

A System Dynamic Model to examine students' no-continuation trends: A Mexican and British Cases

Jorge A. Duran-Encalada

Business Administration and Marketing Department
Business and Economics School
Universidad de las Américas Puebla
Sta. Catarina Mártir, Cholula
72820 Puebla, México
jorgea.duran@udlap.mx

Alberto Paucar-Caceres

Manchester Metropolitan University Business School
Aytoun Building, Aytoun Street, Manchester, M13GH, UK
a.paucar@mmu.ac.uk

Abstract

Universities (and funding bodies) have been trying to tackle high rates of no-continuation of students in higher education. This paper presents the results of a preliminary investigation into the different factors affecting 'non-continuation' (or its other side, 'retention') of students in higher education institutions. For this purpose, we sketch a systems dynamics (SDy) model and we plan to use data from Universidad de las Américas, Puebla, Mexico and Manchester Metropolitan University, UK, to run the model. We report on relevant literature in the area of the managing retention by assembling a list of retention-related terms; then, relevant models developed to map students' satisfaction, are reviewed. A SDy model that captures the factors affecting the transit of students' from enrolment to graduation is proposed; these factors are synthesised into four sectors as the core of the SDy model: *Introduction*; *Retention*; *Motivators*; and *Finance* sector. The study is in a developmental stage, we expect to implement the model when data is collected. In this paper, we only report on the literature reviewed and we sketched the SDy model. This investigation, when completed, will provide a tool to understand the factors affecting students' non-continuation and will help education administrators to manage their retention.

Keywords: student retention; institutional case study; education; student experience; systems dynamics model

A System Dynamic Model to examine students' no-continuation trends: A Mexican and British Cases

(Developmental paper)

1. Introduction

Today it is well recognized that tuitions and fees represent a significant portion of the revenue stream in the universities budget. This has lead higher education institutes, mainly in the private sector, to accept the fact that it is in their best interest to exercise whatever influence they have to the fullest extent on student retention (Seidman, Ed., 2007).

In connection to this situation, some criticism are directed to university administrators who tend to focus disproportionately on programs for attracting and admitting students rather than managing enrollments (DeShields, et al, 2005). Enrollment management and specially retention strategies should be directed to create higher levels of student satisfaction.

Together with the success in retaining students, there are other important implications from the organizational point of view (Waggoner and Goldman, 2005). This retention rewards the faculty for achieving the purpose of the academy: advancing knowledge and facilitating student learning. Higher student satisfaction levels coupled with higher student graduation rates results in higher levels of environmental and resource flow to the institution. The academic reputation of the institution is thus enhanced.

On the other hand, the initiatives directed to retain student, according to Waggoner and Goldman (Ibidem), fully permeates institutional rhetoric. The authors found three descriptors which more frequently cited related to reinforce student retention when institutional documents and discourses of three institutions were analyzed.

- Academic success
- Academic quality
- Educational goal

Other descriptors not less important included: “campus life style”, “student identity and fit” and “invitation to the collective”.

The situation described is reflected in the reality of two institutions which, even though are located in two different and distant countries, consider retention strategies as a very important part of their institutional policies. These are the Universidad de las Americas Puebla (UDLAP) in Mexico, and the Manchester Metropolitan University (MMU) in the UK.

The Universidad de las Americas Puebla is one of the most prestigious private universities in Mexico and is located 80 miles from Mexico City, in the town of Cholula in the state of Puebla. The UDLAP was founded in 1940 and is one of the three universities in Mexico accredited by the Southern Association of Colleges and Schools (SACS) based in USA. UDLAP has a population of 7,500 students distributed in five different schools (Sciences, Engineering, Social Sciences, Business and Economics, and Humanities), including 600 student in graduate level. Besides teaching, the UDLAP is relatively the most active private university doing research activities as evidenced by the number of faculty who belonged to

the National System of Researchers. After reaching the largest enrollment in 2005, with 8,500 students, this has declined in the last three years. This situation and the recent worldwide economic recession have brought an urgent need to implement effective strategies directed to reduce student non-continuation. Non-continuation rates have increased from 10-12 percent in 2000 to 18-20 percent in the last year, 2008.

The other university investigated in this study is a British university: Manchester Metropolitan University (MMU). MMU is one of the largest unitary universities in the UK with more than 33,000 students. It comprises seven Faculties: (1) Art & Design; (2) The Business School; (3) Community Studies & Education; (4) MMU Cheshire; (5) Hollings: Food, Clothing & Hospitality Management; (6) Humanities, Law & Social Science; and (7) Science & Engineering. Its 40 academic departments provide education in around 400 courses at undergraduate and Post graduate level in both full time and part-time modes. It has twelve excellent teaching Quality assessments in areas such as Mechanical Engineering, Art and Design, Sport and Exercise Science, Clothing Design and Technology. Based on these universities' concerns to instrument student retention initiatives, this work seeks to develop a SD student retention model which allows a more comprehensive understanding of no-continuation causes and define more effective strategies. No-continuation rates are higher than in Mexico. Although measured differently, the rate of students not completing courses in UK higher education was reported to be as high as 1 in 5 (20%) for 2006-07 (National Audit office- Staying the course: the retention in higher education, 26-July-2007). Possible reasons for this include: (a) academic failure; (b) selecting the wrong course; (c) a range of personal problems (mainly financial); (d) lack of student support; and (f), lately, increasing class sizes. Retention and its consequences for the economy is an issue highly debated in the UK and the government has launched a range of initiatives making made funds available to tackle this problem. However, in comparison with other OECD countries, these UK figures compare favorably.

The paper proceeds as follows: (1) in the following section we report in the literature in the area of the managing retention in higher education, we assemble terms used in both universities indicating that although there are differences on conceptualisation, we expect to find enough commonalities to use data from both universities; (2) we then proceed to review models that are focused on students' satisfaction and use the work of Rowley (2003) depicting five stages in the relationship between students and its host universities (*Introduction, Experimentation, Identification, Continuous Renewal and Dissolution*) as the base for our systems dynamics model; (3) A model depicting the transit of students from enrolment to graduation, is proposed and mapped into the four interlinked sectors as the core of the systems dynamics model, these sectors are: *Introduction* (or induction); *Retention*; *Motivators*; and *Finance* sector, We expect to run the model when data is collected; so in section 4 the results will be discussed and in section 5 appropriate recommendations will be advanced. Because this paper is in developmental stage, here we only report on sections 1 to 3.

2. Literature Review

2.1 Some relevant definitions

In order to undertake a review of the conceptual framework on student retention, this section begins by describing student non-continuation, the other side of the coin of retention. We found that the theme of no-continuation and retention has been equally analyzed, so our

review will use studies from both sides of the same coin (for instance in the UK the problem of Retention has been largely studied). This is due to the fact that non-continuation has been more widely analyzed. Student non-continuation can be defined as the fact by means of which a student abandons voluntarily or involuntarily studies in a definite manner without completing the total content of the academic program (Duran y Diaz, 1990). With the purpose to measure non-continuation, institutions have looked to different ways to make operative the concept. In the two universities under this study, the conceptualization of these terms is slightly different even though although, broadly, they are referring to the same problem. What follows is a compilation of some concepts used by both universities:

Universidad de las Americas, Puebla (UDLAP)

At UDLAP, there are three modalities to identify non-continuation:

(a) Voluntary non-continuation. Takes place when students follow a formal procedure to leave the university.

(b) Incurred non-continuation. This is the case when students face an academic or disciplinary situation. This prevents them from continuing their studies. Academically, students can not continue when they have incurred in a second withdrawal due to low academic achievement.

(c) Potential non-continuation. This is when students have not enrolled for more than six consecutive semesters and have completed less than half of the total credits of their corresponding program.

Manchester Metropolitan University (MMU)

In the UK, the retention of students in higher education is highly in the agenda of universities and advisory bodies. The National Audit Office (NAO) produces a report every two years and monitors retention and non-continuation and makes recommendations as to how to improve the completion of students in higher education ('Staying the course: The retention of students in higher education, report by the comptroller and auditor general, NAO,2007). It is likely that we will use this data in the modeling part of this study. The terminology for this purposes is slightly different to the one used at UDLA but essentially they are driven by the indicators that are needed to be measured. These are some of the definition used by NAO (2007: pp 53-54):

(a) Continuation: The proportion of the annual intake of new students who return to higher education in the subsequent year.

(b) Completion: For the purposes of the performance indicators published by the Higher Education Statistics Agency, completion refers to the proportion of new students projected to obtain a degree at their original institution within 15 years.

(c) Benchmarks (for continuation): Because there are such differences between institutions, the average values for the whole of the higher education sector are not necessarily helpful when comparing higher education institutions. The Higher

Education Statistics Agency therefore calculates a sector average which is then adjusted for each institution to take into account some of the factors which contribute to the differences between them. The factors allowed for are subject of study, qualifications on entry and age on entry (young or mature). The average, adjusted for these factors, is called the adjusted sector benchmark. The benchmarks are calculated using data from all United Kingdom institutions.

2.2 Perspectives on the issues related to non-continuation of studies

Different perspectives have attempted to explain non-continuation, from the sociological, psychological, economical or managerial fields of knowledge. Within the sociological field, the *Structuralistic* perspective regards student non-continuation as the result of contradictions of the political, economic and social subsystems that finally influence student decision to dropout. A critical posture is then normally adopted by these studies in relation to the higher education role as a mechanism to reproduce social conditions and to filter social mobility in the labor market.

The structural models assumptions act to limit their capacity for explaining behavior at particular institutional level, as non-continuation is a phenomenon pertaining to the total system as whole; only at this level non-continuation becomes recognized as a problem (Lujan and Resendiz, 1981). Following this line of thought, arguments provided by students to abandon higher education can be made invalid as they are considered as ideologies that hide the “truth”.

Structural studies are not linked to a specific methodology. However, as the real reasons to abandon are beyond the actors will, they tend to focus on extra academic variables to explain non-continuation, such as: socioeconomic status, parents’ occupation, family income, labor market conditions, etc. (Willis, 1981). According to Duran and Diaz (1990), these arguments seem inadequate for the Mexican higher education context, as student who arrive to this educational level have already gone through a previous selection process.

The *Economicist* perspective of non-continuation is based on the human capital theory and explains this phenomenon as a rational choice of economic costs and benefits made by the students (Thurow, 1970; Becker, 1962; Schultz, 1961). According to this perspective, an individual would invest time and monetary resources in education as long as the discounted benefits derived from this decision are sufficient to cover the costs, including opportunity cost, and if education is at least as profitable as alternative uses of those resources. However, it is very unlikely that individuals would be able to know with anticipation the value of the relevant variables in order to act with the aforementioned rationality. Even though an approximation to those values could be made, there are many factors that impede a reasonable control on these variables. Non-continuation studies within the economic field, therefore, tend to have a normative/positivist inclination, which makes them inappropriate for conducting social research.

A third perspective, the *Integrative* is undoubtedly the most used framework to explain non-continuation and from which successful institutional policies to increase retention have derived (Flannery et al, 1973; Tinto, 1973; Spady, 1971; Pascarella and Terenzini, 1979). Non-continuation is explained as the result of insufficient student integration to the intellectual and social university environment and community. Thus, Tinto (1975) argues that those students who are more involved with the institutional academic and social milieu are

less likely to dropout from university. In the same vein, Rickinson and Rutherford (1995) point out the degree to which students feel academic and emotionally prepared at the beginning and during university studies as a key factor for completing their programs.

The Integration perspective has oriented more recent studies which attempt to distinguish the contribution of academic or emotional factors on the decisions made by students to leave or remain. There are some studies which emphasize psychological factors as determinants to students' retention. Accordingly, personal and emotional advice is considered a key institutional policy for increasing retention (Wilson et al, 1997). However, social isolation, as demonstrated by Pascarella and Terenzini (1979), has proved to be an important determinant of retention only after eliminating the effect of academic performance.

In relation to academic performance, Schwartz and Washington (2007) have shown that performance at high school is the most important predictor of student persistence. And, once at college, academic performance contributes to explain 10-12% of the variance in retention/non-continuation rates (Tinto, 1993).

A new marketing stream of thought within the Integration literature has emerged in recent years (DeShields et al, 2005; Rowley, 2003). This perspective stresses the role that institutions can play in molding academic and support elements to influence students' permanence by increasing the level of satisfaction. It is known that satisfaction level is determined by the difference between service performance as perceived by the customer and that customer expects (Parasuraman et al, 1986). In the context of higher education, it is argued that satisfaction should be based on long term student interests and commitment to institutional and society goals. These studies attempt to find those elements that contribute to strengthen students' satisfaction and consequently their loyalty towards a particular institution. In this case it is not only important students decision to remain but also their opinions and attitudes that influence other students to behave similarly, acting then as promoters for increasing institutional loyalty (Rowley, 2003).

2.3 Models focused on student satisfaction

The model presented here is mainly based on two works which deal with student satisfaction. The first one is a study developed by Deshields *et al* (2005) who following the Herzber's motivation-hygiene theory associates student retention to two sets of factors.

The first set of factors labeled as "satisfiers", "motivators", or "intrinsic factors" results in satisfaction when adequately fulfilled, but if not provided efficiently leads to no-satisfaction.

A second set labeled as "dissatisfiers", "hygiene factors", or "extrinsic factors" causes dissatisfaction when deficient, but if adequately fulfilled does not cause satisfaction, but no-dissatisfaction.

In the first set of factors there are two subsets which comprehend the variables listed below:

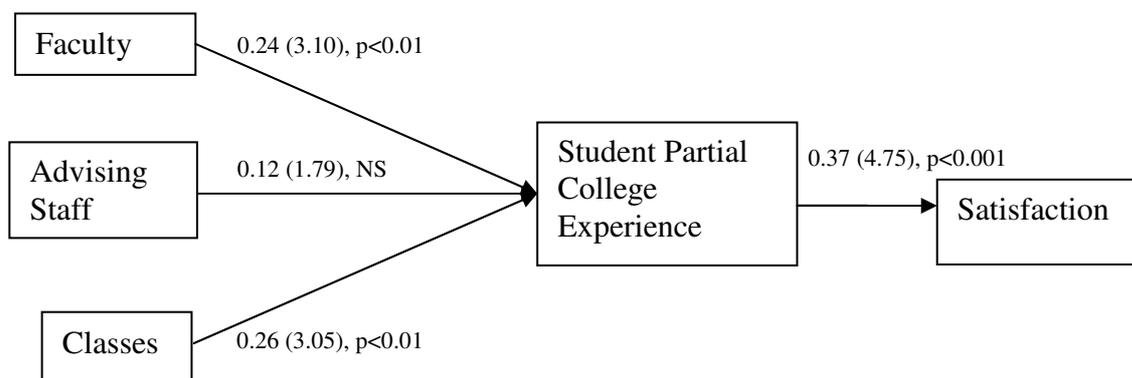
- Faculty: understanding, accessible, professional, reliability, and providing feedback.
- Classes: real-world relevance, course scheduling, and projects/cases.

The hygienic group is associated to the role carried out by advising staff in providing information and counseling for students, and this is characterized by the following variables: accessible, reliable, willing to help, responsive, and understanding.

Using factor analysis and path dependence analysis, the authors were able to relate the three factor groups to a dependent factor named Student Partial College Experience (SPCE), which is composed of the following variables: cognitive development, career progress, and business skills. Cognitive development is a measure of students' personal learning such as improved problem solving ability. Career progress measures the degree to which students believe that programs help them to get ahead in their life career plans. Business skills development measures the degree to which students believe they are learning the skills they need to succeed in business.

Thus, faculty performance, classes, and advising staff performance are the major factors that the authors focus on to influence students' satisfaction/dissatisfaction with higher education. Students who have positive experience will be more satisfied than those students who do not have a positive college experience. Thus, satisfaction will influence the students' intentions to stay at or leave the institution.

The results of LISREL analysis shows the following path estimates and t values (the t-values are in brackets):



Note: NS= Not significant

The study results indicate that the path coefficients from faculty and classes to student partial college experience are consistent with the assumptions that these are key factors that influence college experience. Also the path coefficient from SPCE to satisfaction confirms the influence of a positive experience. On the other hand, while the absence of good advising staff performance to college experience may lead to dissatisfaction, their presence does not lead to satisfaction, since students may not see advising staff as being directly related to the expected outcomes from a college experience.

To complement the results of the study presented there is a need to manage college enrollments from the point of initial student contact to the point of graduation (Seymour, 1993). Towards that end, the work of Rowley (2003) seems relevant. This author proposes to extend the analysis of the relationship between students and universities to five stages:

(1) Introduction: *Choosing a partner*, is the first stage during which a customer makes a careful choice of the communities and organizations with which they wish to engage. In this stage students gather information through marketing communication and open days, and seek to assess whether what university has to offer matches their requirements, both at a cognitive and an emotional level.

(2) Experimentation: *Structuring the relationship*, is the period during which the student and the organization become better acquainted. For students this period occurs early in their time in higher education. Induction and first week experiences are pivotal, not just because they come at a time when the student has a lot to learn about the nature of the relationship, but also because this is a great change in their lives.

(3) Identification: *Devoting time to developing the relationship*, may involve diligent enquiries about service quality, customer satisfaction, seeking opportunities for creating value, building trust and ensuring commitment. This could be described as the courtship phase during which the student gradually becomes a member of the academic community.

(4) Continuous renewal: *Maintaining lines of communication*, is the period during which the dialogues are well established. Students have relationships with academic and some support staff, and most importantly, other students. Withdrawal is less likely to occur, because the student has by now invested a considerable amount of time in the relationship, and wants to manage that relationship in order to succeed and complete their studies.

(5) Dissolution: Parting in good terms must be managed so that trustworthiness is not diminished. At this stage it is important that the student leaves with good memories, so that the parting is on terms that would allow the student to re-initiate the relationship with the university in other roles.

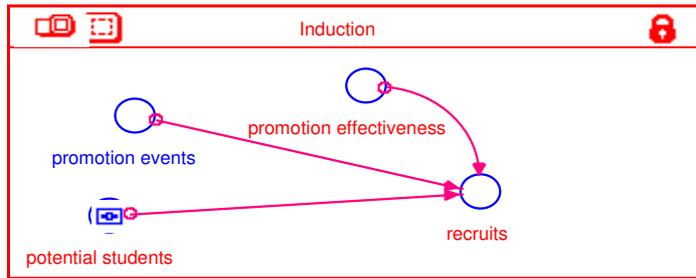
The author recommends to universities to manage each of the stages in the relationship life cycle, even though the players or “service agents” at each stage may be different. And she goes on to argue that too many withdrawals strategies focus on the first two stages, and take the later stages for granted.

As already said these two later studies were pivotal in designing the model which is presented in the following section.

3. Model description

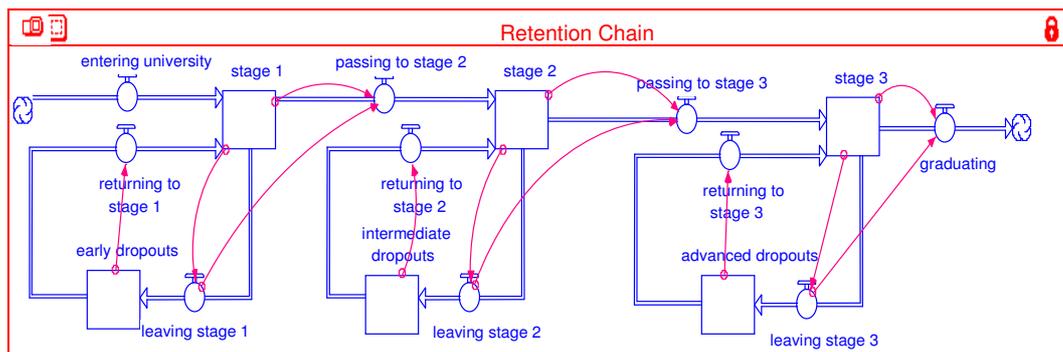
3.1 Induction or Introduction sector

This sector includes activities to promote and attract new students.



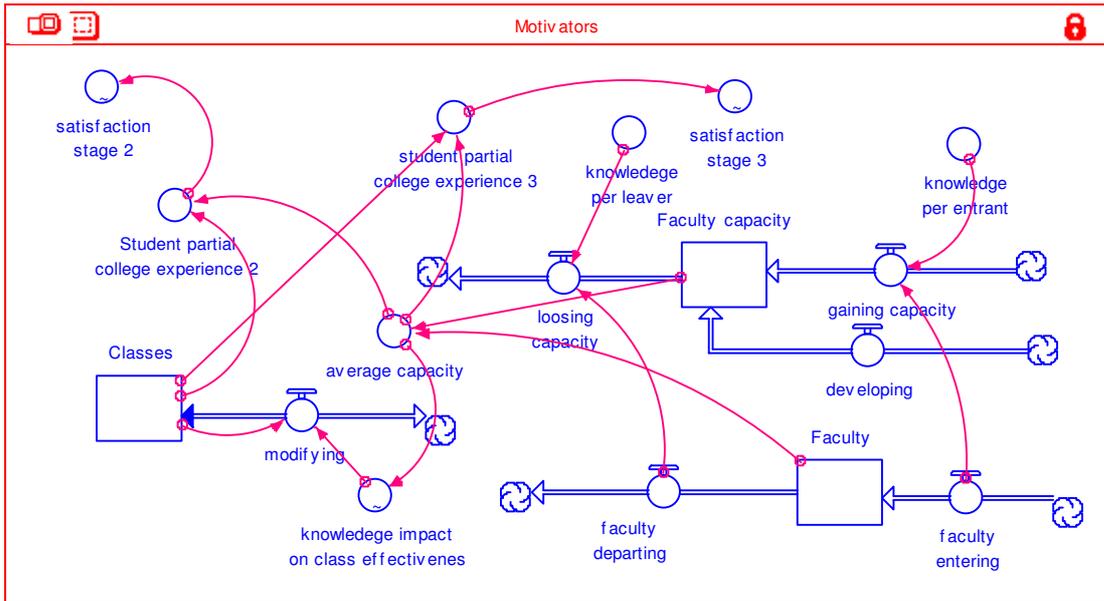
3.2 Retention Chain sector

In this sector will show how students ‘travel’ through different stages during their studies, from entering the university to graduation. There is the possibility of dropping out between the stages, but also students can reenter stages.



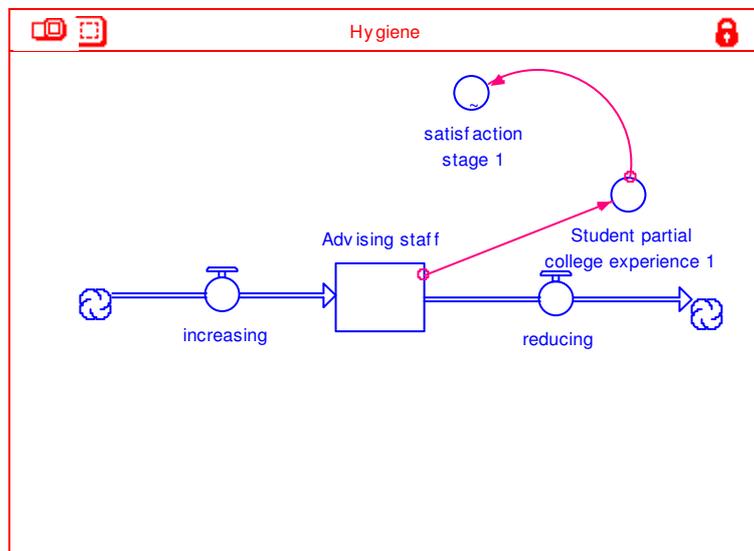
3.3 Motivators sector

These include the *faculty* and *classes* factors as explained above in section 2.3. It is possible to have changes in the *faculty* capacities and the number of faculty as well as in the quality of *classes*. Both factors contribute to college experience (SPCE) and to the level of student satisfaction.



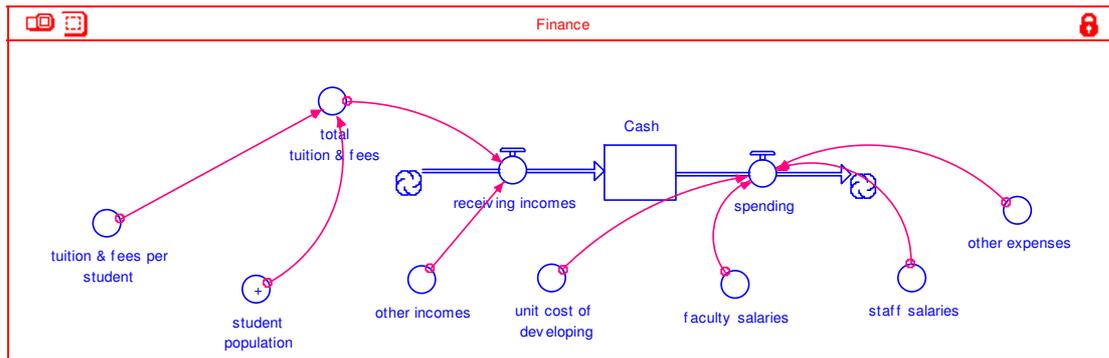
3.4 Hygiene sector

This comprises participation of advising staff, institution experience, and student satisfaction level. In this case changes are represented by recruitment and turnover of staff.



3.5 Finance sector

This sector includes financial implications of students' tuition and fees. Expenses are represented by faculty and staff salaries. Other incomes and expenses are also included.



4. Discussion of results

To be completed and when final runs of the model are carried out; each sector in the runs will be analysed and discussed.

5. Conclusions and recommendations

This will follow discussion of results

6. References

- DeShields, Oscar W. Jr, Ali Kara y Erdener Kaynak, (2005) "Determinants of business student satisfaction and retention in higher education: applying Herzberg's two-factor theory", *International Journal of Educational Management*, Vol. 19, No.2, pp. 128-139.
- Durán Encalada, Jorge A. y Graciela Díaz Hernández, (1990) "Análisis de la Deserción Estudiantil en la Universidad Autónoma Metropolitana", *Revista de la Educación Superior*, Vol. XIX, No. 74, abril-junio, pp. 95-128.
- Flannery, John et al, Final Report of the ad hoc committee to study non-continuation at Miami-dade Community College, Miami-dade Community College, 1973.
- National Audit Office (NAO) (2007) Staying the course: The retention of students in higher education, Report by the comptroller and auditor general, The stationary office, London, 26 July 2007.
- Luján, Juan R. y Alfonso Reséndiz N. (1981), Hacia la construcción de un modelo causal en el análisis de la deserción, Universidad Autónoma Metropolitana, Iztapalapa, México, 1981.
- Pascarella, E.T. and Terenzini, P.T., (1979) Interaction effects in Spady's and Tinto's conceptual model of college dropout", *Sociology of Education*, 52, 1979, 197-210.
- Rickinson, B. and Rutherford, D., (2005) Systematic monitoring of the adjustment to university of undergraduate: a strategy for reducing withdrawal rates, *British Journal of Guidance and Counselling*, Vol. 24, No.2, 1996, pp.213-225.

- Rowley, Jennifer, (2003) "Retention: rhetoric or realistic agendas for the future of higher education", *International Journal of Educational Management*, Vol. 17, No.6, 2003, pp. 248-253.
- Schwartz, Robert and Charles Washington in Seidman, A. (Ed), (2007) *Minority student retention: The best of the journal of college student retention: Research, theory & practice*, Amityvile, NY: Baywood Publishing Company, 2007.
- Seidman, A. (Eds.), (2007) *Minority student retention: The best of the journal of college student retention: Research, theory & practice*, Amityvile, NY: Baywood Publishing Company, 2007.
- Seymour, D.T. (1993) *On Q: Causing Quality in Higher Education*, Oryx, Phoenix, AZ, 1993.
- Spady, William G. (1971) "Dropouts from higher education: toward an empirical model", *Interchange*, No.2, 1971, pp.38-62.
- Tinto V., (1975) "Dropouts from higher education: a theoretical synthesis of recent research", *Review of Educational Research*, Vol. 45, 1975, pp.89-125.
- Tinto, V. (1993) *Leaving college: Rethinking the causes and cures of student non-continuation* (2nd ed.), Chicago. University of Chicago Press, 1993.
- Waggoner, David and Paul Goldman (2005) "Institutional rhetoric and student retention policy", *Journal of Educational Administration*, Vol. 43, No.1, 2005, pp. 86-101.
- Wilson Steve, Terry W. Mason, and Michael J.M. Ewing (1997), "Evaluating the Impact of Receiving University-Based Counseling Services on Student Retention", *Journal of Counselling Psychology*, Vol. 44, No.3, 1997, 316-320.