

Profiling Information Literacy in Higher Education: Traces of a Local Longitudinal Study*

Perfiles de la competencia informacional en estudiantes universitarios: huellas desde un estudio longitudinal

Recibido: 19 de octubre 2013 | Revisado: 10 de agosto de 2014 | Aceptado: 19 de marzo de 2015

HAROLD CASTAÑEDA-PEÑA**

Universidad Distrital Francisco José de Caldas, Bogotá,
Colombia

JORGE WINSTON BARBOSA-CHACÓN***

Universidad Industrial de Santander, Bucaramanga,
Colombia

GLORIA MARCIALES****

Pontificia Universidad Javeriana, Bogotá, Colombia

IDALY BARRETO*****

Fundación Universitaria Konrad Lorenz, Bogotá, Colombia

ABSTRACT

This article reports on a longitudinal study that seeks to understand university students' information-literacy profiles in Colombian universities. The study draws on an understanding of information literacy based on a semiotic and sociocultural framework. Data was gathered at two moments between 2009 and 2012 using an information-literacy-profile questionnaire (ILPQ), and out loud protocols while doing an academic task and in-depth interviews. Findings demonstrate that university students tend to remain in the same information literacy profile during their university studies. Results also show a tendency to move between profiles qualifying processes of access, evaluation and use of information for academic tasks. These findings bring in a number of recommendations for higher education discussed at the end of the article.

Keywords

Information literacy; profiles; higher education

RESUMEN

El estudio longitudinal que se reporta busca comprender los perfiles de la competencia informacional de estudiantes universitarios. El estudio se fundamenta en una comprensión semiótica y sociocultural de la competencia informacional. Los datos se recogieron durante 2009 y 2012 mediante un cuestionario de perfil (ILPQ), protocolos en voz alta al realizar una tarea académica y mediante entrevistas en profundidad. Los hallazgos demuestran que los estudiantes universitarios tienden a permanecer en el perfil informacional durante su carrera universitaria y también tienden a movilizarse entre perfiles, especializando su manera de acceder, evaluar y utilizar la información para sus tareas académicas. Estos hallazgos aportan una serie de recomendaciones para la educación superior, que se discuten al final del artículo.

Palabras clave

competencia informacional; perfiles; educación superior

doi:10.11144/Javeriana.upsy14-2.pilh

Para citar este artículo: Castañeda-Peña, H., Barbosa-Chacón, J. W., Marciales, G., & Barreto, I. (2015). Profiling information literacy in higher education: Traces of a local longitudinal study. *Universitas Psychologica*, 14(2), 445-458. <http://dx.doi.org/10.11144/Javeriana.upsy14-2.pilh>

* Artículo resultado del desarrollo de proyecto de investigación titulado "Eventos atribuidos como significativos en la reconfiguración de la competencia informacional por estudiantes universitarios", con códigos PRE00439014390, PS4663 de la Vicerrectoría Académica de la Pontificia Universidad Javeriana y CH-2012-02 de la Vicerrectoría de Investigación y Extensión de la Universidad Industrial de Santander.

** hacastanedap@udistrital.edu.co

*** jowins@uis.edu.co

**** gloria.marciales@javeriana.edu.co

***** idaly.barreto@konradlorenz.edu.co

Introduction

It has been argued that information literacy is not static as this embraces the dynamic character of university students' life histories and their educational experiences in relation to information access, evaluation and 'consumption' (Castañeda-Peña et al., 2010). This understanding urges to address information literacy at different moments of educational processes to know the 'what' and the 'how' of the development of information literacy competences as it is relevant to support the ongoing interest on how to educate information literate students.

In this line of argument, the research group 'Information Society and Learning' undertook a research study aiming at identifying narrative events in the (re)configuration of university students' information literacy competences during their university life.

Based on this goal, this article introduces a longitudinal study about information literacy in higher education. The first section highlights information literacy re-visited from a culturally expressed and situated framework. A number of curricular perspectives, in relation to information literacy, are also described. The second section indicates a methodological path for the longitudinal study of information literacy and discusses results for two higher education cohorts (2009 and 2012). The last section shows how the results represent broader research avenues rooted in the understanding of information literacy through *in situ* lenses.

Looking Back

The understanding of information literacy as a basic skill has been a highly contested; scholars have argued over notions including skills necessary to study, to learn and to use the school library. Others place information literacy in the nexus with information sources where the skill depends on the personal knowledge a user has about information and also on the knowledge being applied. This shows that information literacy is directly associated with both academic performances and standardized ways of accessing and assessing in-

formation (Association of College and Research Libraries [ACRL], 2000).

This article contends that the information literate individual is also a social subject who partakes in the citizenship processes (Ferreira & Dudzlak, 2004). This is likely because individuals are attached to their own life histories as learners who have accessed and used information. This meaningful way of understanding information has then been constructed in social interactions that are culturally situated within specific communities (Wenger, 2001). This brings into discussion the idea that being competent embraces only the perception of "knowing how," the comprehension of information literacy as "acting upon" also seems relative. A complementary perspective on information literacy rooted in the semiotic tradition (Greimas, 1973, 1989) has been recently added to the specialized literature (Marciales, González, Castañeda-Peña, & Barbosa-Chacón, 2008). Such perspective should not be solely understood as a map of logical possibilities (Alvarado, 2007) but as a layered tapestry of associated beliefs, adherences, motivations and aptitudes built up during one's own life in localized formal and informal learning experiences (Marciales et al., 2008). This information-literacy tapestry frames a myriad of ways of accessing, assessing and using information. It is within this framed multiplicity of associated assets where individual's information literacy is culturally expressed and situated.

Drawing on that sociocultural approach to information literacy, Castañeda-Peña, González, Marciales, Barbosa-Chacón and Barbosa (2010) and Barbosa-Chacón, Barbosa, Marciales and Castañeda-Peña (2010) argue that information literacy should also take in the authority of individuals and communities to create, use and evaluate information, and not only focus on the authority of information sources validated by scientific communities. Likewise, it is understood that all information has inherent biases, therefore, being an informationally competent person implies being able to identify such biases. As a consequence, information is not assumed as objective or positive but as fluid and non-static as it relates to the reality (Freire, 1996) of

being able to transform it. This understanding has a direct effect on information users, as they literally become information consumers. Castañeda-Peña et al. (2010) have profiled higher education students as information users in their first year of university. There is an apparent tendency for such students to fall into three dominant profiles: information collectors, information verifiers or checkers, and being a reflexive student. The dominance of the profile does not necessarily imply a static state. This issue will be discussed below as, for the present study, the 2009 data analysis showed that freshmen students tend to relate with information drawing on the specific profiles mentioned. The 2012 study demonstrated that most of the time, after attending a higher education institution, senior students tend to specialize in the information literacy profile they had when entering undergraduate studies; just a few tend to transition to other profiles. It could be argued then that this scenario could be attributed to how information literacy is related to higher education curricula.

Price, Becker, Clark and Collins (2011) claim that information literacy standards constitute a framework used to plan the development of information literacy as independent from the context. In that direction, any courses on the subject, at any educational level, appear not to be related to specific disciplines but show an assessment perspective of information literacy as a standardized competence. Price et al. (2011) go on to propose three specific models of information literacy education. The first model does not directly assess information literacy but contains it; the second model sees information literacy as part of a specific subject and information literacy is assessed as part of this kind of course. Finally, there is a localized assessment of information literacy when it is fully integrated into disciplinary academic tasks in a course. Wang (2011), in a complementary perspective, puts forward for consideration four models. First, the extra-curricular model envisions courses on information literacy that do not belong to the core subjects taken by university students. Second, Wang (2011) proposes the inter-curricular model where information literacy

is a module of optional courses. The third model is intra-curricular; it is within this model where information literacy is part of the contents of core subjects. Finally, the autonomous model presents courses, which are independently taught. While some scholars tend to see information literacy in a more integrated perspective (Pritchard, 2010; Shanahan, 2007; Wang, 2011), others appear to understand information literacy from a more proficiency-based perspective (ACRL, 2000; Bent & Stubbings, 2011; Chen & Lin, 2011; P. Keleher, J. Keleher, & Simon, K., 2011). Andretta (2007), from a phenomenographic perspective, appears to have a more comprehensive and relational view of information literacy based on Bruce's (1997) faces of information literacy. Additionally, the idea of connecting information literacy to students' learning experiences (Lupton, 2004) also backs up such perspectives, which are also complemented by the information-literacy net-based angle (Edwards, 2006).

Without undertaking a complete review of information literacy in relation to higher education curricula, it appears clear that there is a tendency to place information literacy within at least five diverse and complementary perspectives (Marciales et al., 2013). These perspectives include information literacy assessment models, explicit curricular models, integrative models, proficiency models and relational models.

Taking Stock

The university students in this study faced, in one-way or another, such curricular models. In 2009, when they started majoring in their different university careers only one major (i.e., Psychology) offered a relational information literacy model (Andretta, 2007, 2010). The rest of the majors (e.g., modern languages, social communication and regency of pharmacy technology) did have an inter-curricular perspective (Wank, 2011). This also shows the lack of educational information literacy policies within and between higher education institutions; this could have had great impact on the results reported in the present article.

Method

Material and Procedure

Both cohorts, the 2009 (freshmen students) and the 2012 (senior students), were given an information-literacy-profile questionnaire (ILPQ); they were also asked to produce out loud protocols while doing an academic task. Finally, participants responded in-depth interviews. The designing and assembling of this battery of instruments to collect and register data are further explained in González, Marciales, Castañeda-Peña, Barbosa-Chacón and Barbosa (2013). The ILPQ profiled 285 students in 2009 within a range of three recurring tendencies that were devised as university students' information literacy profiles (Castañeda-Peña et al., 2010). In order to validate this profiling exercise, twenty randomly assigned cases were created, in which students from each profile were asked to develop a specific academic task that involved a search for information aimed at writing an academic essay. The information search followed a procedure for data collection that included videoed out loud protocols for which the participants were trained. After task completion, participants were invited to a structured interview to find out about their profile triangulating this with their ILPQ results and their out loud protocols. As explained below, this procedure was also followed with the 2012 cohort.

Participants

In 2009, 285 students were surveyed via the ILPQ in order to identify students favored ways to relate

to information. Participants majored at a private university (psychology, modern languages and social communication) and at a state university (regency of pharmacy technology *and enterprise technology*). In 2012 we also sought to identify significant narrative moments in the individual cases developed in 2009 via in-depth interviews; however, out of 20 examined in 2009, only seven cases from the private institution were available for analysis. The 2012 study was also done to explore potential changes in information literacy profiles after being a university student for three years. Table 1 shows the information-literacy profiles found in each year.

Design

A longitudinal design was used with a layered level of analysis. Both quantitative and qualitative techniques of analysis were conducted within a phenomenographic perspective (Andretta, 2007). Qualitative features identified in the 2009 cohort (Castañeda-Peña et al., 2010) were also shared by the 2012 cohort. Such features of information-literacy profiles were analyzed quantitatively by using a principal component analysis (PCA).

Results

Results show that for the cases analyzed there is a strong tendency to remain in the same information-literacy profile after three years of higher education; with just a few who tend to transition

TABLE 1
University Students' Information-Literacy Profiles

Participant	Major	2009	2012
MC	Modern Languages	Information Collector	Information Collector
S	Psychology	Information Collector	Information Collector
DR	Psychology	Information Collector	Information Checker
E	Modern Languages	Information Collector	Information Checker
L	Psychology	Information Collector	Information Collector
MD	Modern Languages	Information Collector	Information Collector
N	Psychology	Reflexive Student	Reflexive Student

Source: own work

to a different profile. In order to unpack this claim it seems necessary to examine, in a deeper way, what each profile consists of. This will be done by complementarily explaining the results from 2009 and 2012.

Featuring Information-Literacy Profiles: Information Collectors, Information Checkers (Verifiers) and Reflexive Students (2009 Cohort)

Results for the 2009 cohort indicated the existence of information literacy profiles that will be briefly described below. These profiles are practices undertaken by university students when it comes to developing an academic task. The profile displays the most preferred forms that students display to access, assess and use information.

Information-Collector Profile

It appears that an information collector has no great family background when it comes to define his/her own information literacy practices. This means that there was not a family figure showing the student alternatives or ways of being and or behaving in relation to information. Where getting a good grade is the final goal, most students who tend to

fall within this profile experience trial and error as a preferred way of relating themselves to academic tasks. They tend to believe that the truth lies on the Internet where information is easily and rapidly accessed. When they embrace an academic task, their lack of task planning is evident and there is a dominant “cut and paste” information practice.

Information-Checker Profile

Information-checker students do have a certain degree of family background that orients their information literacy practices. For example, one parent used to read to them and the student had books or magazines to resort to, especially during their high school period. Information checkers seem to understand that knowledge is not static and value myriad perspectives upon it. They search for information in databases and reliable information sources such as books and recognized web pages where information is duly verified.

Reflexive-Student Profile

For a reflexive student what is learned at home appears to support academic performance. In this profile, scientific communities should validate information sources where knowledge is co-con-

TABLE 2
Common Features of Information-Literacy Profiles

Profiles	Shared features
Collectors Checkers Reflexive students	Information literacy applied to research processes
	Information literacy applied to disciplinary-academic tasks
	Group work strategies changes
	Development of information search strategies
	Investment
	L11 information sources evaluation
	Information assessment - Trustworthiness
	Having been taught by a teacher
	Having been demanded academically within an intra-curricular perspective
	Perceiving information literacy development in peers
	Information source use
	Internet use
	Books use

Source: own work

structured. Reflexive students assume academic tasks as part of their own professional development and as an important life-long learning asset. In order to carry out an academic task, reflexive students start searching for information after careful planning and question posing.

Transitions Within and between Information-Literacy Profiles (2012 Cohort)

The 2012 cohort displayed a more comprehensive and evidence-based understanding of the profiles identified in the 2009 cohort. This might sound coherent if it is assumed that majoring in a professional career in a higher education institution has impact at the literacy information level. The qualitative analysis showed how the three profiles share common characteristics (Table 2).

These common ground categories illustrate that information literacy is realized via its application in the discipline when higher education curricula take in information literacy framed within an intra-curricular perspective (Wank, 2011). Senior students appreciated academic tasks from specific core subjects being framed within an interdisciplinary perspective coupling information literacy and content subjects. Socially constructed knowledge was highlighted when group work evolved from adding up individual contributions and piecing together results drawing on collaborative-work. This indicates a transition from the information-collector profile towards a more elaborated checker-reflexive information profile. Participant L was profiled as an information-collector in both the 2009 and the 2012 studies. Regarding her information-literacy profile it is possible to trace out transformations within the same profile. When participant L was asked about her academic performance doing group work for core subjects with an information literacy component, she manifested some changes in her information literacy profile. In participant L's own words,

(...) in the past academic terms it [she refers to group work] was like that (...) and group work was about splitting the tasks, the information search (...) you

look for this (...) you find out about this and that (...) and as a result we have no idea of the topic (...) this is why I am telling you that this term in two core subjects we do have more team work and all of us looked for the same kind of information (...). (L-5:92)

Participant N demonstrated a remaining information-collector profile regarding group work in spite of being profiled as a reflexive student in 2009 and in 2012. This participant still prefers to split the task, as her learning style appears to differ from her group mates. This participant said that it was difficult to do group work as procrastination was also present and in that sense, it was better to work on an individual basis and then put everything together. These findings open room for a discussion in relation to how group work is handled in higher education and for further research about the impact this strategy has on university students' information literacy profiles.

Participant D was profiled as an information checker in the 2012 study, showing a transformation from her 2009 information-collector profile. While there are still traces of being an information-collector, the student has developed new information search strategies. Participant D recalls "(...) to do an academic task (...) now I go to the library and browse a book and choose what seems worthy and I read and imagine what to do with that piece of information (...) from there I search on databases (...)" (D-3:49). This shows a transformation in terms of searching for information strategies. It appears that this participant first collects information for a future comparative in-depth search of information. In the same line of argument, participant E (information-collector in 2009 and information-checker in 2012), explains that for a specific research task "(...) for an early education class what I did was to look for materials to base my research on (...) so I started off by searching with the key word 'children' and I got lots of resulting documents of different kinds, such as legal documents and research articles from different universities (...) so I contrasted bibliographies and studied what was useful for my task (...)" (E-

4:22). With regard to information-search strategies both participants (D and E) bring to mind the information-collector profile at the starting point of their academic tasks, which then appears to evolve towards the information-checker profile. This seems to indicate that the information-checker profile, where students tend to verify information sources and compare points of view, is partly built upon information-collection strategies. This apparently suggests that information literacy search strategies are not static and could be conditioned by the type of academic task (e.g., general academic tasks, research tasks) and by the joint curricular efforts between literacy information content and subject content.

Investment, understood as the personal decisions made to complete academic tasks that require an information search, was revealed differently in the data. Participant MC was profiled as an information-collector in 2009 and 2012. This participant showed how she invested in the academic work. In her view, lots of effort needs to be made to meet the expectation of teachers. From her own perspective,

I was trying to get good grades because I'd got bad ones before with her [she refers to the teacher] (...) and I had to adapt the topic as she liked (...) I do not understand why it was like ups and downs doing schoolwork for her. It has always been a challenge class with her, as in writing (...) one tries to shape the written assignment, introducing one's own idea compared to others' and then highlighting my personal opinion. (MC-1:6)

This appears to reinforce the profile of an information-collector. Not only do they invest in order to get good grades but also there is a sense of pleasing teachers. It seems that this participant qualified her profile by trying to say that what was expected by the teacher shaped her written tasks. This relationship between academic writing and information-literacy profiles is a research avenue that requires more investigation.

A more oriented information-checking participant stated that investment was mainly based on

her determination to find out firsthand information; in her own words "seeking information was very difficult and time consuming; I had to contact forensic linguistic authors, e-mail them and ask them for the information I needed, I mean (...) this information was kind of difficult to get (...)" (E-4:11). This reinforces the idea about thinking of information-checkers as verifiers of information. This also shows a strategy of obtaining 'direct' information reliable from authors.

In the case of reflexive students, it could be argued that they tend to assume information seeking more as a process that backs up innovation in the fulfillment of the academic task. This seems logical given the previously identified characteristic of assuming university life as part of their professional development. Participant N says that lots of work is invested in order to put forward innovative ideas; according to her,

(...) we work very hard and do exhaustive information searches, which at the end of the day are very worthy (...) one cannot pretend to be successful in an effortless way, I mean things just don't happen out of the blue, one has to be persistent (...) I mean tasks are very difficult but at the end the whole research process pays off. (N-7:34)

This might qualify as the reflexive-student profile, as senior students seem to be aware of their future professional development and invest from an information literacy point of view in such forthcoming life stages.

Data also demonstrated a strong affinity for seeking information in first language. This is a feature shared by the three information literacy profiles identified. Participant DR, profiled as a collector of information in 2009 and as an information-checker in 2012, argued that "most of the time there are things written in Spanish which are very relevant and so one reads them" (DR-3:61). This appears to resonate with participant E's thoughts, who stated that "what I found in Spanish seems to be very concise (...) I mean concepts are straightforwardly stated (...) like the way they work and that's about it" (E-4:18). It is worth not-

ing the information-succinctness criterion used by this participant. Participant N (a reflexive student) resorts to a second language only when necessary. In her own words,

I first try Spanish and if all is there... I have always found information in Spanish but I understand there are different perspectives in English but my academic duties are done in Spanish but I foresee that for the BA monograph we will face info in English. (N-7:44)

This demonstrates that the interface between information literacy and foreign languages need scholarly attention, as this has been under researched compared to information literacy in relation to second language use (Conteh-Morgan 2002a, 2002b; Stapleton, Helms-Park, & Radia, 2006; Zoe & DiMartino, 2000). This also has an impact on how university students assess information and information sources.

University teachers appear to exert a great influence on their students, helping them to emphasize features of their own information-literacy profiles. For example, one of the information-collectors, profiled like this in 2009 and 2012, stated that she simply followed the way she was instructed. In the interview she said: “teachers point out when things are wrong (...) they show you the way and I know many teachers publish” (S-2:2). One information-checker also stressed the teachers’ roles: “teachers showed us like different possibilities and many things from different points of view and this has helped me out with my academic tasks” (E-4:26). The reflexive student is aware of the fact that “university teachers have diverse styles (...) one style is not to stick to a traditional idea but considering multiple perspectives (...) this has motivated me a lot” (N-7:11). All in all, it could be stated that teachers could also qualify and shape information-literacy profiles in their students. This raises a question about university teachers’ information-literacy profiles and their relation to pedagogical practices that have potential impact on their students’ information-literacy profiles as well. This appears to be strongly related to how information literacy is correlated to the university curriculum.

Participants DR (information-collector) and N (reflexive student) undertook the same major. They affirm that the research project developed since they were freshmen and contributed significantly to their information literacy development. Conversely, MD (information-collector) undertook a major that offered just a course at the beginning of her undergraduate studies on information literacy skills. For her:

(...) it was difficult, for example, this assignment on linguistic analysis (...) I remember that we collected data but I didn’t know how to do this and didn’t get what was stated in the master copies (...) it was complex because the readings did not make sense at all because that task was not contextualized. (MD-6:26)

This implies that curricular models linking information literacy in higher education need reviewing and well-established educational policies (Marciales et al., 2013).

University students appear to be aware of their peers’ information literacy profiles. They are from the perspective of their own evolving information-literacy profile. On one side, participant L, for example, said that it was difficult for her to see that her peers had different ways to approach information apart from what they got in high-school education. In her own words, “to change people’s minds regarding what they learned at school is a difficult challenge (...) you know (...) we copied and pasted information then exploring information in the university library is huge” (L-5:40). It appears that participant L is aware of specific information-literacy practices that profile typical features of information-collector students, where she is also included. On the other side, participant DR has perceived the change from one profile (information-collector) to another (information-checker). DR expressed the following idea: “There should be a transformation in our information-literacy practices (...) I cannot believe that people undertaken this academic term have not used a database or have no knowledge about this” (DR-3:32). This awareness is interesting but

compared to reality could be deceiving. As it is shown in this study, not all students evolved from one profile to another after majoring in different disciplines for three years of higher education. Indeed, achieving the reflexive-student profile is not that significant in the data. However, participant N, who belongs to this last profile, also shows awareness of types of students according to information-literacy profiles.

Information source use, which includes the Internet and book use, also characterizes features of the three profiles. Participant MC found the following actions reflecting how she improved her 'collector' skills to be significant:

(...) in relation to that task hmmm (...) I did search for information obviously in books and Internet and obviously I had to find texts dealing with the same topic but it was difficult because I had to read a lot (...) at times the titles were alike but the content wasn't, they were about something else and this could affect our work as we could also deviate from what the teacher told us to do, so after reading a lot we came to grips with it and decided on a specific topic (...) yes I have to say that this was a lot of work, there was lots of research, lots of information search in books, in the library, Internet (...) loan books from other university libraries (...) at the end the bibliography we used was based on a linguist from Venezuela and on one international paper we read (...). (MC-1:9)

Now in her senior year, participant MC values her efforts when it comes to information source use. She appears to find it noteworthy that she gets information for an academic task from different sources that include books, Internet, libraries, and other university libraries. What should be highlighted here, once again, is how this participant stays in her own preferred frame to relate to information in terms of searching, assessing and using it. However, there seems to be a difference between 2009 and 2012 with this particular case. In 2009, how she was performing her information-collector profile was not well known; the ILPQ and the out loud protocol demonstrated

this. Three years later, this participant appears to be located within the same information-literacy profile but her information-seeking skills could have been refined. This means that information searches are not just conducted using the Internet and results from Google but the sources are myriad, being underpinned by the same purpose: collecting information. This would benefit from more research following the development of specific features that characterize profiles (cf., Weiler, 2005). In contrast, participant E appears to have migrated from a wide understanding of information-collector profiles into the checker one and this seems to be tied to her schooling experience at the university. In E's own words,

(...) in the first year I used to do simple information searches in Google and I just looked for information there using keywords I thought were appropriate... before starting off my BA thesis I shaped a research idea asking some professors about teaching materials and Carlos [professor's name] suggested me some books and that was the springboard (...) from there I went to other information sources and also searched for universities where they deal with designing teaching materials and I looked for more authors and that was how I worked out the theory that backs up my work (...). (E-4:1:17)

It could be argued that these two opposing experiences show lack of accountability for information-literacy instruction in higher education. However, more research is needed in order to understand why participant MC's experience differs from participant E's experience, being as they are educated at the same university and majoring in the same career. In the next section some implications of these findings are further analyzed.

Based on the results above, it could be argued that literacy profiles tend not to be static. It could also be contended that university students either specialize in one specific information-literacy profile or tend to transition between profiles. In order to better comprehend this data behavior, a principal component analysis (PCA) was conducted as illustrated in Figure 1.

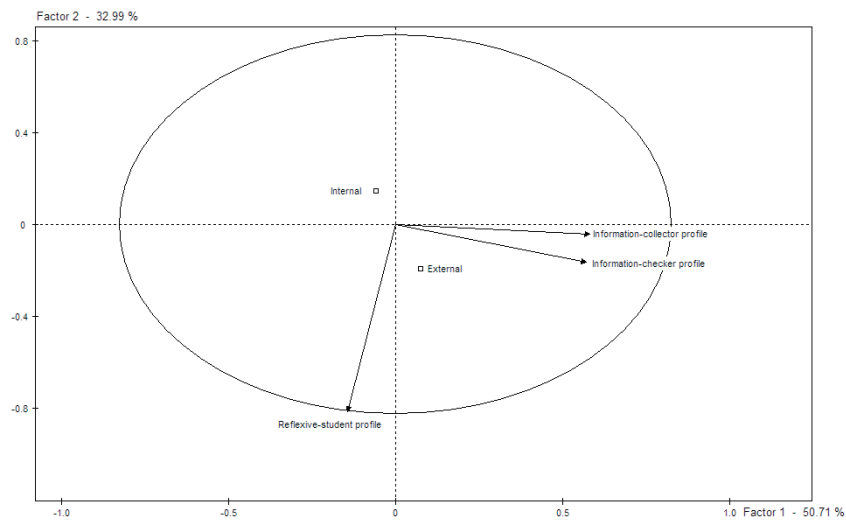


Figure 1. Information Literacy in Higher Education (Principal Component Analysis).

Source: own work

Factor 1 represents our conceptual understanding of information literacy as a layered tapestry where beliefs, experiences and life histories are interwoven. Factor 2 corresponds then to internal and external features that impact information literacy profiles attributed as significant by the research participants to the very same beliefs, experiences and life histories. The PCA factors were obtained using the frequencies of the qualitative shared features from the three profiles. Carrying the PCA further, the dominant aspects in the PCA demonstrate that, for the particular case presented in this paper, the profiles tend to tally differently. For example, it appears that the less preferred profile corresponds to that of the reflexive student. This is logical as only one research participant was profiled as such both in 2009 and 2012. However, it seems more significant to see the negative value this profile has in both axes representing the two factors explained (e.g., information literacy as layered = Factor 1 and features made relevant by information-literacy users = Factor 2). These results would indicate a need for information literacy development at the curricular level is felt in higher education. This interpretation is backed up by the lack of proximity of external and internal features conditioning the reflexive-student

profile at least in the same negative planimetry of Figure 1. As shown in this figure, both factors appear not to be correlated with such a profile; at least none seem to be significant enough for the research participants. Thus, this implicates that education at the university level did not have a substantial impact on senior's information-literacy profiles. This could potentially be the cause for students to tend to specialize in the profiles detected back in 2009 and the dominance of the collector profile.

Overwhelmingly, the checker profile and the collector profile share a positive character in relation to Factor 1. As discussed in the section above, a few students tended to migrate to other profiles according to their own academic experiences. This appears to be promoted by external features such as having been taught by a teacher, having been pushed academically within an intra-curricular perspective and perceiving information literacy development in peers. In great proportion, the other features also described above are of an internal nature. However, it is important to note that internal and external features are not distributed evenly across the research participants' information-literacy profiles and this could limit the scope of our interpretation.

Moving Forward

These results would seem to indicate that the correlation between university curriculum and information literacy development is dynamic and should not be understood only from merely static structural factors as these factors are also dynamic and at work in the (re)configuration of information literacy profiles. This could explain why, at times, an information-collector student would want the information-checker profile, as shown in the section above. In the same line of thought, it could be argued that not always undertaking undergraduate studies would necessarily imply changes in the informational profile of learners. This lack of change or (re)configuration could be also directly influenced by the demand for specific skills and other cross-curricular programs, characteristics of learners, teaching practices and technologies of information and communication made available to university students (Schamal & Ruiz-Table, 2008). Another aspect to be borne in mind is the fact that the incidence of academic disciplines in the development of information literacy is marked. This scenario is most evident when in an academic program it is agreed to do upfront teaching to develop information literacy competences (Sanchez & Alfonso, 2007).

Additionally, we would like to argue that these results confirm the importance that the family figure has on guiding learners towards the use of information. Students with collector profile appear to have few experiences of having shared or having discussed with their parents the reading of the newspaper or any other media of information. The absence of an adequate model of children's reading behavior seems to have as consequence, students' tendency to use trial and error as a preferred way of relating themselves to academic tasks. In addition, information collectors tend to believe that the truth lies on Internet where information is easily and rapidly accessed. In the case of information checkers, the family background tends to help them to orient their searching information practices. In this case, databases and reliable information sources play an important role because

information must be duly verified in any searching task, for this profile.

The results related with the collector and checker profiles contrast with the reflexive profile where the experience at home seems to give them the needed support in order to develop the basic information competences that could help them to do well in academic tasks.

We would also like to argue that with respect to the development of the information competency through undergraduate education, three aspects reveal their importance in this process: Having been taught by a teacher, having been demanded academically within an intra-curricular perspective and perceiving information literacy development in peers. These aspects constitute a trilogy: teacher, student, and peers; trilogy that the review of literature always has revealed as fundamental in any pedagogical relationship. Nevertheless, when students get into the university, parents and teachers believe that they do not need to develop competences to use information because such competences must have been developed during their primary and high school years.

In relation to the kind of academic tasks that could help students in order to develop information competencies, there are three special tasks recognized by students: research projects in class, information research tasks in disciplinary fields, and group work. Each one contributes to promote good practices related to information performance in university academic contexts. These results resonate with Wank's conclusions (2011); according to this author, the information literacy is realized via its application in the discipline when higher education curricula take in information literacy framed within an intra-curricular perspective.

It is important to show the importance that teacher's expectations have over the students' information literacy development. According to the data, it seems that teachers' expectations about their students' written competences have incidence over the development of their information literacy profiles. This relationship between expectations, academic writing tasks, and information-literacy profiles is a research avenue that requires more investigation.

This is a small set of data for a longitudinal study. However, their principal usefulness rests on the idea of looking differently at information literacy and stimulating new ways of thinking of and researching the topic. What seems striking is that while there is a lot of debate about how to integrate information literacy within the university curriculum there is still a felt need to unveil, in localized contexts and across them, what undergraduate students make relevant and profit as learning from such correlation. This along with the findings reported here, we argue, pave a long way of inquiry for those interested in this research topic.

References

- Association of College and Research Libraries. (2000). *Information Literacy Competency Standards for Higher Education*. Retrieved from <http://www.ala.org/acrl/standards/informationliteracycompetency>
- Alvarado, G. (2007, May). *El concepto de competencia en la perspectiva de la educación superior*. Ponencia presentada en el foro El concepto de competencia: su uso en educación técnica y superior, Universidad Industrial de Santander, Bucaramanga. Retrieved from <http://groups.google.com/group/alianza-agro/web>
- Andretta, S. (2007). Phenomenography: A conceptual framework for information literacy education. *Aslib Proceedings: New Information Perspectives*, 59(2), 152-168.
- Andretta, S. (2010). Learner-centred information literacy initiatives in higher education. *Journal of Information Literacy*, 4(1), 1-5.
- Barbosa-Chacón, J., Barbosa, J. C., Marciales, G., & Castañeda-Peña, H. (2010). Reconceptualización sobre competencias informacionales: una experiencia en la educación superior. *Revista de Estudios Sociales*, 37, 121-142.
- Bent, M., & Stubbings, R. (2011). *The SCONUL Seven Pillars of Information Literacy. Core model for higher education*. Available at <http://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf>
- Bruce, C. (1997). *The seven faces of information literacy*. Adelaide: Auslib Press.
- Castañeda-Peña, H., González, L., Marciales, G., Barbosa-Chacón, J. W., & Barbosa, J. (2010). Recolectores, verificadores y reflexivos: perfiles de la competencia informacional en estudiantes universitarios de primer semestre. *Revista Interamericana de Bibliotecología*, 33(1), 187-209.
- Chen, K., & Lin, P. (2011). Information literacy in university library user education. *Aslib Proceedings: New Information Perspectives*, 63(4), 399-418.
- Conteh-Morgan, M. (2002a). Empowering ESL students: A new model for information literacy instruction. *Research Strategies*, 18(1), 29-38.
- Conteh-Morgan, M. (2002b). Connecting the dots: Limited English proficiency, second language learning theories, and information literacy instruction. *The Journal of Academic Librarianship*, 28(4), 191-196.
- Edwards, S. (2006). *Panning for gold. Information literacy and the net lenses model*. Adelaide: Auslib Press.
- Ferreira, S., & Dudziak, E. A. (2004, August). *La alfabetización informacional para la ciudadanía en América Latina: el punto de vista del usuario final de programas nacionales de información y/o inclusión social*. Paper presented in the World Library and information Congress: 70th IFLA General Conference and Council, Buenos Aires, Argentina.
- Freire, P. (1996). *Pedagogía del oprimido*. Buenos Aires: Siglo XXI.
- González, L., Marciales, G., Castañeda-Peña, H., Barbosa-Chacón, J., & Barbosa, J. (2013). Competencia informacional: desarrollo de un instrumento para su observación. *Lenguaje*, 41(1), 105-131.
- Greimas, A. J. (1973). *En torno al sentido: ensayos semióticos*. Madrid: Fragua.
- Greimas, A. J. (1989). *Del sentido II: ensayos semióticos*. Madrid: Gredos.
- Keleher, P., Keleher, J., & Simon, K. (2011, October). *The challenge of embedding information literacy as a graduate attribute into engineering and technology courses*. 41st Annual Frontiers in Education Conference: Celebrating 41 Years of Monumental Innovations from Around the World, Rapid City, SD, United States.
- Lupton, M. (2004). *The learning connection. Information literacy and the student experience*. Adelaide: Auslib Press.

- Marciales, G., González, L., Castañeda-Peña, H., & Barbosa-Chacón, J. W. (2008). Competencias informacionales en estudiantes universitarios: una reconceptualización. *Universitas Psychologica*, 7(3), 314-326.
- Marciales, G., Cabra, F., Castañeda-Peña, H., Peña, L., Mancipe, E., & Gualteros, N. (2013). *Nativos digitales: transiciones del formato impreso al digital*. Bogotá: Editorial Pontificia Universidad Javeriana.
- Price, R., Becker, K., Clark, L., & Collins, S. (2011). Embedding information literacy in a first-year business undergraduate course. *Studies in Higher Education*, 36(6), 705-718.
- Pritchard, P. A. (2010). The embedded science librarian: Partner in curriculum design and delivery. *Journal of Library Administration*, 50(4), 373-396.
- Sánchez, N., & Alfonso, I. (2007). *Las competencias informacionales en las ciencias biomédicas: una aproximación a partir de la literatura publicada*. Retrieved from http://eprints.rclis.org/9097/1/Las_competencias_informacionales_en_las_ciencias_biomedicas.pdf
- Schamal, R. & Ruiz-Tagle, A. (2008). Una metodología para el diseño de un currículo orientado a las competencias. *Ingeniare. Revista Chilena de Ingeniería*, 16 (1), 147-158. Retrieved from <http://www.scielo.cl/pdf/ingeniare/v16n1/ART04.pdf>
- Stapleton, P., Helms-Park, R., & Radia, P. (2006). The web as a source of unconventional research materials in second language academic writing. *Internet and Higher Education*, 9(1), 63-75.
- Shanahan, M. C. (2007). Information literacy skills of undergraduate medical radiation students. *Radiography*, 13(3), 187-196.
- Wang, L. (2011). An information literacy integration model and its application in higher education. *Reference Services Review*, 39(4), 703-720.
- Weiler, A. (2005). Information-seeking behavior in generation Y students: Motivation, critical thinking, and learning theory. *The Journal of Academic Librarianship*, 31(1), 46-53.
- Wenger, E. (2001). *Comunidades de práctica: aprendizaje, significado e identidad*. Madrid: Paidós.
- Zoe, L., & DiMartino, D. (2000). Cultural diversity and end-user searching: An analysis by gender and language background. *Research Strategies*, 17(4), 291-305.

(Endnotes)

- 1 L1 stands for mother tongue
- 2 Capital letter identifies the research participant, first number indicates interview and second number indicates number of codified quote from the interview.

