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| RESEARCH ARTICLE

## Factors Affecting Student Retention: A Complex-Systemic Study of EFL Students at Cadi Ayyad University

Hassan Ait Hammou<sup>1</sup> ✉ Youcef Hdouch<sup>2</sup> and Lalla Meriem Ouahidi<sup>3</sup>

<sup>1</sup>Faculty of Languages, Letters and Arts, Ibn Tofail University, Kenitra, Morocco

<sup>3</sup>Faculty of Arts and Humanities, Sultan Moulay Slimane University, Beni Mellal, Morocco

**Corresponding Author:** Ait Hammou Hassan, **E-mail:** [hassan.aithammou@uit.ac.ma](mailto:hassan.aithammou@uit.ac.ma)

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| ABSTRACT

In order to shed light on the problem of student retention (a university's ability to retain its students), this paper analyzes the implementation of complexity theory in Moroccan universities. Tinto's (1975) Student Integration model served as its main reference. Through the lenses of nestedness and networked interactions, we examine the case of the English department at the factors affecting student retention at the English department and (b) build a model that will serve as an example for student retention there. In order to address the topic at hand, the study conceptualizes student retention as an emergent phenomenon brought on by component and agent interaction in a complex system. Data was gathered from freshmen English department students. EFA (exploratory factor analysis) and correlations were used to analyze the quantitative data. Statistically significant findings supported three of the five hypotheses. According to the research, four variables from the initial model were revealed by the EFA. The following variables are: (1) Initial goal and institutional commitment; (2) Social integration; (3) Family background; and (4) Academic integration. In a nutshell, this paper seeks to investigate how complexity perspectives might be used to construct student retention models that will guide institutional decision-making at Moroccan universities.

| KEYWORDS

Complexity Theory; Student Retention; Moroccan Higher Education; Complexity Pedagogy.

| ARTICLE INFORMATION

**ACCEPTED:** 19 March 2024

**PUBLISHED:** 05 April 2024

**DOI:** 10.32996/ijels.2024.6.2.1

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### 1. Introduction

Student retention refers to an institution's capacity to maintain students' enrollment. In literature study, there are two types of constructs: one focuses on students who drop out of university, and the other on those who stay. The latter is made up of student persistence and student retention, or students' willingness to graduate from university. Since it is challenging to track students who drop out of school, I have chosen to focus on the university's capacity to keep students (student retention).

There hasn't been much research on student retention in Moroccan universities. More crucially, according to (Davis and Sumara 2006), the application of complexity thinking, which uses the characteristics of complex systems to describe learning systems, is still in its infancy stage as a potent conceptual framework for education. Complexity thinking offers a starting point for modern educational research thinking because of its organic, non-linear, relational, and holistic characteristics (Morrison 2005). To examine the topic of student retention from a fresh and novel angle, this paper applies complexity thinking.

### 2. Literature Review

#### 2.1 Student Retention Models

According to studies on student retention, both the social and academic facets of involvement in higher education have a significant impact on how students develop academically. The Student Integration Model, a foundational piece of theoretical

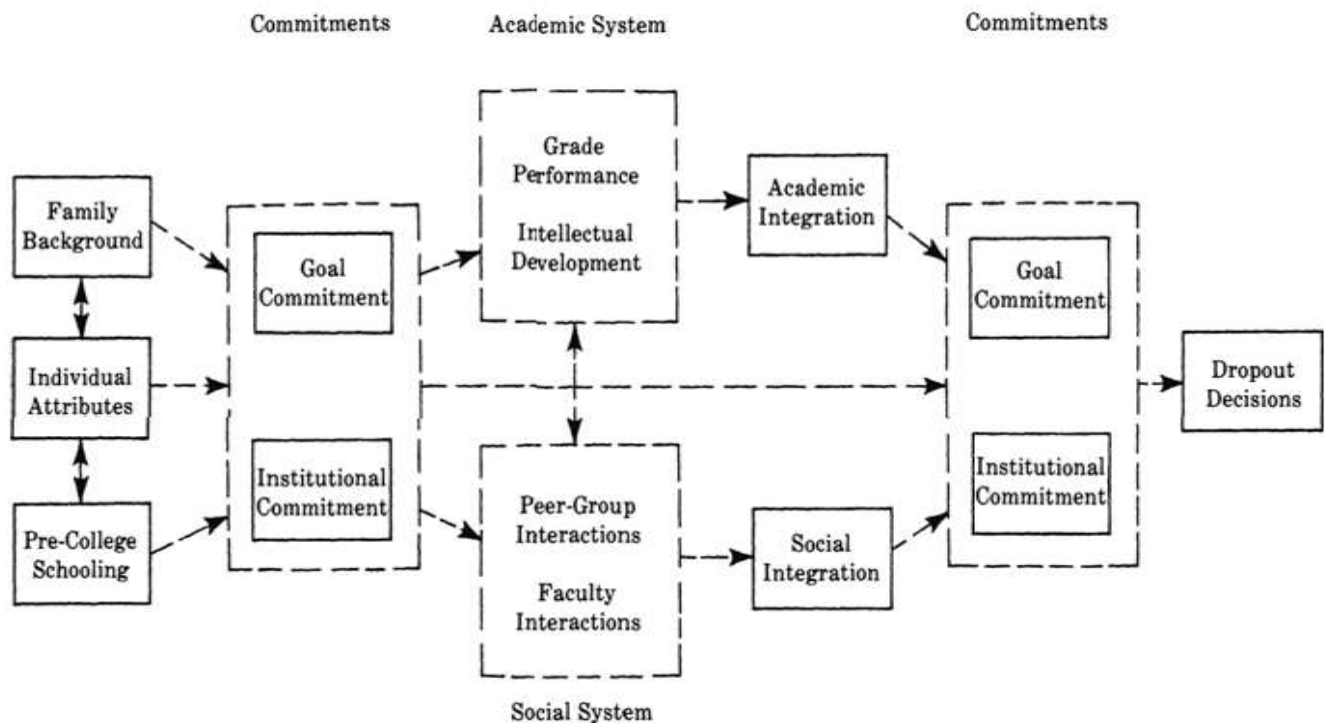
modeling, was elaborated by Tinto (Tinto, 1975; 1982; 1987; 1997). Moreover, Bean is one of the key researchers behind the founding of the Student Attrition Model (Bean, 1980; 1982). The previous two theoretical models differ significantly from one another, yet they also have a lot in common. Consequently, they can be viewed as describing a variety of complementing factors in many ways (Cabrera et al., 1992).

Early research on student retention in higher education focused on university infrastructure like schedules, library architecture, course content, and test calendars (Yorke and Longden, 2004). From that point forward, the modeling of student retention began to incorporate a social integration approach more and more. The work of Spady played a major role in the spread of this change (Spady 1970; 1971).

For proponents of the social integration model, one must interact with a society to internalize its values, customs, and beliefs before they can truly call themselves a part of that society (Forsman, 2015). For attrition rates to drop drastically, students needed to become a part of the campus culture, a fundamental aspect to the development of Spady's theoretical framework. Spady claims that students invest plenty of time into adjusting to campus life. Everything from their academic development to the love and support of their families to the bonds of friendship to the satisfaction of their lives is a part of their education. variables like family background, academic performance and academic potential are also accounted for in Spady's model.

The social integration model was well-recognized and valued in research on student retention because it had the ability to inform students' and universities' efforts aimed at retaining further students. Tinto (1975) upgraded Spady's theoretical model of student retention that served as the theoretical foundation for the social integration model. Tinto claimed that students must integrate academically to pursue education, he made a distinction between the social system of the university and the academic. He argued that not all social integration-promoting interactions, such as forging new friendships, necessarily result in integration into the university's academic system. The academic guidelines, expectations, and conventions that control academic integration within the context of the institution were contained in Tinto's (1975) academic system.

**Figure 1: Tinto's (1975) conceptual model for university student dropout.**



Many academics began to empirically examine Tinto's work in the early 1980s and concluded that many of his components had a major impact on student retention (Forsman 2015). Using a psychological framework at the time, Bean (1980) criticized Tinto's model for lacking external issues like the economy and housing. In Bean's (1980) model, student attrition was explained by drawing an analogy between it and employee turnover in a workplace. Social experiences (students' perceptions and experiences of the university's "high quality"), the experience of the university's quality and parental approval were included in Bean's methodology. According to Bean (1980), these characteristics contributed to the formation of students' behavioral philosophies and attitudes inside university.

Cabrera et al. (1992) conducted a study with 2,453 full-time first-year students in the United States to test Bean's and Tinto's models. The research determined that these models have a shared foundation and are mutually explanatorily valuable. They developed a questionnaire containing 79 items culled from tested instruments previously employed in studies on student retention.

After that, avoidance behavioral scholars Eaton and Bean (1995) claimed that student's unique behavioral approach to university life is determined by their experiences. Some experiences produce approach behavior, while others produce avoidance behavior. Both behaviors influence academic integration and student's intentions to drop out or stay at university.

Later, Tinto (1997) developed his previous concept with a case study. His revised model introduced internal and external communities that affect students' academic and social integration in university. Tinto claims that classrooms are learning communities. These new constructs could help professors increase student retention through learning communities and external communities (Tinto, 1997).

Although Tinto's model has been widely used to study student retention, it is not without limitations. The model neglects the role of finance on student retention (Bean and Metzner, 1985; Cabrera et al., 1992; St. John et al., 2002). It fails to distinguish between factors leading students to transfer rather than dropout (Tinto, 1982; Pascarella and Terenzini, 1983). In addition, it fails to incorporate the important differences in educational career paths for students of different race, gender, and social background (Tinto, 1982).

Very little additional fundamental theoretical work in student retention has been published in the literature after the establishment of the previously mentioned two models. Because of the significant discrepancies between Tinto's model's empirical trials and findings, according to Braxton (2000, p. 258), it must be "seriously changed." Braxton contends that this call for the creation of a new framework for such modeling. Additionally, Tinto (2010) recently made the case for the necessity of creating models for student retention that are intended to guide university institutional decision-making.

This part has presented a brief review of the literature on student retention in higher education. mainly the Student Integration Model (Tinto 1975) and the Student Attrition Model (Bean, 1980; 1982) and their empirical findings. It was concluded by the inconsistencies and limitations of these models. The next part will present Complexity theory.

## **2.2 Complexity Theory**

An overview of the components of complexity thinking is given in this section. It also aims at introducing the theoretical and conceptual underpinnings that serve as the basis for the solutions to educational research issues.

Complexity theory attempts to shed light on the nature of complex systems and the reasons why they exhibit regularity, hierarchy, and other forms of organization. These hierarchies, patterns, and structures in complex systems appear to emerge naturally without the need for top-down control, and this is an important phenomenon to keep in mind.

Forsman (2015) proposed creating a theoretical framework which embodies prior research in student retention studies and incorporates new phenomena and methodologies to pinpoint successful interventions missing in earlier attempts to model student retention.

Amime (2016; 2019) first coined the concept of complexity pedagogy. He defines pedagogy as a science that embodies education and establishes its theoretical and practical side. He argues that complexity pedagogy transcends the classical definition of pedagogy which used to link it to education and schools. Amime (2016; 2019) posits that complexity pedagogy is the science and art of solving problems and coming up with solutions in a variety of social settings.

Complexity pedagogy is a contextual pedagogy, originating from complex Moroccan contexts. Therefore, this pedagogy aims at raising the awareness of Moroccan educators to develop a complex pedagogy that considers its characteristics, responds to its challenges, and provides solutions that consider the contexts of its application.

Many researchers claim that the phrase "too complicated to understand" has been used frequently to describe student retention when it comes to complexity. This is because academics have uncovered numerous important factors that may influence students' decisions to continue their education. Additionally, because these factors interact with one another, dealing with the system is exceedingly "messy." The work of (Forsman, 2014; 2015), which combines these numerous interacting aspects into the modeling of complex systems, served as inspiration for the theoretical framework provided in this paper.

The Student Integration Model and the Student Attrition Model focus on two levels of the system under study, hopping between the individual and the system level, according to Forsman (2015). This poses additional theoretical and methodological issues. This is addressed by the concepts of nestedness and fractals/scale-invariance/scale-variance from complexity theory.

Forsman (2015) goes on to claim that problems can arise from the empirical discrepancies between different student cohorts' effects on retention factors, but only if such discrepancies are interpreted as linear cause-and-effect correlations. The discrepancies could, rather than being an issue, be considered as actually indicative of the intrinsic character of the important elements discovered considered possibly non-linear by applying complexity theory.

### **3. Methodology**

The study is exploratory in nature. It used purely quantitative methods to gather data from the students. It aims to collect data, investigating and analyzing it to probe the targeted phenomenon of student retention in depth through coding and decoding different items included in the Student Retention questionnaire administered to students.

The questionnaire was originally created by Pascarella and Terenzini (1980). The main variables include initial goal and institutions commitment, social integration, academic integration, and subsequent commitment to goals and institutions. The questionnaire employs a five-point Likert scale, with values ranging from strongly disagree (value 1) to strongly agree (5) and is made up of twenty-nine items.

Data analysis and decoding was performed through the incorporation of SPSS program. The aim is to leverage the various theoretical and illustrative elements of complexity thinking to better comprehend the complex systems of universities and student retention, not to create new variables for modeling student retention.

The procedure followed to collect data in this research took into account different steps. To start with, and after getting the formal consent from university administration, the professors and student were informed about the research objectives and issues. Finally, we conducted a pilot study before carrying out the main one.

From here a formulation of a possible visualization of the structure and dynamics of the complex system of student' retention is created through the use of the following tools that can be seen to be complimentary to those used in complexity studies: exploratory factor analysis (EFA) and correlations.

#### **3.1 Statement of the problem**

Student retention research is one of the most widely studied topics in higher education over the past thirty years (Braxton, 2002; Seidman, 2005). Since then, several theories have been developed to explain student retention. Taking the English department as a complex system, every year thousands of students get enrolled, but the problem is that only too few of them succeed to persist and get their degree.

#### **3.2 Rationale and goal of the study**

In 2018 The ministry of national education pointed out that 16.5% of university students drop out in their first year while 8.1% drop out in the third. The alarming figure is that 47.2% of university students drop out without getting any degree at all.

The current paper pinpoints the variables influencing student retention at the Marrakesh faculty of letters and humanities' English department. Examining and evaluating models of student retention developed in the literature requires a complex environment. Additionally, the paper tries to show how complexity theory can be applied to the modeling of English departments' ability to keep their students. In the meanwhile, this study attempts to offer pertinent advice to construct student retention models that will guide institutional decision-making at Moroccan universities.

#### **3.3 Setting and participants**

115 freshmen English department students participated in the current study at the Faculty of Arts and Humanities (FLSH) Cadi Ayyad University. They were males and females from different Semester 2 groups. Research has revealed that most students drop out during their freshman year, hence freshmen students were chosen as a population for this paper. (Astin, 1993; Tinto, 1993; 1996; Johnson, 1994; Yorke, 1999; Blythman and Orr, 2003; Fitzgibbon and Prior, 2003; Pascarella and Terenzini, 2005).

#### **3.4 Research questions and hypotheses**

To determine the factors affecting student retention in the Moroccan Higer Education context, we formulated these research questions:

- a. What are the factors that affect EFL student retention at the English department at Cadi Ayyad university?
- b. How can we establish an informative modelling of student retention in the complex system of the English department?

In order to answer the research questions above, these research hypotheses were to be tested:

- H1. Student retention depends on grade achievement.  
 H2. Satisfaction with the financial situation leads to student retention.  
 H3. Female students are more retained than Male students.  
 H4. Science baccalaureate students are more retained than arts/humanities Bac students.  
 H5. Student retention depends on parents' education.

To recap, this section has so far shed light on the methodology, instruments and procedural tools adopted to investigate the issue under study. It, therefore, paves the way for the coming section where the obtained data are described, analyzed, and discussed.

#### 4. Results and Discussion

##### 4.1 Results of testing hypotheses.

The hypotheses were tested by using statistical tests including Spearman test correlation, T-test and ANOVA to show statistical correlations between variables. The results of the hypotheses testing are presented in Table 1. Three of the five hypotheses were shown to be supported by statistically significant findings. The following supported hypotheses:

| Hypothesis   | Statistical Test | result      |
|--|------------------|-------------|
| 1. Grade achievement will be positively related to student retention.                                      | Spearman's rho   | Confirmed   |
| 2. Satisfaction with financial situation leads to student retention.                                       | Spearman's rho   | Unconfirmed |
| 3. Male students are more retained than female students.   | T-Test           | Unconfirmed |
| 4. Science/Economics baccalaureate students are more retained than arts/ humanities baccalaureate students | T-Test           | Confirmed   |
| 5. Parents' education has a positive effect on student retention.  | One way ANOVA    | Confirmed   |

**Table 1. Hypotheses summary**

For H1, Grade achievement has a direct effect on the drop-out/ retention decision because students who have poor grade achievement may choose to drop out or can be dismissed for academic reasons (Tinto, 1975). In contrast, students who have high-grade achievement will choose to persist and will be retained.

For H2, according to the table above, we can observe that there is no significant relationship between financial satisfaction and retention. Tinto (1975; 1982) argued that students' financial situation was of a paramount importance to students to be retained in university because retention and finance are deeply related to each other.

For H3, in general, both male and female models did not support most of Tinto's propositions. Both models had a generally similar pattern. None of the background variables had a direct effect on either initial commitments or retention.

For H4, Science/ Economics students are more retained than Arts/ Humanities students. The Mean for the first group of students is 4,38 whereas it's 3,82 for the latter.

For H5, the results indicated that family background was significantly associated with student's retention. This indicated that students whose parents had high levels of formal education were more likely to have high levels retention. This is consistent with Tinto's theoretical expectations and with previous research (e. g., Pascarella, Duby and Iverson, 1983; Braxton, Vesper and Hossler, 1995). So, we can conclude that parents' education has a positive effect on retention; as parents' education increases retention also increases.

##### 4.2 Results of exploratory factor analysis (EFA)

Typically, EFA will demonstrate that some items are present in several factors. The shared variables amongst the layered systems were seen as evidence of interactions between them. We have conducted an exploratory factor analysis using the data items that have solid foundations in the literature. It was feasible to recognize the multilayered complex systems (Forsman 2015) that constitute the broader system. Using the Statistical Package for the Social Sciences (SPSS), we conducted our analysis on the questionnaire data as well as the students' English baccalaureate grades, modules passed in semester 1, age, and gender.

In order to create a suitable correlation matrix of items to be used for exploratory factor analysis, the following three measures were combined:

1. Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy. We eliminated some questionnaire items from the data repeatedly till the Kaiser and Rice (1974) recommended value of 0.70 was reached.

2. Bartlett's (1950) sphericity test. When criterion 1 was met, this had a significance level of less than 0.000.
3. The sampling adequacy indicator known as the anti-image correlation (MSA). Items having a value less than 0.5 were omitted.

|                                   |                           |          |
|-----------------------------------|---------------------------|----------|
| <b>(KMO) Sampling Adequacy</b>    |                           | ,702     |
| <b>Bartlett's Sphericity Test</b> | <b>Approx. Chi-Square</b> | 1117,187 |
|                                   | <b>df</b>                 | 465      |
|                                   | <b>Sig.</b>               | ,000     |

**Table 2. KMO and Bartlett tests**

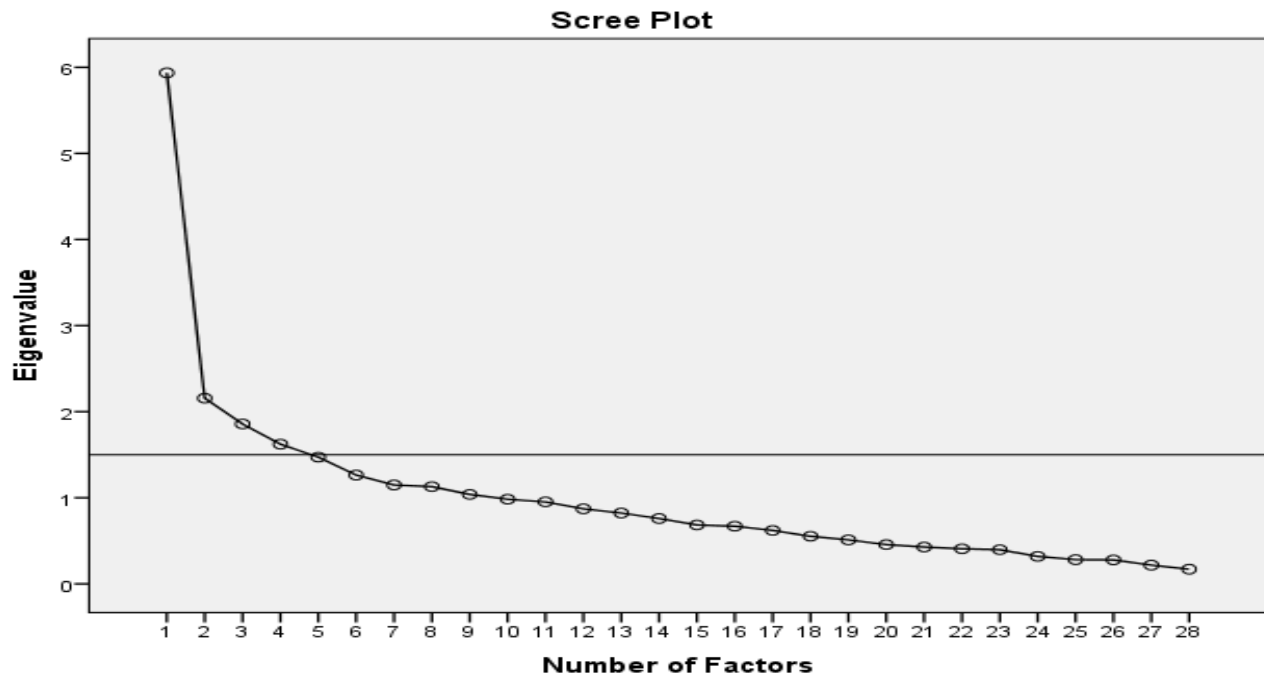
Consequently, six questions were excluded from the analysis; their labels are listed in Table 3. These items were determined to have minor influence on the student retention system, at least for the purposes of this study, given the small data set and the high rate of retention between the first and the second year.

| <b>Question No</b> | <b>Item</b>   |
|--------------------|---|
| -                  | Age   |
| -                  | Gender  |
| -                  | Students' English baccalaureate grades  |
| 6                  | My possibility to continue with my studies is dependent on me working while I study |
| 5                  | My Financial situation allows me to focus on study as professors demand.            |
| 27                 | university English course is much different from my previous English course         |

**Table 3. Removed items from the exploratory factor analysis (EFA).**

We conducted a scree plot (figure 2 below) to determine the number of components in the model. The "Scree plot" consists of checking the eigenvalues graph and counting the number of data points above the "break" point, or the place where the curve in the data naturally bends or breaks. Usually, the maximum number of variables to consider. To create the scree plot, each item is regarded as a vector with an eigenvalue (length) of 1.5 before the optimizations of the sum of the vector projections on factors are carried out. Using Figure 2 as an example, we can see that an eigenvalue of six leads to a One Factor solution, which informs us that all major loadings in One Factor can be pooled, providing us with six times as much information as a single variable. Furthermore, it suggests that the elements that make up the factor share traits.

**Figure 2. Scree plot displaying the number of components and eigenvalues following varimax rotation. The solution of four factors was selected.**



As a result, we choose to resolve the model utilizing the four factors. A five-factor solution only yielded one factor with two significant loading variables (above 0.32), which is not what the analysis method prescribes in a factor solution. Despite having a similar eigenvalue, the cut-off was set at four factors rather than five. The "additional" feature would not provide the analysis or questionnaire with significantly more information than one or two other variables. Significant item loadings for each component were discovered using a minimum loading of 0.32 on each item, which translates to a 10% common variance between items.

Thus, the following factors were generated from my data:

- ↪ **1st factor: Initial goal and institutional commitment;**
- ↪ **2nd factor: Social integration;**
- ↪ **3rd Factor: Family background;**
- ↪ **4th factor: Academic integration; Results of testing hypotheses.**

## 5. Conclusion and discussion

In this paper, I have tried to show how complexity theory and system theory can provide a novel and unique research perspective. Moreover, I have tried to illustrate the usage of some complementary tools to study student retention. For instance, using exploratory factor analysis (EFA) to show variables within the overall student retention complex system to illustrate their nested and interdependent structure. In order to provide a potential solution for this paper, the exploratory factor analysis produced four construct systems. It also demonstrated how a significant overlap, or fuzzy boundaries, between the systems may be interpreted in terms of the interactions and interdependencies between the systems and the items that affect student retention within the systems. Items that are common to several criteria may be seen as critical concerns, and post-secondary institutions may choose to focus their efforts or improvements in these areas to increase student retention rates.

This paper produced some intriguing findings that will be very beneficial to both students and the ministry of higher education. In terms of the students in the English department, the findings give professors, faculty staff, and parents some understanding of the various elements that go into keeping students enrolled. Additionally, the results of this study show that a variety of factors are important for academic success and motivating students to learn effectively, suggesting that faculty members and instructors should be aware of these factors. Additionally, the findings will increase educators' understanding of the importance of encouraging students to persevere and become more involved in the university's academic and social systems. Last but not least,

a key pedagogical implication this study supports is that by shedding light on these critical factors that were discovered during the course of the research, the literature on student retention will be much enhanced.

### **5.1 Limitations:**

Every study's findings have limitations, and this one is no different. Although this study provides answers to the research questions and provides evidence in support of the research hypotheses, there are some limitations that must be considered. The study only included a small number of participants. The results cannot be extended to other various wider situations because these participants were primarily from the Marrakesh faculty of arts and humanities' English department. The fact that some students did not take the study seriously should also be mentioned. This indicates that relying only on questionnaires is insufficient. In this sense, opting for, at least, interviews may be of great contribution to the already obtained results.

### **5.2 Suggestions and implications:**

The following suggestions are given to address how the Ministry of Higher Education in Morocco and Cadi Ayyad University in particular might improve the issue of student retention based on the findings of this study and the related literature review. The suggestions listed below are given to:

- Increased interaction between students and faculty in less formal contexts is advocated as a potential strategy for eliminating the cultural hierarchy that may be seen in students' responses to the previous question. High levels of student-faculty engagement are crucial for student retention, according to prior research (Tinto, 1993; Pascarella and Terenzini, 2005).
- It is advised that the minister of higher education and Cadi Ayyad University take action to guarantee that this scholarship would be enhanced, distributed broadly, and placed into the students' bank accounts on schedule and as anticipated.
- In order to promote social integration and students' interactions with one another outside of the classroom, I advise allowing students to create clubs and societies or join already-existing clubs where they can meet and socialize.
- It is suggested that during the first two weeks of classes, Cadi Ayyad University give more assistance and guidance to students, particularly to freshmen.

**Funding:** This research received no external funding

**Conflicts of Interest:** The authors declare no conflict of interest.

**ORCID iD** <https://orcid.org/0009-0009-1322-6846>

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