

# Diagnosis of Information Science Informational literacy from the perspective of the student of the University of Havana

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## ABSTRACT

The Information Society of today requires students to access, analyze, evaluate and use information properly. To this end, students need to acquire competencies associated with search, evaluation, processing and communication of information. These competencies are especially important in information professionals, who are charged with the task of matching information resources with information needs. This implies the ability to identify needs and resources, and organize and represent information to the satisfaction of users. Using the ALFIN-HUMASS self-assessment questionnaire, students' perceptions of motivation and self-efficacy were studied in terms of the competencies associated with four overarching informational categories: Search, Evaluation, Processing and Communication.

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Moreover, the study examines the learning contexts of self-guided or independent learning, library work, coursework and classrooms. The study offers a reflection on the degree of importance students lend to informational competencies and their perceived degree of expertise, while also drawing some conclusion about learning needs.

**Keywords:** Information competencies; Information sciences.

## RESUMEN

### **Diagnóstico de las competencias informacionales en Ciencias de la Información desde la percepción del estudiante de la Universidad de la Habana**

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En la actual sociedad de la información es importante saber acceder, analizar, evaluar y utilizar la información adecuadamente; para ello son necesarias las competencias relacionadas con la búsqueda, la evaluación, el tratamiento y la comunicación de la información. Estas competencias se hacen aún más importantes para los profesionales de la información, pues son quienes deben lograr la correspondencia entre los recursos y los requerimientos de información, lo que implica la identificación de necesidades y recursos, la representación y organización de la información y la satisfacción de los destinatarios. Tomando como referencia el cuestionario ALFIN-HUMASS, en el presente trabajo se estudian la motivación y la autoeficacia en cuanto a las competencias relacionadas con la información de los estudiantes de la titulación de Ciencias de la Información de la Universidad de la Habana, especialmente en cuatro categorías (búsqueda, evaluación, tratamiento y comunicación de información), desde la autoevaluación; se analizan además los entornos de aprendizaje a partir de criterios como la biblioteca, individual o autodidacta, cursos o clases. Se reflexiona acerca de la importancia que dan estos estudiantes a las competencias informacionales y su nivel de destreza, así como también las necesidades de aprendizaje.

**Palabras clave:** Competencias informacionales; Ciencias de la Información.

## INTRODUCTION

The new society in which the use and generation of information is increasingly important, information professionals with specialized knowledge of informatics technologies will become key agents.

This information will serve as an indispensable bridge between suppliers and users of information. This bridge is undergirded by the new information and communications technologies and it stands within a complex world of competencies. [...] The changing circumstances of labor markets require these information professionals to develop new and often disparate competencies [...] which are, in terms of academics, essential to the institutions that train them as well as to the professionals themselves. (Sánchez and Vega, 2004. Translated from Spanish)

The information and knowledge society requires information professionals to be competent in information.

Librarians must have their own kind of literacy or 'Information Competency,' i.e., they must have mastery of the concepts of the information world, its procedures and values in order to perform contextualized, reflective and intentional selections, assessments and integrations of information for its subsequent ethical use and communication. [...] With regard to informational competence itself: even though it must be continuously renewed in the current technological and scientific context, it is usually understood as a given and inherent to professional practice [...]. (Gómez-Hernández, 2009: 107. Translated from Spanish)

Moreover, it is the professional who must acquire informational competencies at the level of the entire society, taking into account the concept of life-long training and learning that embraces ongoing professional, academic, social and cultural appraisals of broad range of informational competencies. This issue has become increasingly relevant in university level teaching, because the knowledge, abilities and attitudes associated with information developed during one's university training are what allows a the professional to compete in the labor market. Higher education, as understood by Pinto, Doucet and Fernández-Ramos (2008), should respond to this new demand, while stressing that these competencies go beyond bibliographic instruction and use of technology. The approach should include matters of analytic and critical thinking, as well as the development of problem solving skills.

Information Science (IS) as a field of study is charged with producing professionals capable of resolving the conundrum posed by accessibility versus availability of information resources and the needs, expressed or other-

wise, for information and training of diverse persons or social groups. This professional is tasked with matching information resources to needs. This implies identifying needs and resources, and their proper representation and organization in order to satisfy the needs of the user.

There is a broad literature on matters of informational literacy in higher education; however, not much has been published on questions of informational competency of IS students. In Cuba Quindemil (2010) has proposed an educational approach to facilitate the introduction of ALFIN in the ongoing IS education model and “C” curriculum developed in the Universidad Agraria de la Habana. Meneses-Placeres and Frías-Guzmán (2011) examine the presence of ALFIN postulates in the training of information professionals through a curriculum design and characterize the insertion of ALFIN in the “D” curriculum of the IS faculty at the Universidad Central “Marta Abreu” of Las Villas.

As for the Universidad de la Habana, an exploratory study on information competency of students, which included IS students (González, Sánchez and Lezcano, 2012) exists, but it does not provide a specific analysis of these students. Consequently, the main objective of this paper is to offer a diagnosis of the impression students in the Universidad de la Habana have of IS, while also examining their motivations and degree of mastery of information competency, as well as how they go about acquiring the same.

## THEORETICAL FRAMEWORK

Informational competencies exist insofar as they are the practice of mobilizing and combining the skills, knowledge and attitudes, and transferring these across an array of contexts, in order to solve problems and learn to learn; regardless of the type, format and support of the information resource. Such competencies are required in any area and include other competencies such as technological skills, librarianship, critical thinking skills and social abilities (Sánchez, 2008b). “In order to achieve a high degree of expertise, [...] this deployment of information competencies occurs in several stages: identification, standardization, evaluation, development and certification” (Sánchez, 2008a).

The identification and standardization of informational competencies has been performed through diverse models and standards, including the

*Normas sobre aptitudes para el acceso y uso de la información en la educación superior* of the Association of College and Research Libraries (ACRL/ALA, 2000). The development of competencies in the informational perspective consists of the teaching-learning process that facilitates the acquisition of informational competencies at the desired level. The ways by which competencies are acquired lie within the framework of the formal system (previous training, initial and basic, before active life and outside of the work context) outside or within the curriculum as a specific class or part of a subject area. It also occurs in the extra-formal system (ongoing education, on-the-job training and during active life); and in the informal system (experience and actual professional practice) (Sánchez, 2010b).

The evaluation of informational competencies is the process of verification of evidence of performance associated with the information of an individual against a defined standard. This can be a diagnosis, when it serves to identify the training needs. It can also be a result when it allows certification of these competences (Sánchez, 2010a). The literature in the field presents several projects and initiatives for evaluating information competencies, including:

*SAILS Standardized Assessment of Information Literacy Skills*, *ETS/ICT-Educational Testing Service/Information and Communications Technology*, *Bay Area Community College Information Competency Assessment Project*, *ISST-Information-Seeking Skills Test*, *TRAILS-Tool for Real-time Assessment of Information Literacy Skills*, *Information Skills Survey (ISS) for Assessment of Information Literacy in Higher Education*, *European Network on Information Literacy for a Culture of Information* ENIL. (Sánchez, 2012: 55)

ALFIN-HUMASS is a tool designed with a focus on attitude and specifically for graduation assessments in Sociology and the Humanities.

## METODOLOGY

To gather data, this study uses the ALFIN-HUMASS questionnaire. The study is limited geographically to Cuba and focuses specifically on students enrolled in Information Science of the Universidad de la Habana. The study was carried out in two stages. The first stage consisted of gathering data during the 2011-2012 academic year and the second consisted of performing the descriptive analysis of these data. The sample consisted of 146, most of which were first-year students (*Table 1*).

Table 1. Subjects in the study

Academic year	Number of students
First year	55
Second year	39
Third year	29
Fourth year	23
Total	146

A hard copy of the questionnaire was handed out to students in classrooms of the Faculty of Communication over the course of three consecutive days. Each group of students surveyed first received a short explanation of the survey and the objectives of ALFIN-HUMASS. Instructions were provided to the students by the researcher in order to prevent bias, and responses were completely anonymous.

The ALFIN-HUMASS<sup>1</sup> questionnaire is comprised of 26 items (Pinto and Lopes, 2010) grouped in four categories or large transversal competencies:

1. Search (items 1-8): 1- Knowing how to use printed information sources; 2- Knowing how to access and use automated catalogues; 3- Knowing how to consult and use electronic sources of primary information; 4- Knowing how to consult and use electronic sources of secondary information (e.g., databases); 5- Knowing the terminology of one's field; 6- Knowing how to search and retrieve information on the internet (advanced searches, directories, portals); 7- Knowing how to use informal electronic sources of information (e.g., blogs, distribution lists); 8- Knowing informational search strategies (descriptors, Boolean operators).
2. Evaluation (items 9-13): 9- Knowing how to assess the quality of the information resources; 10- Recognize the author's ideas in the text; 11- Knowing the typology of the sources of scientific information (e.g., Thesis); 12- Being able to determine if an information resource is updated; 13- Knowing the most relevant authors or institutions in your field of inquiry.

1 The original ALFIN-HUMASS Spanish-language instrument can be consulted at: <http://www.mariapinto.es/alfin-humass/>

3. Processing (items 14-19): 14- Knowing how to summarize and outline information; 15- Being able to recognize the structure of a text; 16- Knowing how to use database managers (e.g., Access, MySQL); 17- Knowing how to use bibliographic reference managers (e.g., End-Note); 18- Knowing how to manage statistical programs and spread sheets (e.g., Excel) 19- Knowing how to install informatics programs.
4. Communication (items 20-26): 20- Knowing how to communicate in public; 21- Knowing how to communicate in other languages; 22- Knowing how to draft a documents (e.g., report, academic work); 23- Knowing the ethical code of one's academic/professional field; 24- Knowing the laws regulating the use of information and intellectual property; 25- Knowing how to make academic presentations (e.g., Power Point); 26- Knowing how to disseminate information on the internet (e.g., Webs, blogs,...).

In this sense, each of these items is framed in three dimensions:

1. Motivation or importance (subjective and quantitative)
2. Auto-efficacy or degree of acquisition (subjective and quantitative)
3. Sources, modalities or habits of learning (qualitative)

In the quantitative dimensions, students had to respond to a Likert scale with values of 1 to 9, where 1 was the lowest and 9 the highest. In the qualitative dimension, students indicated, as warranted for each variable, traditional classroom, library, individual work or specialized courses. The data were gathered in Microsoft Excel and the analysis was performed SPSS 15.0 informatics software. In the subjective and quantitative dimensions (motivation and self-efficacy), the central tendency is determined as the average and the dispersion of data with the standard deviation. The extreme, atypical values of items were determined in order to discover strong and weak points. Moreover, the central tendency, dispersion, outliers and atypical items in each category were assessed against motivation and self-efficacy.

Given the number and diversity of the student sample, comparisons are made on the basis of their grade levels. By means of the frequency, we attempt to identify the main sources of learning used by the surveyed population.

To ascertain the reliability of the instrument the Cronbach alfa coefficient is employed. Internal consistency of the instrument was found to be

quite high (See *Table 2*). In this light, the survey instrument may be deemed reliable. Variations in the responses to survey in fact reflect real differences in opinion and are not caused by faulty or confusing items.

*Table 2.* Reliability analyses of survey questionnaire

Reliability Analysis-Scale (Alpha)	
Reliability Coefficients	
N of Cases = 146,0	N of Items = 52
Alpha = ,9369	

The external validity of the ALFIN-HUMASS instrument is clearly evident. Its parts, scales and procedures can be generalized and are applicable to the population in general. Moreover, it is transferable and applicable to other similar contexts. Of a total of 146 cases, 100% were validated.

## RESULTS AND DISCUSSION

The results appearing in the last row of *Table 3* reveal an overall average higher for motivation (8.26) than that for self-efficacy (6.31). The difference between these overall averages is 1.95. In contrast, the standard deviation was lower for motivation (1.524) than for self-efficacy (2.318). All told, the average scores were higher and more concentrated in assessments of motivation and lower and more dispersed in assessments of self-efficacy.

In general there were ten items that attained higher average scores for motivation and self-efficacy and lower deviations (*Table 3*):

1. Knowing how to use printed information sources
3. Knowing how to consult and use electronic sources of primary information
5. Knowing the terminology of one's field
9. Knowing how to evaluate the quality of information sources
10. Recognize the author's ideas in the text
12. Being able to determine if an information resource is updated
14. Knowing how to summarize and outline information
20. Knowing how to communicate in public

22. Knowing how to draft a document (e.g., report, academic paper)
25. Knowing how to make academic presentations (e.g., Power Point)

Among these items, numbers 22 and 25 (Knowing how to draft a document and Knowing how to make academic presentations, respectively) stand out positively; because they have among the five highest average scores and the five lowest deviations. This observation is applicable to both motivation and self-efficacy. There were also nine items with the lowest average scores and the highest deviations in both motivation and self-efficacy (Table 3). These were as follows:

4. Knowing how to consult and use electronic sources of secondary information (e.g., databases)
7. Knowing how to use informal electronic sources of information (e.g., blogs, distribution lists)
8. Knowing informational search strategies (descriptors, Boolean operators)
16. Knowing how to use database managers (e.g., Access)
17. Knowing how to use bibliographic reference managers (e.g., End-Note)
18. Knowing how to manage statistical programs and spread sheets (e.g., Excel)
19. Knowing how to install informatics programs
24. Knowing the laws regulating the use of information and intellectual property
26. Knowing how to disseminate information on the internet (e.g., Webs blogs)

Among these items, number 17 (Knowing how to use bibliographic reference managers) is the most negative, because it is among the five lowest average scores and five highest deviations. This observation is applicable to both motivation and self-efficacy, making it in the minds of students the least important and least acquired.

Table 3. Averages and deviations of the items N=146

	Items	Motivation		Self-efficacy	
		Mean	Standard Deviation	Mean	Standard Deviation
1.	Knowing how to use printed information sources	8,39	1,285	7,55	1,799

2.	Knowing how to access and use automated catalogues	8,13	1,472	5,73	2,431
3.	Knowing how to consult and use electronic sources of primary information	8,41	1,354	6,88	2,144
4.	Knowing how to consult and use electronic sources of secondary information (e.g., databases)	8,12	1,686	6,24	2,371
5.	Knowing the terminology of one's field	8,60	1,214	6,89	1,799
6.	Knowing how to search and retrieve information on the internet (advanced searches, directories, portals)	8,42	1,579	6,34	2,544
7.	Knowing how to use informal electronic sources of information (e.g., blogs, distribution lists)	7,66	1,882	5,48	2,570
8.	Knowing informational search strategies (descriptors, Boolean operators)	8,04	1,890	5,44	2,966
9.	Knowing how to assess the quality of the information resources	8,38	1,430	6,35	2,033
10.	Recognize the author's ideas in the text	8,30	1,367	7,39	1,837
11.	Knowing the typology of the sources of scientific information (e.g., Thesis)	8,29	1,172	7,28	1,975
12.	Being able to determine if an information resource is updated	8,44	1,245	6,53	2,088
13.	Knowing the most relevant authors or institutions in you field of inquiry	8,35	1,625	6,22	2,389
14.	Knowing how to summarize and outline information	8,40	1,465	6,82	2,126
15.	Being able to recognize the structure of a text	8,01	1,686	6,65	2,138
16.	Knowing how to use database managers (e.g., Access)	8,10	1,604	5,03	2,613
17.	Knowing how to use bibliographic reference managers (e.g., EndNote)	7,99	1,974	5,35	2,954
18.	Knowing how to manage statistical programs and spread sheets (e.g., Excel)	8,01	1,738	5,91	2,682
19.	Knowing how to install informatics programs	7,86	2,019	5,88	3,022
20.	Knowing how to communicate in public	8,57	1,250	6,93	1,934
21.	Knowing how to communicate in other languages	8,45	1,391	4,95	2,597
22.	Knowing how to draft a documents (e.g., report, academic work);	8,71	0,868	7,31	1,678

23.	Knowing the ethical code of one's academic/professional field	8,24	1,838	6,64	2,293
24.	Knowing the laws regulating the use of information and intellectual property	8,07	1,933	5,30	2,547
25.	Knowing how to make academic presentations (e.g., Power Point)	8,59	0,809	7,83	1,734
26.	Knowing how to disseminate information on the internet (e.g., Webs, blogs,...)	8,22	1,861	5,21	3,010
		8,26	1,524	6,31	2,318

A pair analysis of the relationship between motivation and self-efficacy demonstrates that the differences in the averages, falling between 1 and 3, are significant (*Table 4*). Scores below 1 were observed in variables 1, 10 and 25 (Knowing how to use printed information sources, Recognizing the author's ideas in the text and Knowing how to make academic presentations, respectively). Both of these items yielded high motivation and self-efficacy scores. Scores above 3 were observed in pair 16 and 26 (Knowing how to use database managers (e.g., Access) and (Knowing how to disseminate information on the internet (e.g., Webs, blogs). These items yielded high average motivation and low self-efficacy, suggesting there is room for improvement.

The highest values for difference in standard deviation reflect lower levels of training, something that should be addressed. Those items where differences came in above 2 are the areas requiring improvement (*Table 4*). The Pearson coefficient  $s(r)$  shown in *Table 4* suggests a correlation between motivation and self-efficacy. As motivation increases, self-efficacy also does to some degree. It seems that greater students' perception of their degree of expertise in a given competency, the greater importance they lend that competency. It is very likely that when training in a given competency is given greater emphasis with concomitant greater degree of acquired expertise, greater will be the perception of the importance of the competency.

In view of the  $r^2$  (the Pearson coefficient squared determines to what degree motivation contributes to self-efficacy in each variable or item –correlation of motivation and self-efficacy) shown in *Table 4*, motivation for items 10 and 23 (Recognizing the author's ideas in the text and Knowing the ethical code of one's academic/professional field) alone contributed 20% to the self-efficacy scores of the same. Moreover, there were three items that contributed 10% to the self-efficacy score.

Table 4. Differences between motivation and self-efficacy

	Items	Difference between means	Difference in standard deviations	Pearson Coefficient <i>r</i>	<i>r</i> <sup>2</sup>
1.	Knowing how to use printed information sources	0,84	1,8581	0,31	0,10
2.	Knowing how to access and use automated catalogues	2,4	2,5633	0,21	0,04
3.	Knowing how to consult and use electronic sources of primary information	1,53	2,0882	0,36	0,13
4.	Knowing how to consult and use electronic sources of secondary information (e.g., databases)	1,88	2,4576	0,30	0,09
5.	Knowing the terminology of one's field	1,71	1,7210	0,40	0,16
6.	Knowing how to search and retrieve information on the internet (advanced searches, directories, portals)	2,08	2,5388	0,31	0,10
7.	Knowing how to use informal electronic sources of information (e.g., blogs, distribution lists)	2,18	2,8042	0,24	0,06
8.	Knowing informational search strategies (descriptors, Boolean operators)	2,6	2,9062	0,35	0,12
9.	Knowing how to assess the quality of the information resources	2,03	2,1972	0,23	0,05
10.	Recognize the author's ideas in the text	0,91	1,7396	0,44	0,20
11.	Knowing the typology of the sources of scientific information (e.g., Thesis)	1,01	2,0772	0,21	0,04
12.	Being able to determine if an information resource is updated	1,91	2,2019	0,20	0,04
13.	Knowing the most relevant authors or institutions in you field of inquiry	2,13	2,2733	0,41	0,17
14.	Knowing how to summarize and outline information	1,58	2,1608	0,32	0,10
15.	Being able to recognize the structure of a text	1,36	2,1191	0,41	0,16
16.	Knowing how to use database managers (e.g., Access)	3,07	2,9299	0,10	0,01
17.	Knowing how to use bibliographic reference managers (e.g., EndNote)	2,64	2,9976	0,31	0,10
18.	Knowing how to manage statistical programs and spread sheets (e.g., Excel)	2,1	2,8049	0,25	0,06

19.	Knowing how to install informatics programs	1,98	3,0215	0,33	0,11
20.	Knowing how to communicate in public	1,64	2,2719	0,03	0,00
21.	Knowing how to communicate in other languages	3,5	2,6929	0,20	0,04
22.	Knowing how to draft a documents (e.g., report, academic work);	1,4	1,6911	0,24	0,06
23.	Knowing the ethical code of one's academic/professional field	1,6	2,2132	0,44	0,20
24.	Knowing the laws regulating the use of information and intellectual property	2,77	2,7038	0,28	0,08
25.	Knowing how to make academic presentations (e.g., Power Point)	0,76	1,7878	0,17	0,03
26.	Knowing how to disseminate information on the internet (e.g., Webs, blogs)	3,01	3,2266	0,19	0,04

The descriptive analysis of the transversal competency categories included in ALFIN-HUMASS yields varying results (*Table 5*). At the high end of motivation, we find the category of Communication with a score of 8.41. It appears this transversal competency is the most important in the minds of students. For self-efficacy, Evaluation also yielded the highest score (6.75), suggesting that this is perceived as the most broadly acquired transversal competency. The scores for the Processing transversal category came in below the mean for both motivation and self-efficacy. Students believe this is their weakest area of expertise and they also lend it the least importance. The category they believe least important is that which: “[...] is that which worries them the least, in that they exhibit the least interest in it when learning it and with regard to improving their degree of competency” (Pinto and Puertas, 2012: 9. Translated from Spanish).

*Table 5.* Central Tendency of Categories N=146

	Transversal competencies	Motivation		Self-efficacy	
		Media	Standard Deviation	Mean	Standard Deviation
1	Search	8.22	1.54	6.32	2.33
2	Evaluation	8.35	1.37	6.75	2.06
3	Processing	8.06	1.75	5.94	2.59
4	Communication	8.41	1.42	6.31	2.26

It is interesting to note that under the Processing category, students feel they are best prepared in the item they view as most important. (*Table 6*)

Table 6. Analysis by competency category

Categories	Most Important Competency	Least Important Competency	Best Acquired	Worst Acquired
Search for information	Knowing the terminology of one's field	Knowing how to use informal electronic sources of information	Knowing how to use printed information sources	Knowing information search strategies
Means	8,60	7,66	7,55	5,44
Evaluation of information	Being able to determine if an information resource is updated	Knowing the typology of the sources of scientific information	Recognize the author's ideas in the text	Knowing the most relevant authors or institutions in you field of inquiry
Means	8,44	8,29	7,39	6,22
Treatment of information	Knowing how to summarize and outline information	Knowing how to install informatics programs	Knowing how to summarize and outline information	Knowing how to use bibliographic reference managers
Media	8,4	7,86	6,82	5,03
Comunicación y difusión de la información	Knowing how to draft a documents	Knowing the laws regulating the use of information and intellectual property	Knowing how to make academic presentations	Knowing how to communicate in other languages
Means	8,7	8,07	7,83	4,95

Broken down in terms of academic year (*Table 7*), we see that fourth year students are the most highly motivated. It is important to work with first year students because they are the least motivated and least self-effectual. The highest self-efficacy is with second year subset.

Table 7. Differences between motivation and self-efficacy

Academic year	Motivation		Self-efficacy	
	Mean	Standard Deviation	Mean	Standard Deviation
1 <sup>st</sup> year	8,07	1,84	5,33	2,72
2 <sup>nd</sup> year	8,45	1,38	6,96	2,15
3 <sup>rd</sup> year	8,17	1,53	6,79	1,99
4 <sup>th</sup> year	8,51	1,06	6,92	2,21

An analysis of the items under the Learning Habits category also yields relevant information. *Figure 1* shows the proportions of the four main cate-

gories of Learning Habits: Independent learning, Classroom lecture, Library work and Courses. Self-teaching and classroom learning were particularly significant in the surveyed population, while the Library as learning habit was rated quite low.

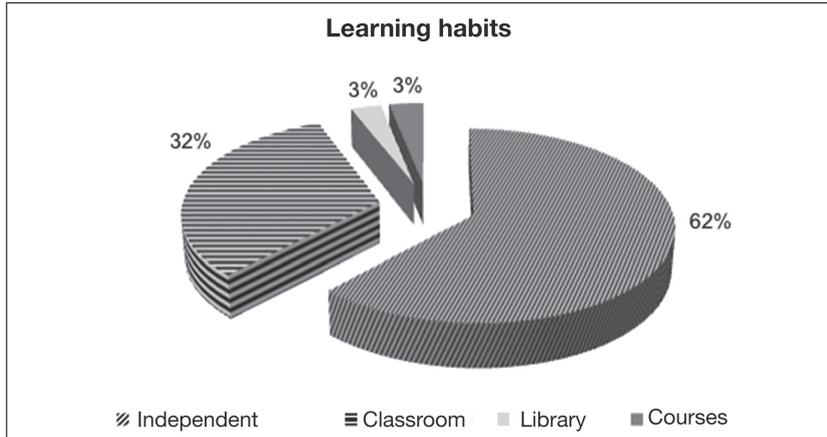


Figure 1. Learning habits

## CONCLUSIONS

The study shows that informational competencies are very significant to the graduation requirements in Information Science. In general, IS students exhibited high levels of motivation in most items. Pinto has pointed out that: “[...] motivation is the keystone of informational literacy.” (2011: 146. Translated from Spanish). In contrast, their levels of self-efficacy are quite low. This situation should be exploited by working with the high levels of motivation to improve self-efficacy.

Those items exhibiting high levels of motivation and self-efficacy, invite further study in order to understand the relationship between beliefs and genuine satisfaction. In light of these results, the faculty should exhort students to act as facilitators to develop these competencies across the diverse areas of the university.

The student body is least motivated in the competency associated with Processing information. In this area, students must be made more aware of how important it is in professional practice. Moreover, the data show that

students are least motivated in the competencies in which they feel least prepared. This result is quite interesting since students do in fact take several courses focusing on this competency.

Priority should be given to raising motivation in items 2- Knowing how to access and use automated catalogues, 11- Knowing the typology of the sources of scientific information, 15- Being able to recognize the structure of a text and 23- Knowing the ethical code of one's academic/professional field. Information professionals are committed to excellence in the use of new information and communications technologies, management of non-traditional sources of information, identifying information content, professional ethics and the values and principles of the profession. Moreover, the low scores in motivation and self-efficacy in the item 17- Knowing how to use bibliographic reference managers must be addressed immediately. Interestingly, the item scoring highest and that scoring lowest in motivation and self-efficacy were the same in this study and in the study performed by Pinto (2011) and Pinto and Puertas (2009, 2012). The high degree of dispersion reveals the lack of uniformity and coherence among the sample population with regard to the informational competencies, even among IS majors.

Our results regarding information competencies strongly suggest that ALFIN programs should be included in the IS curriculum. The need to achieve higher degrees self-efficacy in these students is also clear, because they must meet the demands of the information society. Only in this way can the information professionals meet the challenges of the twenty-first century and capitalize on new opportunities. Moreover, these information professionals will, in turn, will be charged with developing information competencies, so a strong foundation must be provided in the present.

Qualitatively, the study shows the persistence of the independent learning modality, which points to the need to develop and integrate information competencies into the curriculum of the specialization. This also evidences the importance of the work of the Faculty Library and urgency of greater collaboration among librarians and professors. This integration must begin in the first year with the aim of spurring the motivation of learners.

Within the context of Cuban higher education, this study is, doubtless, a pioneering work, which will point the way to new studies of the Latin American context; because when we have an understanding of informational competencies from the student perspective, we can take concrete, correct action.

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