning mode, provided that a minimum duration determined by the institution is completed, thus enabling the completion of the course. These include: supervised apprenticeship; programme of foundation science; complementary studies; subjects in other areas of knowledge; integration with other sequential courses. Activities in the workplace.

k) General course structure – each higher education institution will structure its course aiming to offer: a semester-based structure utilising credits and pre-requisites of both required and optional modules. Certain modules can be offered in an intensive or "sequential" format over a shorter period of time given that the required number of hours is completed.

Characteristics: sequential module: essentially as a module, separate from the course; specific module: can be a closed module or structured in number of credits; basic module: modules or credits

Of information tecnology

The sequential courses for occupational studies is subject to the authorisation and recognition procedures in the same way as the undergraduate degree courses. According to the Consideration 672/98, State University of Ponta Grossa included in the current prerogatives of University autonomy are exempt from such procedures. They will have a minimum of 1600 hours and 400 academic days, including periods of academic or vocational training. The sequential courses of Information Technology has 1605 hours. The documentary analysis of the start with the following data: Name of the higher education institution: Universidade Estadual [...];address of the higher education institution: [...], Paraná, Brazil; complete title of the sequential course: of Information Technology; field of knowledge: Computer Science and Information Science; undergraduate degrees that cover the disciplines of the Sequential Course: Department of Agricultural Sciences and Technology; Department of Human Sciences, Languages and Arts;Department of Applied Social Studies; Librarianship; number of teaching hours: 1605 hours of class; minimum duration of course: 2 years; number of places – annual total: 30; assessment: annual; maximum number of students in seminar classes: 30; registration: annual.

Teaching staff

Policies for improving teaching staff's professional qualifications: the efforts already made (or being planned) towards the improvement of teaching staff quality, as well as the plan for teaching staff training, especially if encouraging teachers towards post-graduation.

Table 1. Of Information Technology: teacher's number – so-called, highest teaching qualification, subject title to be taught and area of knowledge, [...] Paraná, Brazil – 2002

Teacher's called	Highest teaching qualification	Subject title to be taught	Disciplines which includes the subject
Teacher 1	MA	Computer Science	Technology
Teacher 2	MA	Theory of the Communication	Communication
Teacher 3	Ph. D	English Language	Foreign Language
Teacher 4	MA	Portuguese Language	Language
Teacher 5	MA	Portuguese Language	Language
Teacher 6	MA	Foundations of Philosophy	Philosophy
Teacher 7	MA	Foundation of Mathematics	Mathematics
Teacher 8	MA	History of Culture	History
Teacher 9	MA	New Information Technologies	Information Technology
Teacher 10	MA	Information of the Reading	Information Technology
Teacher 11	MA	Applied Scientific Methodology	Mythology
Teacher 12	Post-graduate	Psychology of the Information	Psychology
Teacher 13	MA	Descriptive Representation	
Teacher 14	MA	Documentary Language	Language
Teacher 15	Master Science	Internet	Technology

Source: Co-ordinator Sequential Course. The teacher staff is working full-time.

CourseCo-ordinator'sprofessionalqualifications: the course co-ordinator is [...], who holds a Master's Degree in Science. She works full-time in the State University of [...], and has approximately 15 years experience in academic administration These data which will be used to compare with the other courses of the need for co-ordinators to have both subject knowledge and experience in management.

Educational Plan

Profile of the successful students and the methodology of the course

Professional aptitudes are expected from the student: The revolution of information and its power has not yet been fully explored. Currently new ways by which information can be handled and accessed are being presented at ever increasing the job and speeds. The new technologies will become irreplaceable for the diffusion of information.

Modern systems of information have an enormous potential for the sharing of knowledge and to enlarge the learning process. In any part of the world it can be accessed by other people's past experience who can join in this process. Information and knowledge can create allies in the search for power in the competitive world that confronts us all.

Information users will have to accept that they will need to continue to learn and learn, taking part in possible several formal processes of learning: I would like to examine for example, the course of managment as a sequential courses of Information Technology offered by the State University of Ponta Grossa.

The profile of the professional that works or will work with information requires a strategic vision that should be harnessed by means of quality control and marketing techniques. The information technician will be required to work in a multidisciplinary manner, manipulating the new information technologies. They will need to be prepared for changes in working environment, products and services use to technological evolution. They will also be required to pay full attention to the customer who will become more and more demanding and expert in the technologies of data communication.

Curriculum structure: the curriculum structure for the course at present is laid out in the following table, including, for each separate subject: reference code, a title, a number of credits and the pre-requisites (where required).

Table 2. Of Information Technology: Subject's number – so-called, Course of study of the subject, Number of teaching hours, [...] Paraná, Brazil – 2002

Reference number of the subject	Subject	Course of study of the subject	Number of teaching hours
First			
203006	Computer science	Technology	60
595001	English language	Foreign Language	45
596001	Portuguese language	Language	
591001	Foundations of philosophy and Logic	Philosophy	45
293008	Internet	Technology	45
191001	Foundations of Mathematics and Basic Statistics	Mathematics	60
Second			
203006	Computer Science	Technology	60
293014	Services and Electronic Resources as Support in he Search for Information		45
293010	Applied Scientific methodology to Information Technology		45
293008	Internet	Technology	45
293002	Sources Electronic Information	Technology	45
Third			
293003	Foundations and Transfer of New Information Technologies	Technology	45
293013	Descriptive Representation		45
293002	Sources of Electronic Information	Technology	45
293009	Document Language		45
293014	Services and Electronic Resources as Support in the Search of Information		45
293012	Quality in Information Services		30
591002	Psychology of Communication and Human Relationships	Psychology	30
203---	Supervised apprenticeship		45
Fourth			
293005	Information and reading		60
293007	Information and Globalisation		
293003	Foundations and Transfer of New Information Technologies	Technology	45
407001	Theory of Communication	Communication	45
293011	Organization and Methods in Information Systems	Methodology	45
203	Supervised apprenticeship		120

Source: Co-ordinator sequential course.

What type of problems the student will be equipped to solve: To prepare professionals for the exercise of technician's function in libraries units given information in public or private institutions; To train technicians in the domain of new information technologies; performance of auxiliary services of acquisition and technical processing of formal materials as well as techniques in dealing with the public; To enable technicians to aid librarians in the organization and management of the information, providing them with knowledge of up to date techniques and improvement.

What positions will the successful student be able to apply for in the job market? The new labour market will demand technical professionals, to be employed in the construction of better tools and search interfaces information through computer science. This will require the practical integration and involvement of hardware resources, software and information.

The areas of work include: specialized managerial files, banks and data bases, electronic, digital or virtual libraries, development of electronic data bases, digitalisation of images, CD room creation, publishers, technical offices, schools, universities, specialized libraries, museums, bookstores, industries, and other places related to the area of information.

The interdisciplinary of the areas that make up Information Technology will give the technologists that work within them; a wide work opportunity in the technological, scientific or educational areas.

Demonstrate the relationship between the vocational education and the undergraduate degree to which it is linked. Requirements for obtaining a certificate or diploma: The students need to participate in at least 75 per cent of the classes plus, 120 hours of supervision apprenticeship and obtain grade 7 or more.

Disciplines Contents – For each subject the following information is provided regarding the contents: 1. Computer Science – Binary logical computer science and basic concept about computers; the operating system, graphic interfaces, text editors. Electronic tables. Data base. Integrated tools and Utilitarian packages. 2. Theory of the Communication – Processes of communication. Communication as a problem in contemporary culture. Communication and society. Interdisciplinary studies in communication. History and paradigms of communication studies. Communication, information and new technologies.3. English Language – Basic knowledge of the English language. Reading and understanding of general and specific texts related to the study area.. 4. Portuguese Language – Notions of basic grammar. Portuguese literature. Linguistics. Reading and analysis of texts. 5. Foundations of Philosophy and Logic – The act of thinking. Perception of thinking. Perception, judgment and reasoning. Induction and deduction. Concepts and theories about sequential courses. The formalization of the thought. 6. Foundations of Mathematics and Basic Statistics – Introduction to numerical systems, mathematical logic, relationships, graphs, groups, induction. Preliminary notions of statistics. Tables and graphs. Complementary measures. 7. History of Culture and Information Records – Historical perspectives on the regarding information. Communication spaces and culture, from the first methods to the present time. Current production of the recording of knowledge. 8. Foundations and Transfer of New Information Technologies – Data banks and bases: beginnings, concepts and terminologies, organization of files, project and implementation of data base and systems of recovery of data bases. Mechanisms of absorption of new technologies. 9. Information and Reading – Conceptualisation of reading, texts and contexts, different readers and different readings. The culture of information in the post-industrial society. Study of different strategies and reading techniques. 10. Applied Scientific Methodology to Information Technology – National and international Normalization. Relative basic norms for printed

and electronic information. 11.Psychology of Communication and Human Relationships – The psychology of human relationships. Personality, attitudes and behaviour. Transactional analysis applied to human relationships. Leadership aspects and leadership. 12. Descriptive Representation – Organization, processing and forms of the recording of information. Theoretical aspects, patterns and norms of descriptive representation in use in Brazil for bibliographical description. Automation in the descriptive representation of documents. National and international formats. Preparation and conservation of materials. Entrance of data in information systems. Generation of reports. 13. Language of Documents – Historical Panorama, objective forms of systems of bibliographical classification. Specialized classification systems. Subject headers. Controlled vocabulary. Thesaurus. 14. Internet – History of the Internet. Basic notions of the use of the Internet: tools and resources. Elaboration of home pages. HTML Language. 15 Sources of Electronic Information – Use and operation of the Internet as source of information. Searches and recovery of information from national and international data banks and bases. Use of the main sources of information in data bases, nets, reference works, patents and technical norms. 16. Quality in Information Services – Philosophy of quality. Tools of quality. Customer satisfaction in information units services. Evaluation of the services and products. Strategic planning. Application of marketing philosophy in services and products developed in information systems. 17. Services and Electronic Resources as Support in the Search for Information – Attribution of the service and techniques of dissemination of information. Bibliographies. Search strategies. Services and reference instruments. Reference centres and processes of dissemination of information. Available resources offered to the client. 18. Information and Globalisation – Technological information. Information for industrial and specific sectors. International industrial, commercial and financial information. Technological innovation. 19. Organization and Methods in Information Systems – Concepts and functions of O&M in organizations. Techniques of elaboration of manuals and procedure norms. Techniques of elaboration of forms. Techniques of acquisition of conventional materials. 20. Advanced Seminar – Technical visits to companies, state and private institutions for familiarisation systems with information that use new technologies. Lectures with specialists and consultants in the area of new Information technologies. 21. Supervised Apprenticeship – Supervised Apprenticeship in information systems.

Concluding remarks

The higher level education in Brazilian universities, so-called sequential courses, are included in tertiary education are not new, but considering the need to increase the number of places in short term Sequential Courses, it can be said that both the existing programmes on offer as well as their dynamic professional life

In Information Technology at the [...] State University, Paraná, Brazil. The State University of [...] has institutional autonomy and public funding. The said sequential course has 15 teachers and 40 students.

The sequential courses of Information Technology was implemented because it is impossible to imagine any company in which information about their product resourse. About the disciplines contents, for each subject is provided regarding the aproved contents that offered to pupils.

The profile of the successful students and the methodology of the course to support professional aptitudes are expected from the student. Modern systems of information have a potential for the sharing of knowledge and enlarging the learning process.

The type of problems the student will be equipped to solve comprehend the exercise of

technician's function in library units of information in public or private institutions and management of the information, providing them with knowledge of up to date techniques and improvement.

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