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# Academic success of first year university students and mastery of documentary research: applicability of the predictive model in the digital age

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**Abstract:** «In the first year of university, those who have the best results are those who have mastered or the skills in documentary research». These are the conclusions of several studies and predictive models of the academic success of newcomers to the university. In an era where digital technology is the rhythm of daily life, where access to information is facilitated, today's students have developed capacities for autonomy in information research. Is academic success enhanced? Using surveys, interviews and direct observation, this paper aims to study the validity of the predictive model presented above. This, with the final aim of identifying the gaps faced by students entering university today and thus rethinking the training offer, particularly in the use and access to sources of information in order to allow them a better adaptation and ensure their academic success.

## Introduction

Academic success according to Leclercq and Parmentier is synonymous with the successful completion of a course (achievement of learning objectives and mastery of knowledge); results and obtaining recognition of prior learning (diploma, certificate, attestation of studies, etc.) are indicators of this success (Leclercq & Parmentier, 2011). It is the result of a process of affiliation (Coulon, 1997) or integration (Dubet, 1994). Researchers distinguish two types of academic success; quantitative success and qualitative success. If the first refers to the pass rate, the second refers to the skills learned. Whatever the type of academic success, it is equated with accomplishment, the achievement of goals. In the first year of university, however, it is almost always and exclusively a question of authorization to move on to the following year. With or without repetition. Above all, we must not forget that the first academic year is considered a year of transition between two education systems. Secondary school students who reach higher education are not always equipped to face the new environment surrounded by «pedagogical vagueness» (Oberti, 1995) as to the work practices to be implemented in order to succeed. Newly arrived students at university do not know what work techniques to use. However, according to Perret (2013), university success is partly based on learning new standards and forms of work that are largely implicit when entering university, and the ability to self-document is essential to succeed (Coulon, 1997 and 1999).

Several research results [Alain Coulon (1996), Boyer and Coridian (2002), Mittermeyer and Quirion (2003), Sylvie Gervais and Clément Arsenault (2005), Thirion and Pochet (2008), Cathy Perret (2017)] make the link between the capacity for documentary research and the academic success of first-year university students. This predictive model would suggest that students

who have developed independent skills in documentary research do best in their first year of university. For example, according to the studies of Alain Coulon (1996) on the importance and effectiveness of documentary learning in intellectual work and the success of undergraduate students: from 1986 to 1989, the researcher followed 8171 students. Its aim was to find out if there was a correlation between the academic success of students with a mastery of documentary methodology. The results are striking. Indeed, students with an aptitude for documentary research succeed more easily and validate their university year. A new study carried out between 1995 and 1996 showed the same effects. Let us specify here that by «capacity for documentary research»: Coulon assimilates it to the capacity to seek and appropriate information with the objective of «knowing how to use the available resources, to master reading, to improve memory and organize their work ”and documentary research proper“ is a working method offered to students to enable them to build knowledge, to evolve in line with the society in which they live ”. (Coulon,1996). However, if this predictive model is verified until 1996, what about now when digital is law and where access to information is facilitated by the Internet modifying the report of the student and information? Indeed, with the advent of Information and Communication Technologies (ICT), student practices have changed. According to an American study in the dawn of the 2000s, it showed the predispositions of students to use the Internet in studies (Jones, 2002). Increasingly, students are autonomous on the question of information research, and most of the time, most of the time, they carry out their information research at home and in any place, without the help of an intermediary.

However, in the information age where students have relatively easy access to information, where information abounds, where new skills are developed, can it be said that students have developed the skills necessary for mastery of this new information environment to the point of successfully completing their university studies? In other words, under what conditions is the predictive model according to which students with a mastery of documentary research methodology are the most successful still valid today when students seem to change their relationship to information? With regard to the context (accessibility of information, autonomy in research, and more recently with the constraints linked to the pandemic), can we say that the autonomy in the search for information developed by the students is mastered and sufficient to ensure their success? Is academic success improved quantitatively and qualitatively?

This article aims on the one hand, to study the predictive validity of the model in its current environment in order to help in the orientation of the decision-making aiming at the integration or not in the programs, of a support module in documentary research. At least, extend this module to other sectors that do not relate to documentary information or info-com. On the other hand, the exploratory analysis of this predictive model could make it possible to identify the gaps faced by students entering university and thus rethink the training offer, particularly in the use and access to sources of information in order to allow them a better adaptation and ensure their academic success. To carry out our work, the chosen methodology includes a qualitative approach by direct observation and a quantitative approach by questionnaire.

## **Related Work**

Three major elements of the information search process have been studied in surveys of university students in recent years: the use of information sources, research strategy and academic success in the first year of university. This over two distinct periods: before and after the arrival of the Internet.

### **Before Internet**

A year of transition between two systems (secondary and higher), the first year at university is decisive and validating it is a major challenge for any student entering higher education. Leclercq & Parmentier (2011) estimates that «when statistics tell us about success at the end of the first

year of university education, it is almost always exclusively the authorization to move on to the following year. With or without repeating a year”(Leclercq & Parmentier, 2011). However, students entering high school have no mastery of research methodology. Also, a researcher carried out a study within the framework of the reform of higher education, provided for in the orientation law, the University of Paris 8 introduced in 1984 the teaching of documentary methodology, in the first university cycles. «It was about training the students in a method of intellectual work based on observable activities in the processes of research and appropriation of information. The objectives of documentary methodology were then to know how to use available resources, to master reading, to improve memory and to organize work ” (Coulon, 1996). Of the 8,171 students followed for three years, from 1986 to 1989, some of whom were studying documentary methodology and some not, the study showed a noticeable difference between the two groups. Alain Coulon affirms by this study that the performances of these students lead to a faster course.

“In fact, 59% of the students who have followed the documentation course reach the license two years later, against only 33% for the sub-group who did not follow this course. In addition, the exits by failure are much less numerous” (Coulon, 1996). Through this study, the researcher believes that the teaching of documentary methodology contributes to «the intellectual affiliation of first-year students». By «affiliation» he means the development of new working methods, the acquisition of knowledge, the management of time, the use of documentation.

## After Internet

Since the arrival of the Internet and connected objects, Information and Communication Technologies (ICT) have become the centerpiece in info-communication practices and information research. Indeed, Hatim (2017) states that «the development of digital devices has led to the emergence of a new information-communication environment.

Ergonomics, accessibility and ease of communication and access to information make them attractive means of benefiting from personalized digital services, in particular obtaining the desired information and communicating it with the desired person ”(Hatim, 2017). Sylvie and Arsenault (2005) studied 24 students in a situation of information research autonomy. They note that “in addition, a large number of students access information outside the walls of the library, therefore in a situation of autonomy. Autonomous practices make training in the search for information difficult and they prevent us from knowing their real needs” (Sylvie & Arsenault, 2005).

Indeed, the arrival of the Internet and its computerized catalogs as well as online resources have transformed the way people find and use information sources. Mittermeyer and Quirion (2003) go further in their observation by noting that «a good number of students seem to know little or not at all, the basic elements of documentary research» (Mittermeyer & Quirion, 2003) in particular the use of information sources. This is shown by Loisel et al (2003). The autonomy observed among students in mastering and manipulating the Internet is only apparent. According to the study, students on the Internet use regular search engines more than databases. “89% of students learn to search on their own, few (35%) have received training and 63% of them consider that they do not need training. It seems that students, especially in the first year of university, have a minimal understanding of effective use of information ”(Loiselle, 2003).

Regarding the search strategy, it is about the ability for the one who seeks information to is the ability to «define his subject well, to find the adequate concepts and to combine them with the search operators» (Sylvie & Arsenault, 2005). The problem for information seekers and especially students is to be able to transform the problem into an information seeking problem.

On this subject, Amos David (2005) believes that it is the problem to be solved that must trigger the search for information in his approach to economic intelligence.

He thinks that to make the right decision and conduct good research, you have to define your problem. Of the 07 steps resulting from the economic intelligence process, he defines the first 03 as crucial: Identification of a decision-making problem; Translation of the decision problem into an information search problem and Identification of relevant sources of information (David, 2005). Along the same lines, other researchers say that it is the ability to translate their need for information into a query that allows students to pick up more useful references. The development of an adequate search strategy is at the heart of information retrieval concerns (Pennanen & Pertti, 2003).

The Internet environment is more complex than it looks and students struggle to master the right approach for effective documentary research. Knowledge of specialized databases is limited without prior training. Learners learn on their own and discover tricks at random. Observing the methodological practices of students allows them to understand their difficulties in terms of seeking information and to provide them with adequate assistance.

## Research Methodology

It should be recalled here that this article aims to validate the predictive model of success in the first year of university and its strong correlation with the ability to search for documents. Indeed, researchers show that the most successful first year university students are those who are autonomous and master the methodology of documentary research. However, given the globalization of the Internet and the democratization of research tools; given that our young people live in a completely digital environment and have developed autonomy in its use; in this article, we would like to know if this new environment impacts on the results of the students and if so, in what way? In other words, are first-year college results improving in the digital age?

It is preferable here to clarify the terms “uses” and “practices” which are sometimes confused because, having a common semantic field. To summarize the definitions proposed by various researchers Jouet (1993), Millerand (1998), Jauréguiberry and Proulx (2011), Vidal (2012), and Badillo & Péliissier (2015), we will say that we speak of use by putting emphasis on the object studied. Here, it is about the Internet, the digital environment and we are talking about practice by centering the study on the man who manipulates the object. Hatim (2017) worked on the differentiation of the two terms. It emerges several works before him which come back to the two definitions. This is how in Information and Communication Science (CIS), Jeanneret et al. (2003) specify that the practices take into account «the social depth of the practice under construction» by taking into account the question of the context.

For them, “the context is a major and indispensable element which determines the meaning and dynamism of practices and which allows them to grasp their latter as“ phenomena of signification in specific social places ”(Davallon et al., 2003) . They are the result of actions by individuals who «take on both styles, individual issues and social and professional commitments that link them to standardized systems» (Davallon et al., 2003) «(Hatim, 2017) Latour suggests studying the practice as combining «places, bodies, groups, tools, devices, laboratories, procedures, texts, documents, instruments, hierarchies allowing any activity to take place» (Latour, 1996); That is to say, «practice is a term without opposite which designates the totality of human activities» (Latour, 1996). In a synthetic way, «the use is [...] more restrictive and refers to the simple use while the practice is a more elaborate concept which covers not only the use of the techniques (the use) but the behaviors, the attitudes and representations of individuals that relate directly or indirectly to the tool ”(Jouet, 1993).

For Jeanneret (2009), the term “use” “does not replace that of” practice ”but dialogues with it”. According to him, use is a component of cultural practice, an element relating to situations where individuals («social subjects») are confronted with devices designed by others. So, we will say that studying the uses and practices of documentary research allows us not only to understand how students seek information but also how they seek it, in what environment and what are the motivations. To carry out this study, we thus observed the uses and practices of documentary research of the first year students of the Advanced School of Mass Communication (ASMAC) of the University of Yaoundé 2 and the first year students of the Faculty of Sciences of the University of Yaoundé 1 in Cameroon. Our approach is rather qualitative by direct observation and quantitative by questionnaire. The quantitative approach by question is administered to approximately 340 first year students from ASMAC and 300 from the Faculty of Science for a total of approximately 640 respondents. The relatively low representability of the Faculty of Sciences lies in the fact that the questionnaire was optional and random. We were supported by some colleagues from the Faculty who encouraged the students to fill out the questionnaire. Being a professional school of communication, our survey was easily carried out because we had the full collaboration of teachers and students.

Evaluating the correlation between mastery of research methodology and academic success, our study extended over one semester, in particular the first semester of the 2020/2021 academic year, from October 2020 to April 2021. The semester 1 was ideal as the results of the various competitions were available and the new students had just obtained their baccalaureate and were thus taking their first steps in the world of higher education, with their heads full of dreams and prejudices. The exams to mark the end of the first semester take place around the end of February or early March and the results are posted as soon as the corrections are completed. The qualitative survey by direct observation was extended to a larger population at the Faculty of Sciences (around 1000 students) because it did not engage anyone other than us. We had freedom in our actions. Direct observation focused on specific dimensions based on the direct-to-reference model of ACRL’s documentary skills model.

Association of College & Research Libraries (ACRL 2000) has set up a repository translated by the Conference of Rectors and Principals of Universities of Quebec (CREPUQ 2005).

This presents the performance indicators as well as the expected results for the five principles that a university student in Quebec but also in most countries of the world (Mokhtar & Majid, 2008) should master (ACRL, 2000):

- determine the extent of information he needs;
- access the information he needs effectively and efficiently;
- critically appraise information and its sources, and integrate the information into its knowledge network;
- use the information effectively to achieve a specific objective;
- understand the economic, legal and social issues surrounding the use of information, access and use information ethically and in accordance with the law.

These are information skills, defined as «the set of skills that enable individuals to identify when they need information, and to find, assess and use that information”(ACRL, 2000). We retained certain elements of steps 1 and 2 of the competency model for our analysis. These elements correspond to the primary skills that students must develop in information research.

The questionnaire is made up of four parts:

- the first includes questions on the student: date of birth, gender, school of origin, course, attendance at the CDI (Documentation and Information Center) in high school, and access to a computer;
- the second part looks at Internet access: Frequency of use, applications used, terminal used

to access the Internet (computer, tablet, phone, etc.), connection mode (wifi, modem, etc.);

- the third part is devoted to the methodology of information research, use of Boolean operators, the functioning of a search engine, knowledge of databases;
- the fourth part is mainly dedicated to the results of the end of the first semester, personal opinion on the documentary research methodology.

## Results and Discussion

Our results will be presented in different tables representing the different parts. We will also make a distinction between the results of ASMAC and those of the Faculty of Sciences for a better comparison.

### Part 1: student's identification (Questionnaire)

	Sex		Age		Former high school		Attendance to high school's library		Access to computer		Total
	F	M	13- 17	More than 17	Private	Public	Yes	No	Yes	No	
ASMAC	200	140	70	270	205	135	180	160	165	175	340
Faculty of Sciences	160	140	145	155	120	180	100	200	180	120	300

Several elements emerge from the identification of the students questioned:

- The relatively high percentage of girls than boys in the two entities, whether at ASMAC (58.82%) and at the Faculty of Sciences (53.33%);
- The relative youth of the students who arrive at university. The 13 to 17 age group is fairly representative. ASMAC (20.58%); Faculty of Sciences (48.33%);
- We see that a good percentage of new students come from private schools before entering university. ASMAC (60.29%); Faculty of Sciences (40%). Which from our point of view calls out because of the big difference in the study environment. The lecture halls are crowded and it is easy to understand that these students are «lost» when you know that they come from private schools where enrollment is controlled;
- In the same sense, on the percentage of those who used the libraries of their school, more than the majority are those of private schools. ASMAC (66.66%); Faculty of Sciences (70%). The reason would be in the fact that most high schools do not have functioning libraries.
- More than half of the students have a laptop.

## Part 2: Internet (Questionnaire)

When it comes to frequency of use and access to the Internet, all students report having access to it every day.

	Access the Internet			Connexion mode		Uses of Internet		
	Computer	Tablet	Phone	Wifi	MoDem	Social media	Email	Research
ASMAC	300	05	340	55	300	340	104	200
Faculty of Sciences	120	20	300	25	300	300	90	70

We note that more than the majority of students have a computer at ASMAC unlike the Faculty of Sciences. The explanation may lie in the fact that at ASMAC, the computer is part of the material required of the student. On the other hand, all students, whether they are at ASMAC or the Faculty of Sciences, have a phone and access social networks every day. However, research does not occupy a very large place in the digital lives of students. Being a professional school of communication, it is quite normal that students develop aptitude for research, compared to the Faculty of Sciences.

## Part 3 : Literature research (Questionnaire + Observation)

	knowledge of how a search engine works		knowledge of Boolean operators		knowledge of database	
	Yes	No	Yes	No	Yes	No
ASMAC	75 (22,05)	265 (77,94%)	80 (23,52%)	260 (76,47%)	120 (35,29%)	220 (64,70%)
Faculty of Sciences	85 (08,5%)	915 (91,15%)	50 (05%)	950 (95%)	75 (07,5%)	925 (92,5%)

It is very clear in this section that first year college students do not have a great deal of knowledge of how search engines work. They have no ability to search using Boolean operators and very few know what a database is. With these statistics, it should nevertheless be noted that the relative difference which emerges from ASMAC, relates to the students of the «documentary information» sector who have courses in research methodology. They know what a database is and how to use it. They know how a search engine works. Most students do research blind. The only search engine they know of is «Google». They don't know how it works. Some people copy from their peers without knowing exactly what they are doing.



## Part 4 : First semester's results (2020/2021)

	validation of all teaching units		Can the Research Methodology Course Help You Improve Your Results?		Do you have the documentary research methodology courses?	
	Yes	No	Yes	No	Yes	No
ASMAC	315	25	320	20	220	120
Faculty of Sciences	200	800	758	242	0	1000

Failure is more pronounced in college than ASMAC. Probably due to the teacher / student ration. To the question of knowing what are the consequences of not validating your semester? The students concerned say they have to take the unvalidated teaching unit and that this affects their morale. They realize it's not that easy. Some are discouraged and we believe that failure may be the cause of dropping out of school. This is the reason why some students do not complete their course or change courses, thinking that it will be less difficult elsewhere. Of those who have not completed their semester at ASMAC, most are students who do not have the documentary methodology course.

This study clearly shows us that even though we are in the digital age, the uses and practices of information retrieval have not changed. While the information is readily available, first-year students do not have full access to it.

The autonomy they demonstrate is apparent. Most of the time, they are dangerously on social networks for which they have no control. They act out of mimicry without knowing or understanding the significance of what they are doing. The predictive model that «the most successful first year students are those who have mastered the literature search methodology» holds true. The digital environment in which we operate and which we thought would have a positive influence on the academic results of first year students is having no effect. On the contrary, the students seem to be lost in all this flood of information and they are floundering without benchmarks. The tracking, access and production of information has been greatly facilitated.

These changes have had multiple repercussions on our behavior, causing several notable transformations, but also causing certain problems that are reflected in academic results. However, mastery of information skills encourages students to pursue their studies and helps them develop self-confidence.

## Conclusion and Future Work

In view of the gaps encountered and observed in the daily practice of students in documentary research and the link which is confirmed with academic success, it is more important than ever to train students in information skills. On the other hand, several universities too often limit themselves to more traditional models of these skills, such as that of the Association of College & Research Libraries (ACRL), which take too little into account the tools and possibilities of Web 2.0, with which are however so familiar to the students. "The integration of information skills into the student journey has not evolved as quickly as the dissemination of information. Individual initiatives abound, but programs aimed at standardizing and evaluating these initiatives

are needed «(D'Amour et al., 2005). In this regard, Karsenti et al. propose a model that seeks to «strike a fair balance between the traditional models of information retrieval presented above and the new technological reality which is transforming our habits of research, evaluation and sharing of information» (Karsenti, Dumouchel, & Vassilis, 2014). This is divided into five steps which are iterative:

- information research;
- its treatment;
- its use;
- its transmission and;
- the evaluation of the process carried out.

«Each of these stages is characterized by a series of interrelated skills, the result of which would form, in our opinion, the notion of information skills in the era of Web 2.0» (Karsenti, Dumouchel, & Vassilis, 2014). On the one hand, this model has the advantage of better identifying the different skills that make up the set of current information skills. On the other hand, this model makes it possible to adapt the traditional model of information retrieval to new technological tools.

Finally, the model presented can also participate in an improvement of the training in information skills which are currently offered, for example at ASMAC, where all students can be introduced to the handling and mastery of tools such as databases or search engine. It would be beneficial to make students aware that their academic skills could better develop if they mastered research tools. Also, instead of offering training in research methodology only to students in the sector, it would be beneficial for everyone to extend it to all other fields.

We can suggest some avenues for reflection:

- integration of skills in a program approach, place of anchoring in targeted courses and alignment with the content, requirements / lesson plans and student learning methods;
- improvement in the quality of the work produced by students, mainly with regard to the presentation of citations and references in a bibliography (Lebrun et al., 2007).

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