

The Necessary Competences for Student Success in the First Academic Year

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Abstract

This paper tries to show which competences have an impact on the success of students in higher education and especially in the first academic year. This situation also requires finding a way to acquire the competences which are necessary in this new experience that is the first year. A student is considered to be a person who has the basic competences required. Our role is to show how this person in higher education can acquire the other new competences that help him/her attain the positive results that we name "success". Normally, higher education is a new experience because he/she has never been in these situations before. To reach this goal we will first demonstrate a method to construct or produce this kind of competence. Secondly, we will measure these competences by means of two statistical methods to obtain scientific proof of our suggestions. In this way, we will be able to show what the essential competences are and thus validate the necessary competences.

1. Introduction

The failure rate increases each year among students enrolled in the first academic year at university. For example, at the University of Burgundy the failure rate which was 37% in 2008-2009 rose to 41% in 2009-2010. In 2010-2011 it rose yet again to 52%. These figures relate only to students who have failed. If we also add students who do not show up for exams, the number is alarming. This observation should alert us to the existence of a problem in the student population. In other words, what causes a high probability of leaving the university and failing exams? To determine the cause/s of this problem we decided to carry out this research in order to prove our theory in this case. In fact, the determinants of academic success are a central issue of research in the Science of Education in view of the effective direction of educational policies. Specifically, it is in this context that we will try to understand the essential competences needed for a student's success. In addition, to better understand the process of skill

development, we will study the links between knowledge already acquired by individuals (inputs) and the competences that are required (outputs) to succeed at the university. In order to reach this goal, we will attempt to define the concept of competence. "Competence" is first of all the term for the ability to act specifically. While in the legal field "competence" means the legitimate right to act on the basis of formal authorization, in the social domain". [6] It should be mentioned that the concept of "competence" may pose various problems in case studies. This is a protean concept with a definition that is rarely agreed upon. A scientific consensus in this regard is much needed. We decided to first "revisit" this notion which is unclear and subjective. We must thus first establish the difference between types of competence.

2. The term "competence": concept and construction

In this case, it is necessary to discuss the different types of competence before giving a general and specific definition. First, we must read a wealth of literature concerning the subject in order to choose the most relevant types of competence and those that are most related to our research topic. All of this leads us to identify two types:

A. general competence

B. specific competence

Specific competences are further divided into two categories:

B1. Specific "referential" competence

B2. Specific "developed" competence

It is to be noted that specific "referential" competences can be considered as essential to acquire more advanced specific competences. As at all levels of learning, the student must follow a hierarchy to learn or acquire a competence. We summarize the hierarchy of competences in the following figure:

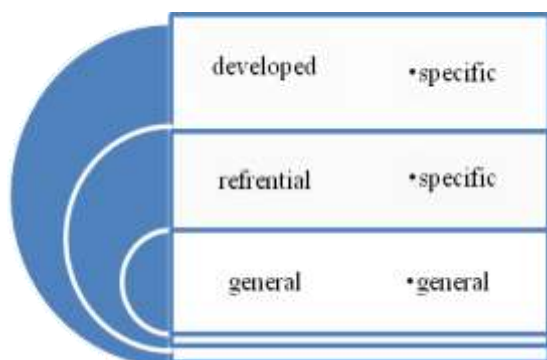


Figure 1. Hierarchy of competences

To clarify these specific competences we distinguished two levels: referential and developed. What must be taken into account to define these competences is the hierarchy that exists between them. We also propose here to categorize the specific competences based on a hierarchy of acquisition and a degree of complexity. In this process, we respected the priority level and degree. Thus, we need to explain, first, the specific referential competence in accordance with a student in the first academic year (university), then the specific developed competence. These students are considered as professionals; therefore not only 'specific' competences but a certain forms of 'developed' competences are required. Any attempt to acquire a developed competence requires a controlled referential. But before all these processes, we need to acquire general competences as a foundation.

2.1. Definition of general and specific competence

To be clearer about the definition of competences, we need to classify them. For this current project this classification is based on two main levels: general and specific. The general competences can serve as the primary level for all individuals. This primary level is demanded for all students who want to come to University. They are normally acquired before entry into higher education. They can be applied to a wide range of contexts and contents. But when we expect the higher level of competence, it is time that they should be classified as specific competences. "Specific" competences are identifiable in/with specific or complex tasks because they refer to competences belonging to a specific area. To define a competence as specific is to confer a broad meaning that can be attributed to each group of expertise when it comes to a particular situation and specific objectives. Therefore, we attribute the term "specific" in this work to a

competence when it comes to having expertise in the first academic year at University as a specific area and a new situation. So these competences have their particular characteristics.

To define the characteristic of the competences, we cite Marie-Francoise Legendre, professor in the Sciences of Education. One of the domains of her research is "Approaches based on competences and development of competences". For her, a competence includes six characteristics in all and by nature: it is not directly observable; it manifests itself in action and has a composite structure and requires a mobilization, and is likely to be developed. It requires developed cognition and finally, it is both an individual and collective component [9]. We retain these characteristics for both their clarity and operational practicality. This will help us further explain the components and the procedural methods of the construction of competences. For Wittorski, "the competence is the mobilization of the action of a number of combined knowledge in a specific manner depending on context of perception that actor (individual or collective) builds of the situation. [13]" By these definitions we conclude that a competence is a complex notion that is constructed by combining knowledge which can be defined in action and which depends on the situation of use. The study of specific competences as competence required for first year studies (action) at University (context) is the heart of this work, because general competences have necessarily been acquired before the period studied here, which is to say before entry into university. Thus, specific competences must be defined with some precision before analysis.

2.2. What is the difference between general and specific competences?

As stated above, these two types of competence are in effect two levels for competence acquisition. Then difference resides in the level and time of acquisition Heilmann & Heilmann [5] and Weinert [12] explained the difference between the general and the specific competence as follows:

"An individual needs specific competence to be able to perform adequately in a given area of "bottom" This kind of competence/expertise might be to fly or to establish a medical diagnosis. Specific competences can provide productivity gains in the short term. General competence covers a variety of concepts, such as intelligence, models of information processing, meta-competences and key competence. General competences are important for long-term employability."

In the context of this work, we understand the

term "specific" as referring to the competences needed for a student in the first year of University. Requirements in terms of competences at university are not the same level as those which apply to primary or secondary school, but they derive from them. So what the students have acquired at primary school and high school gives them a variety of concepts that build their key competence or general competence. At university, they need to apply these competences to reach a more specific level, in defined sectors and particular problem situations. (Every field includes its competences. The competence which is needed as specific to find a particular solution cannot have the same representation in the field of mathematics and sciences). This may be the short-term productivity which Heilmann & Heilmann evoked. To acquire this competence level we have to have productivity. This productivity allows students to succeed in their chosen field.

To begin with, in the process of acquiring as well as distinguishing between these two competences, we explored the ideas set forth by González & Wagenaar (cited by Conchado & al.) [3] who distinguished three stages which are always present in every domain of competence. According to these authors, each competence includes three phases: instrumental, interpersonal and systemic. The first phase is called "instrumental" as it concerns the acquisition of knowledge, the second, called "interpersonal," is the aspect of individual and social interaction, and the third, called "systemic," is concerned with the individual's understanding of the system. This system can be a methodology, a university system or simply a university course. The first phase (instrumental) is the most important, because it is present in all forms of competence. This is the cognitive knowledge and for the "general competence", is the "general cognition" [3]. It covers the basic data (primary information) to expand and develop through an individual process to achieve more advanced competences. This phase is especially important for students entering university. We consider this phase as their input. As such, we must find the source of this instrumental knowledge. If we search for the source of this knowledge, we find the root in previous years, before entering higher education. This is the "instrumental" or "general cognition". We can suggest that the lack of instrumental knowledge can be one reason for the differences in proficiency among students in acquiring other competences. These previous academic years can be the source of certain competences that form a foundation for these students and normally this basis must be the same if the academic subjects are the same. So the future student must acquire until the end of high school

certain competences that provide the same foundation for entry into University.

Therefore, considering "instrumental" as general competences such as those learned in past school experiences and without considering the "interpersonal" aspect (because it is common to both of the levels of competence), we can claim that knowledge should help the student to learn in the university context and help them acquire the third phrase: "systemic" which for the student is a professional or "specific" stage. As stated by Conchado & al. [3], the human capital of university graduates is an amalgam of general and specific skills. General skills provided are not intended for a specific context but they are required to develop the ability to learn in a new "system" that calls for new competences. As for these two sides, there are general competences which, in a situation where all things are equal, individuals should be able to use them. Each student must be armed with a range of such competences that are derived from the acquired competences. After this phase, the student can enter into the second phase, which is the specific competence. The student must develop the general competences in order to use them as specific in the new situation where more developed competences are required. The "interpersonal" aspect is the common phase in this process because it can also play a role in the two other phases and as such is necessary in both of them. It depends on the social and personal characteristics of the student. The classification of different competences depends more precisely on the objective. Thus it may take on various categorizations according to the intended field of study or professional domain. The differences between objectives, in each domain, thus result in the differences in definitions and structures.

2.3. Structuring of specific competences

The importance of specific competences in this work implies situating the different strategies toward further reasoning and reflection on the structure of competences. Finding the way to demonstrate the structure of competences leads us to choose among the diverse strategies. One of our strategies is to refer to a formula developed by De Ketele in 2003[4]. According to this formula, competence (C) is defined as the result of the mobilization of a combination of "resources" and a "family of situations":

$$C = \left(\text{Resources} \right) * \left(\text{Family of problems or situations of complex tasks} \right)$$

↑
(Mobilisation)

A competence is “a combination of skills, abilities, and knowledge needed to accomplish a specific task” [7]. This formula will constitute a basis for our work. As a second strategy, we will construct a table adapted to it and in this way we will develop a definition for the structuring of specific “referential” competences. The table consists of a row of cells, generated by the crossing of a horizontal line representing “capacity” and a vertical line corresponding to “knowledge.” Each cell thus relates to a different competence. “Capacity” and “knowledge” are respectively the “family of situations” and the “resources” mentioned in De Ketele’s formula. It should be noted that “capacities” and “knowledge” need to be rigorously defined; in addition, they must have been acquired in previous years so they normally exist in student’s curriculum. Next, this formula can be used to explain the process of the production and development of specific competences. At this point, we will return to the formula presented above by adding certain developmental methods such as “select”, “combine” and “transfer”. [8] These methods promote additional knowledge and play an important role in mobilizing the structural elements of competences. It is important to note that mobilization is highly important in the process of the production of developed competences which are not possible without an individual’s ability to use his/her cognitive knowledge in order to find solutions in new and/or complex situations.

The role of the university in the structuring of competences is akin to a context of transition. In this transition, the existing competences are used in order to acquire required competences. The university must make the transition between these two phases to help to complete the structure of specific competences. It is therefore plausible to say that the necessary competences at university must cover both of these phases. Thus the determination of these necessary competences seems to be a crucial part of their structure.

3. How are the determinants of these competences identified?

Once the competences are defined, it is crucial to present their determinants. What are the sources and factors that allow for the formation, acquisition and development of these competences? A quantitative approach must be considered to fulfil this goal. Econometrical analysis through the use of statistical packages such as SPSS or LISREL allows us to identify these determinants. At this point in time, the structural model of covariance LISREL seems to be

most effective in helping us to understand the determinants of the acquisition of competences. As recalled by Morlaix [10] this model, like the methods of multivariate analysis, has the following advantages:

- i) An introduction in the analysis of latent (or unobservable) variables;
- ii) The specification of the nature of the relationship between these latent variables and their measures;
- iii) The opportunity to specify the type of relations between latent variables;
- iv) An analysis of the causal inferences between several sets of explanatory and explained variables;
- v) The establishment of a confirmatory approach.

This method allows to us to carry out multiple assessments of competence and provides useful and meaningful information that is relevant to decision-making or policy-development related to competences.

4. How do we use this model?

What we aim to present in this research project is an example of the application of covariance structure analysis in a study of the competences most predictive of success in first year students in higher education. This model allows us to test the fit of a causal theory that we developed previously, via a mathematical model of our observed data. As stated above, this is a model of covariance. This means that for each concept of a competence we have two or more indicators to be measured. Two or more concepts will then explain a more complex concept. Latent (unobserved) variables will also be measured, in part by the observed variables and also by their indicators. This model must rely, first, on a principal theory (Morlaix [10]):

"The principal theory is the basis of the model. It is used to develop a general theoretical model, the basis of the analysis, to establish relationships between variables targeted in (for) the proposed study. It implies in particular the development of a summary diagram that describes (with arrows) the direct or indirect effects of certain variables (observed or not) on others. It allows to decompose the model (or models) explanatory (s) of a particular phenomenon in a number of factors able to influence it. If we look, for example, to explain a concept A for which it is assumed that B and C are two explanatory factors and we assume again that A is divided into two dimensions (A' and A''), assumptions need to be made about the relations that link these different theoretical variables (Kestemont, 1997)". Aisch-Van Vaerenbergh [1]

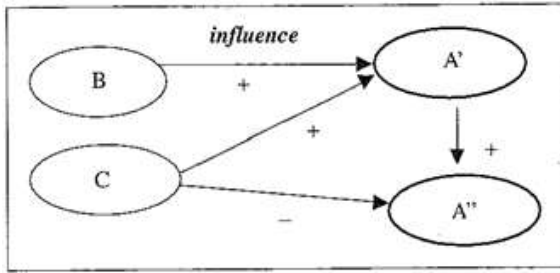


Figure 2. Schema of the principal theory, S. Morlaix [10]

According to the figure above, in the context of the present work, B and C would be defined as general competences. A' and A'' are the specific 'referential' competences seen as the DIMENSIONS of a more complex concept that is a developed competence (A) for us. Thus, it becomes possible to explain a developed competence that is not directly observable. The main theory will be supplemented by an auxiliary theory. Here we have the opportunity to explain the relationship between the latent variables as well as between these variables and their indicators, as well as to measure the impact of each of these elements (variables observed, their indicators, unobserved variables, etc.) on each other. Thus, thanks to this theory and this method, we can explain developed competences considered endogenous (that is, those that we seek to explain) in the LISREL model, via exogenous competences (B and C). These will themselves be explained by their own indicators. Indicators are obtained by means of different tests with students (cf. Figure3).

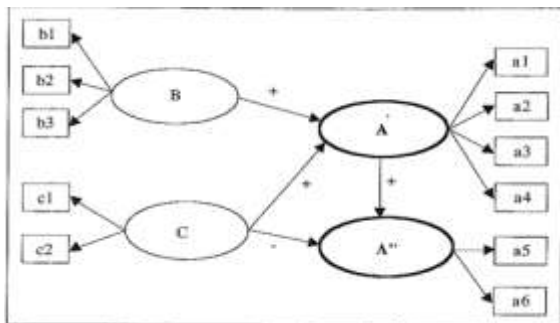


Figure 3. Representation of the main theory and the auxiliary theories, S. Morlaix [10]

LISREL will verify the degree of acceptability of the measurement and estimate the links that are assumed.

LISREL provides the advantage of confirming our assumptions and the reliability of knowledge and competences initially chosen. Among our hypotheses, LISREL allows us to identify those that

are acceptable and those that are not. Similarly, the software indicates which indicators account for a primary competence and which primary competences can explain a more complex competence. Thus, the indicators will be extremely varied.

They range from skills and knowledge, as cognitive institutional indicators, and extend to socio-demographic indicators. These indicators are represented by the coefficients xi boxes in figure3. Determining the sources of competence will never be a perfect process, and other factors or skills may still play a role in the process of the production and development of new competences. In the auxiliary model we will therefore try to explain the impact of other factors in the development of competence. New competences are created when individuals are able to use the underlying competences which are necessary for their construction. The SPSS and LISREL programs define the factors which have a positive impact and those which have a negative impact in the construction of these new competences.

5. The completed LISREL model

The model is pictured in the following figure. This model presents the complete relationship between the indicators, factors and variables used.

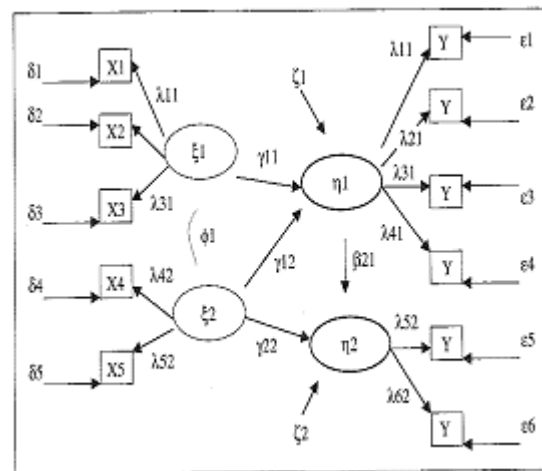


Figure 4. The complete figure, S. Morlaix [10]

The advantage of using LISREL resides in its ability to distinguish between observed variables and latent variables on the one hand and between exogenous variables and endogens on the other hand. It also distinguishes between errors in the equations and errors in variables. To explain this model, we can present the variables in the structural part of the model as follows: [10]

ξ : represent exogenous latent variables;

η : endogenous latent variables;

χ : observed variables or indicators of exogenous latent variables;

Y : observed variables or indicators of endogenous latent variables;

In terms of measurement:

λ : is a measure of the validity of the indicator considered;

δ et ε : measures of reliability indicators (respectively X and Y);

δ : errors in the observed variables X ;

ε : errors in the observed variables Y ;

In terms of parameters that LISREL estimates to take into account causal relationships formulated a priori we have:

λ^x (λ^y): represents the impact of latent exogenous and endogenous variables on the observed variables X and Y ;

γ : impact of exogenous latent variables on endogenous latent variable;

β : impact of latent endogenous variables on another endogenous latent variable;

ξ : represents all factors implicated (not explicit causal structure) that may have a specific effect on the latent endogenous variables;

\varnothing : represents the relationship between exogenous latent variables or impact of latent exogenous variables on another exogenous latent variable.

The mathematical model equation derived by means of the LISREL diagram can be explained by two series of matrix equations and be distinguished:

1-the models of measurement formulate as follows:

$$X = \Lambda_x \xi + \Theta_\delta$$

$$Y = \Lambda_y \eta + \Theta_\varepsilon$$

Θ_δ and Θ_ε are the matrix of prediction errors for the indicators of exogenous and endogenous variables.

2- and the structural model that can be constructed by means of the following formula:

$$\chi_1 = \lambda_{11} \xi_1 + \delta_1$$

$$\text{or } \chi_3 = \lambda_{31} \xi_1 + \delta_3$$

for Y we have too:

$$Y_2 = \lambda_{21} \eta_1 + \varepsilon_2$$

These formulas reveal the structure of latent variables. In this structure we must consider the rate of participation ($\lambda_{11}, \lambda_{31}, \lambda_{21}, \dots$) of an observed variable ($\chi_1, \chi_2, \chi_3, Y_1, \dots$) in the construction of exogenous latent variables ($\xi_1, \xi_2, \xi_3, \dots$) or endogenous variables (η_1, η_2, \dots) and add to it the rate of error in the chosen indicator. ($\delta_1, \delta_3, \varepsilon_1, \dots$ represent the error in the structural equation).

This formula will be the same for each latent variable. We therefore have the following equation for more complex variables we have:

$$\eta_2 = \gamma_{22} \xi_2 + \beta_{21} \eta_1 + \zeta_2$$

By means of these formulas, we will be able to build the structure we wish as a start, and then by the measurement of the indicators verify the friability of our structure.

6. The contributions of this study

The goal of this research leads us to determine the academic competences necessary for success in first year university students. In this case, we thus needed to study the impact of all elements (educational background, skills, primary competences, knowledge etc.) to be treated as control variables in the academic success of students. In our case study, conducted on students at the University of Burgundy, we identified 78 general competences as necessary to acquire. Each of these competences is constituted by a combination of two indicators, one being the capacity and the other the relative knowledge in question. These indicators were chosen from the 19 competences presented in the REFLEX research -an international project directed by the Research Centre for Education and the Labour Market- (For more information cf. www.uni-kassel.de/incher/cheers.) and the capacities were chosen relative to writing. (We were unable to test oral capacities). We numbered these general competences for facility of use. After the measurement of these competences we hoped to identify certain that were more important than others for student success. For example, we suggest that the competence of "automation" is a developed competence that should be acquired by students as it plays a role in his/her success. By means of this competence, they will be able to use their previously acquired knowledge and capacities in the new situation. It is a latent variable (endogenous) so it needs to be explained by the other variables (exogenous) that are observable. We suggested that general competences 20 and 32 can form this developed competence. These two variables are explained by their indicators. Competence 20 is made up of capacity number 6 (namely, "the control of mental calculation") and writing knowledge A (namely, knowing "how to use the adequate words"). In the same manner, competence 32 is a combination of capacity 9 (namely, the capacity of "having an analytical mind") and knowledge A. LISREL reveals to what extent competence 20 is explained by its indicators. It will reveal whether the indicators of competence 32 have more impact on this competence than the others or not. It will also tell us what the degree of dependence of this competence on competence 32 is. It will indicate the extent to which the developed competence of using

knowledge “automatically” depends on general competences 20 and 32. It therefore gives us the possibility to analyze the causal inferences between several sets of explanatory and explained variables as well as the opportunity to show the type of relations between latent variables. Are these relations negative or positive? This is a question that LISREL answers. By means of this measurement, we are able to confirm our hypothesis or refute it. The result is not yet ready for presentation at this time, and we are testing other factors. Academic success is not independent of the living conditions of the students or their sex, age or nationality. We must take into account the student’s socio-economic or demographic data, and consider whether this context has an impact on his competence. Figure 5 shows an example of this application.

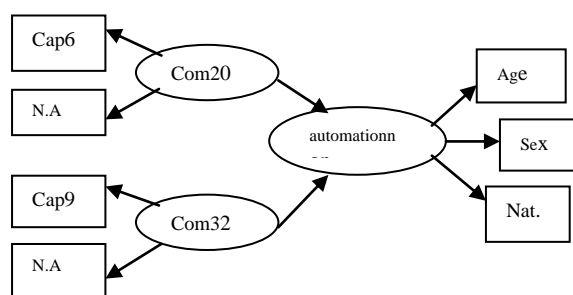


Figure 5. Application of the main theory and the auxiliary theory to general and developed competences

In Figure 5 the abbreviation ‘cap’ means ‘capacity,’ ‘N’ is chosen for knowledge and ‘com’ is competence. To identify these indicators, they must be justified, measured and tested. In our study, we will use DALF (Advanced Diploma in French Language) test scores and the results of psychological tests conducted on students at the University of Burgundy in their first year in different fields: ESA (Economics and Social Administration), psychology and law. These three majors were chosen because they represent a large part of the student body and because they are heterogeneous fields in terms of the social origins of their enrolled students. All of these students were surveyed by means of two sets of questionnaires: one distributed in the first half and a second distributed at the end of the academic year. All of this will enable us to observe and so understand the causes of failure and to develop hypotheses about the most predictive competences. All students tested were submitted to the ‘‘ C1’’ level of the “DALF”. This is a test which measures written comprehension. In this way, one aspect of academic performance was measured by the DALF tests. This provided us with an overall measure of a

level of written comprehension in students who enter the university. We wanted to examine whether the specific diploma obtained and the school curriculum previously followed had an impact on general competences. If the answer turned out to be positive, we wished to determine which diploma represented the greatest advantage. By means of the diploma factor, we were able to test the capacity and the knowledge acquired by the student. We could then more easily predict the most effective elements leading to success. In a second step, we also considered the field of university study of the student. This allowed us to examine the relationship between past academic work and the chosen field of study at university. The DALF test can provide us with some indicators to test the students’ knowledge and capacities. It is based on certain literary texts and students must answer questions by commenting or analyzing certain passages. More precisely, the DALF is composed of 13 items for “written comprehension”. These items construct a score for which the highest possible value is 22 points. For our total sample, the average score was 12.9 with a standard deviation of 3.6. We observed differences in scores between the three selected fields of study. Our results show that students in law have cognitive competences which are superior to those of students enrolled in the other two sectors (Psychology and ESA), but the average scores of students in psychology and ESA are very similar and not statistically different. Other results, such as the second semester grades, confirm this test. They reveal that law students obtain better results. The failure rate among law students is 9.7%, whereas in the case of students in ESA it is 14.6% and for Psychology students the rate rises to 17.8%. (Source: the statistics service of the University of Burgundy 2010-2011). We can thus conclude that written comprehension is a competence that is related to knowledge and capacities acquired in the academic past of university students and that it can have an impact on their success at the University. It can be proven by the LISREL as shown in figure 6. This figure picture the impact of four variables which are tested by the DALF test (A2, B4, D8 and D10). We can construct the competence 2 through observation of the rate of participation of these variables which is very significant especially for the three latter variables.

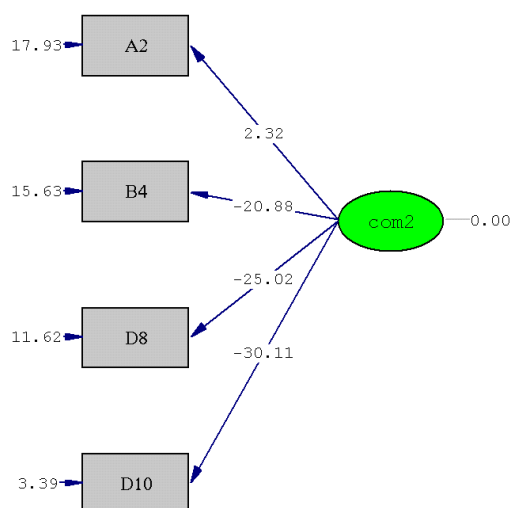


Figure 6. Demonstration the result of the DELF test

The student's past school curriculum is observable by means of another variable: the honors obtained for a given diploma (first, second or third honors). As for the title of the diploma, this variable revealed a significant difference between kinds of diplomas (lower results for technological and professional diplomas). The honors associated with a diploma presented an advantage for the students who received at least third honors.

Note that the type and the honors obtained with the diploma show the highest coefficients. Students who obtained a professional diploma are the most disadvantaged in this test of written comprehension (1.6 points lower than students who obtained a general studies diploma). For the other factors such as sex and the age, we note no difference in terms of test results for sex, but for age we observed that to obtain the same diploma, students two years behind at school (so older than their peers) have significantly lower scores than the others.[11]

All this proves that the competence linked to students' cognitive knowledge can be crucial to their success. So before entering the University, the future student must possess certain knowledge and capacities which are prerequisites for language competence and cognitive capacity, necessary not only for success but also for use as a basis for the acquisition of other, more complex skills.

We also tested students' cognitive knowledge by means of psychological tests (Raven, TBRS (time based resource sharing model) etc.). By means of these tests we examined in effect students' working memory and the speed of their recognition capacity. We needed this test because we had to know if the student was able to recognize which knowledge was the most effective in each problem situation and to examine the latent competence of "automation". This

latent competence involves an element of speed as "automation" is the speed with which one can use information that is stored in working memory. "Among the different measures of cognitive capacity, only the working memory score was correlated with the academic acquisition." [2]. Working memory is a cognitive ability that is also related to the academic and socio-demographic characteristics of students. The tests showed that the differences revealed depend on the field of study chosen (ESA students scored significantly lower than those in other fields). In all, socio-demographic and academic characteristics explained 40% of the variance in grades in the first semester. Sex also had a negative effect. Girls scored 6 points lower than boys. And finally, economic and educational difficulties also revealed a negative influence. For example, the fact of benefiting from needs-based financial aid, which in a certain way reflects a student's socio-economic background, is associated with a success rate which is on average nearly half a point lower. [11] These characteristics have no impact on written comprehension scores, but the socio-demographic profile of the student's parents is a definitive factor.

All of these tests provide the indicators that allow us to justify our hypotheses by measuring and analyzing the different factors and different non-observed (endogenous) variables, allowing us to predict what the necessary competences in the success of students are.

7. Conclusion

In order to find an answer to the question: Are competences essential for a student to succeed in the first year of university?, we must undertake a large-scale study and so choose many items relative to the capacities, knowledge, economic and social situations and even the working memory of these students. Every item suggested as being important in the success of students in their first academic year should be tested by statistical scientific methods (LISREL, SPSS, etc.). Psychological tests and questionnaires can complete this processes. All these means are mobilized in order to define the role and the degree of importance of competences in the success of students. The final step is to identify those competences having the biggest impact. The LISREL programme gives us the possibility to identify these competences, but it is important to note that every statistical method has its problems and its limits. In this case, LISREL sometimes produces a vicious circle of indicators and we are obliged to choose the indicators that are most appropriate to our object. LISREL is not a new method. It is not commonly used, despite its interesting contributions. We

likewise used SPSS and with the help of these two rigorous statistical methods, we tried to measure the impact of each factor on the student's level of competence. The use of these methods also allows us to determine whether the empirical values confirm the theoretical values. In other words, it can confirm our hypotheses. In this way, we hope to find an answer to the increasing rate of student failure in the first year and then use it as a method to be applied to a wide range of situations in the future.

8. References

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