Educação e a Apropriação e Reconstrução do Conhecimento Científico 4

Américo Junior Nunes da Silva
Ilvanete dos Santos de Souza
Reinaldo Feio Lima
(Organizadores)

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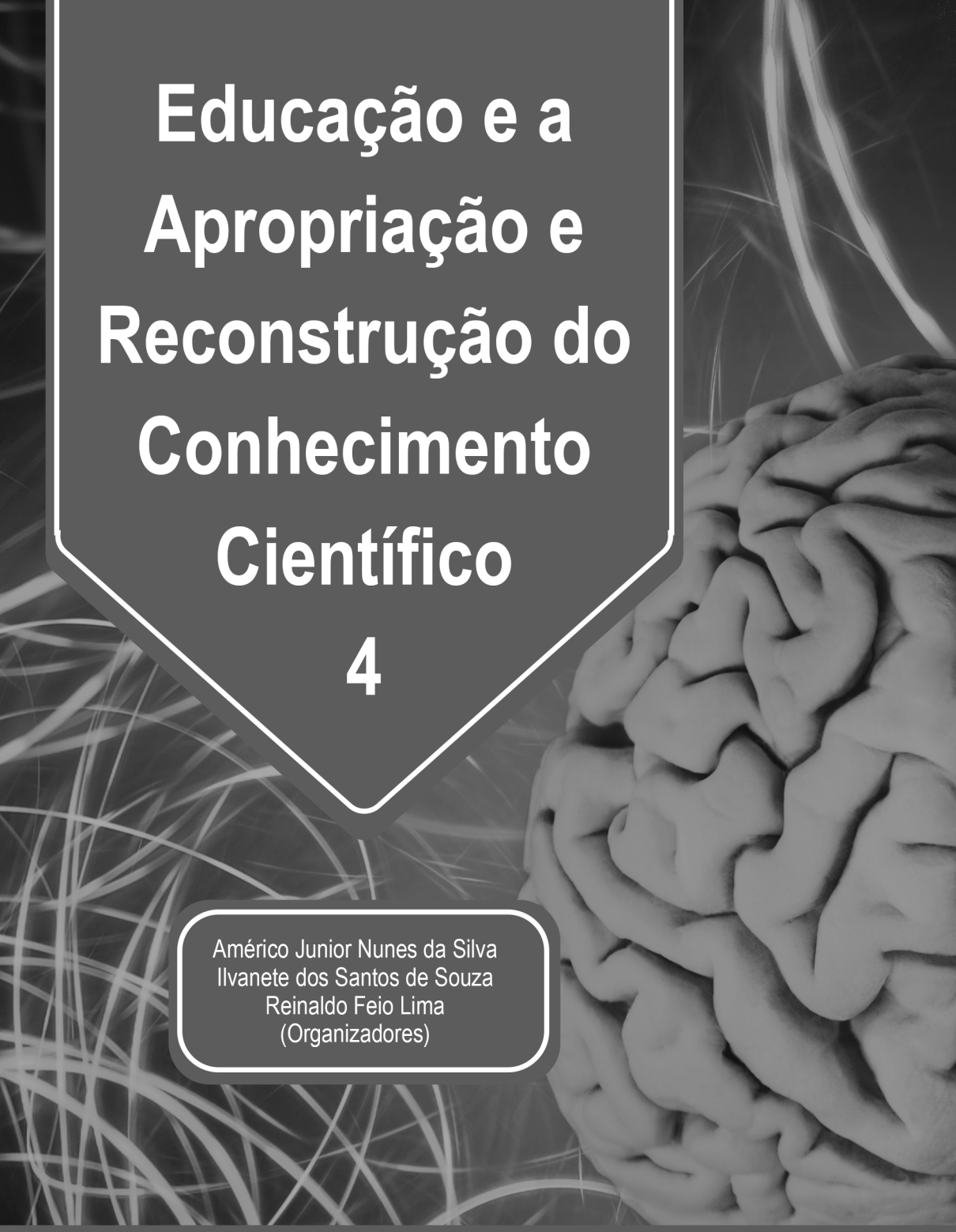

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APRESENTAÇÃO

Esta obra surge no bojo de uma pandemia: a do novo coronavírus. Contexto marcado pelo distanciamento social e consequentemente a suspensão das atividades presenciais em escolas e universidades. Segundo a Organização das Nações Unidas para a Educação, a Ciência e a Cultura (UNESCO), a pandemia da COVID-19 já impactou os estudos de mais de 1,5 bilhão de estudantes em 188 países. E é nessa conjuntura de um "novo normal" que os autores dessa obra organizam as produções que compõem este volume.

Boaventura de Souza Santos[1] em sua obra "A cruel pedagogia do vírus" nos apresenta algumas reflexões sobre os desafios desse período emergencial e lança luz sobre as desigualdades sociais evidenciadas por esse panorama. E consequentemente, na Educação, esses aspectos compactuam de algum modo, ao acentuar a exclusão daqueles que não conseguem adequar-se desencadeando impactos no ensino como, por exemplo, acesso a tecnologia, reinvenções metodológicas e a mudança de rotina da sala de aula, dentre outros. O cenário emergencial potencializa os desafios e traz à baila as fragilidades do ensino, ainda em fase de apropriação, pois precisam ser compreendidos, ou seja, as informações carregam intencionalidade.

As discussões realizadas neste volume 4 de **"Educação e a Apropriação e Reconstrução do Conhecimento Científico"**, perpassam pela Educação e seus diferentes contextos e reúnem estudos de autores nacionais e internacionais. Este livro, portanto, reúne trabalhos de pesquisa e experiências em diversos espaços, com o intuito de promover um amplo debate acerca das diversas problemáticas que permeiam o contexto educacional brasileiro. Os capítulos que compõe essa obra abordam, de forma interdisciplinar, a partir da realização de pesquisas, relatos de casos e revisões, problemas e situações comuns do contexto educacional.

Por fim, ao levar em consideração todos os elementos que apresentamos anteriormente, esta obra, a partir das discussões que emergem de suas páginas, constitui-se enquanto importante leitura para aqueles que fazem Educação no país e que se interessam pelas temáticas aqui discutidas. Nesse sentido, desejamos uma boa leitura a todos e a todas.

Américo Junior Nunes da Silva
Ilvanete dos Santos de Souza
Reinaldo Feio Lima

1 SANTOS, Boaventura de Sousa. A Cruel Pedagogia do Vírus. Editora Almedina, Portugal. 2020.

SUMÁRIO

CAPÍTULO 20

SUGGESTIONS TO IMPLEMENT AND ENHANCE INFORMATION LITERACY PROGRAMS

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Tulio Barrios Bulling
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ABSTRACT: As society develops, so do all areas of knowledge. Information literacy (IL) has been gaining importance and recognition during the last decades since it is a field closely related to the understanding, management, and dissemination of information. Additionally, it is closely related to the educational processes of skills and competencies development. The term has become more complex as new meanings and interpretations emerge. This paper aims to revise existing literature in search of conceptual precision and pedagogic implications to provide operational suggestions such as the timing, qualification, affective factors, and methodology to enhance IL programs at educational institutions.
KEYWORDS: improvement, information literacy, skills development

SUGESTÕES PARA IMPLEMENTAR E APRIMORAR PROGRAMAS DE ALFABETIZAÇÃO INFORMACIONAL

RESUMO: À medida que a sociedade se desenvolve, o mesmo ocorre com todas as áreas do conhecimento. A alfabetização informacional (AI) vem ganhando importância e reconhecimento nas últimas décadas, por ser um campo intimamente relacionado à compreensão, gestão e disseminação da informação. Além disso, está intimamente relacionado aos processos educacionais de desenvolvimento de habilidades e competências. O termo tornou-se mais complexo à medida que novos significados e interpretações emergem. Este artigo tem como objetivo revisar a literatura existente em busca de precisão conceitual e implicações pedagógicas para fornecer sugestões operacionais como o momento, a qualificação, os fatores afetivos e a metodologia para aprimorar os programas de AI em instituições de ensino.
PALAVRAS - CHAVE: alfabetização informacional, desenvolvimento de habilidades, melhoria

INTRODUCTION

The importance of Information Literacy (IL) is increasingly becoming universally recognized, and many of its aspects can be directly related to the teaching practice. The teaching of contents is being challenged by the accessibility they have through the technological means and mainly the Internet. As a result, the development of cognitive skills and IL skills is increasing its relevance within the academic world. Additionally, IL skills are also closely related to comprehension and dissemination of knowledge and hence, associated with critical thinking and other higher orders cognitive skills.

IL skills are being regarded as key tools in modern society; not only as a means for life-long learning, but also as a way leading to

development, prosperity, and freedom. IL should enable people, regardless of the activities they are involved in, to search, evaluate, use, create, and disseminate information, to achieve personal, professional, social, and educational objectives. Those who have developed IL skills can access relevant information and, thus, take vital and well-informed decisions regarding their lives and future.

In the information society, IL requires all users to possess the necessary competencies to make effective use of information technology and its applications to access and create information. This implies not only technical knowledge about communications and information, but also a clearer understanding of diverse media and formats through which communication is spread.

This article aims to conduct an exploratory review of recent IL literature and to provide a set of suggestions for educational establishments that want to design or enhance IL programs.

LITERATURE REVIEW

In this section, the author will review some significant contributions to the field of IL, trying to capture the main concepts and most influential ideas of the topic being studied.

Information Literacy years 2006 – 2010

An attempt to interpret the relationship between theory and practice in the field of IL education was Bruce's, Edward's, and Lupton's (2006) article. In their paper, the authors identified new and increasing challenges for IL educators with a profound influence on curriculum design, teaching, and learning. Many of these challenges came from new approaches and from learning theories that have to be applied and integrated into IL education coherently. To contribute to this demanding reality, Bruce et al. (2006) proposed their *Six Frames for Information Literacy Education* which should help to analyze, interpret, and understand these new demands.

For the authors, each person approached IL education differently. These diverse perspectives were deeply influenced by the different conceptions about teaching and learning. The vision of teaching might include concepts that ranged from memorization to autonomous learning; while the perception of IL might refer mental models of information systems, and building knowledge bases for personal purposes.

The frame Bruce et al. (2006) proposed included content, competency, learning to learn, personal relevance, social impact, and relational frames. Each of them is associated with a particular view of IL: information, curriculum focus, learning and teaching, content, and assessment. Every frame consisted of six constituent view elements: IL, information, curriculum focus, teaching and learning, content, and assessment.

Bruce at al. (2006) exemplified these views as follows: the content frame might consider IL as knowledge about the world of information; the user's view of information

might be that information existed apart from the user, so it could be transmitted. Learning was a change in how much was known; the view of context might be described as what needs to be known had primacy. The authors showed a special interest in the relational frame as

> one through which the content, learning to learn, and experiential frames are mediated, or brought together. Users of the relational frame are interested in both content (phenomena) and how that content is seen or experienced. Learning in this frame is understood as coming to discern things in new or more complex ways. (pp. 5-6)

Bruce's at al. (2006) presented some guidelines to implement this frame. Firstly, the information and the student were not separated entities but one. As a result, IL was not understood as a set of skills, competencies, and characteristics anymore, but as complex different forms to interact with information. As one may realize, the teaching implications were significant; mainly, for classroom and library practices. Some challenges the authors proposed were how to help students explore variation, how to help them be discriminating web users, and how to help them learn through assessment.

Ending their paper, Bruce at al. (2006) outlined the tension an IL implementation program might generate between people who preferred a social approach to learning to learn and those who favored individual learning. The authors seemed convinced that the frames defied us to identify our primary frame, and to analyze how our professional practice might grow by adopting one or more of the proposed frames.

A good example of educational literacy learning integrated into a specific discipline was Holliday's and Fagerheim's (2006) article. The authors informed about the implementation of a sequenced IL program for two core English composition courses at Utah State University (USU). In their context, the authors recognized two main streams: one that considered IL a discipline in itself, and consequently should be taught as a credit course, and another one that argued that it was more effective to develop IL skills in a course-integrated way. Holliday and Fagerheim (2006) reported they favored the latter for practical and pedagogical reasons. They decided to begin with a curriculum design project for the writing program since most instructors were frequently using the library, and the program administrator had a good working relationship with the library.

The implementation process required a careful assessment process to bridge the gap between current teaching and the students' real needs. Also, librarians had doubled the sessions delivered due to an increase in demand. Hence, the assessment process required multiple methods to determine the goals, contents, and strategies. Literature review, surveys, debriefing sessions, and discussion were some of these methods.

Holliday and Fagerheim (2006) discovered students preferred the World Wide Web to library resources. Besides, they were more focused on assignment requirements than critically evaluating sources to address their research questions. Furthermore, students

seemed to be quite confident about their research skills; nevertheless, they tended to investigate superficially and assignment-focused. Regarding the librarians' role, they were asked to rate each learning goal and after some discussion, they decided on an ideal scope and sequence of learning goals. They were also consulted about primary responsibilities. Most of them accepted that it was developing skills for the selection of appropriate resources and search tools, and conducting effective searches. Skills involving integration and synthesis of information and its use were considered to be the primary responsibility of the English instructors. The definition of information needs, the evaluation of sources, and the ethical and legal issues were considered to be shared responsibilities.

Holliday and Fagerheim (2006) used the common ground librarians and instructors had to design a more well-sequenced instruction for two English subjects. The strongest commonalities referred to defining the nature and extent of the information need (Standard 1) and accessing needed information effectively and efficiently (Standard 2). The curriculum and the lessons were planned upon this common ground. They also considered the other standards. Hence, the lessons were designed upon five basic learning outcomes, define and state the need for information, identify a variety of sources of information, select the most effective search tools, construct and implement effective search tools, and evaluate sources and information to make decisions.

Holliday and Fagerheim (2006) organized multiple related learning objectives into five groups: topic selection, background research, and focus formulation; identification of potential sources of information; search skills; evaluation and iteration; management of information, and citation sources. This way the authors surpassed the single activities for each learning goal approach, developing a more complex, yet more meaningful and comprehensive one. During the implementation process, the authors worked very closely with the instructors, providing them with core and supplementary activities and model sequences, with the problem-based sequence being one of the most important.

Collaborative work and virtuous partnerships were the key elements to overcome any type of difficulties an IL project may convey. It seemed more efficient to include the library in a new curriculum from the very beginning rather than having a late reaction. Finally, part of this preliminary success was simply enhancing IL visibility.

So far, IL appeared to be the essential set of skills for the information age. In this line, Eisenberg (2008) considered that information and technology literacy were key elements for anyone who needed to acquire and use information related skills.

Eisenberg (2008) offered specific conceptual and practical strategies for effective IL instruction. Context was the main element for a meaningful IL program. Additionally, he distinguished three essential contexts for successful IL learning and teaching: the information process, the contextualized technology, and the real needs. Contextual keys should help us to keep focused and better-positioned to succeed.

Eisenberg (2008) introduced his Big6 Skills IL approach which consisted of six major

stages and two sub-stages attached to them. Stage task definition, sub-stages define the problem and identify the information needed. Stage information-seeking strategies, sub-stages determine all possible sources and select the best ones. Stage location and access, sub-stages locate sources and find information within them. Stage information use, sub-stages engage and extract relevant information. Stage synthesis, sub-stages organize information from multiple sources and present it. Finally, stage evaluation, sub-stages judge the result and the process.

According to Eisenberg (2008), his model covered the full range of information problem – solving actions. In his words,

> The Big6 is an approach that can be used whenever people are faced with an information problem or with making a decision that is based on information. Students - K-12 through higher education - encounter many information problems related to course assignments. However, the Big6 is just as applicable to professional or personal life. (p. 40)

In Eisenberg's (2008) perspective, his model was more than a simple set of skills. It helped students to learn the information problem-solving process. As students became aware of their mental states and process his model represented 'metacognition'. The Big6 provided the learner with vocabulary to describe the process and become more self-aware. Through contextualized practice, users recognized their learning styles, strengths, and weaknesses.

IL teaching is another associated facet that has attracted the attention of researchers. Grassian's and Kaplowitz's (2009) offered a pertinent overview and profound debate about it. The concept of IL has changed over the years, adding new meanings. Most of these modifications came from the field of technology. Although no-one can deny the influence of technology, the authors stated that IL dealt with how people searched for information and how they transferred those skills to cope with a variety of needs. Consequently, IL was a broader concept than just being technologically competent.

Grassian and Kaplowitz (2009) considered the IL instruction role of librarians very significant. Nevertheless, in a rapidly changing world, there was a need for skills enhancement and upgrading to achieve higher levels of efficiency. In chapter 9 of their work, the authors presented an analogy between the menu at a Café and the long list of options for IL instruction. When you had so many alternatives you could very easily get confused, so you had to be able to ask the right questions to provide the best answers. For example, which form of instruction is the most suitable for every situation? What factors should one consider when selecting an instruction mode? What types of instruction modes should libraries offer? What estate should they serve, and which modes would serve that estate best? How do budget, staffing, technological know-how, equipment, software, access, and preparation time impact this decision? For the authors, the ideal situation would be to offer "a mix of different instructional methodologies and formats, allowing our users to select the

approach that best suits their learning style and current needs" (p. 129).

The forms of instruction were necessarily related to the role of libraries and librarians. Notwithstanding, most libraries did not have unlimited resources, so the possibility to maintain all forms of instruction was limited. When facing such a situation, the librarian would have to opt for the best model to meet the circumstances and needs.

For Grassian and Kaplowitz (2009), it was the instructor's responsibility to select the best instructional modes from the user's menu to achieve the pedagogical goals. This selection process required examining all forms of instruction offered, their costs and benefits, and not tiding instruction to a single model. Some steps to guide this reflection process were identifying needs and establishing expectations, determining the type of audience, and weighing other key issues like staff, facilities, budget, and time constraints.

Information Literacy years 2011 – 2015

In this period, Mackey and Jacobson (2011) reframed IL as metaliteracy. The authors argued that social media and online communities had created a transcendent, flexible, collaborative, and free-flowing informational and technological environment; hence, several new concepts related to literacy had emerged: digital literacy, visual literacy, and information technology fluency. As a result, Mackey and Jacobson (2011) highlighted the need for a new comprehensive framework. The new multiple modalities were challenging the traditional definitions of IL. In the authors' words: 'Information literacy is more significant now than it ever was, but it must be connected to related literacy types that address on-going shifts in technology' (p. 62). According to the authors, the traditional IL frameworks reflected common professional standards tied to the field of library and information science. They proposed an examination of multiple IL types to create a base for metaliteracy that may respond to emerging technologies adequately.

Mackey and Jacobson (2011) considered that most IL definitions share several elements and that most of them were generated before the Web 2.0 and social media innovations. The authors affirmed that "metaliteracy expands the scope of information literacy as more than a set of discrete skills, challenging us to rethink information literacy as active knowledge production and distribution in collaborative online communities" (p. 64). For them, metaliteracy was "an overarching, self-referential, and comprehensive framework that informs other types of literacy" (2011, p. 70).

Mackey and Jacobson (2011) suggested that metaliteracy should become operational to engage students with new media. This would require format type and delivery mode understanding, user feedback as active researcher evaluation, context for user-generated information creation, dynamic content evaluation, original content in multiple media formats production, personal privacy, information ethics and intellectual property understanding, and information sharing in participatory environments.

Regarding IL competencies, Virkus (2011) investigated how they were developed

in European higher open and distance learning institutions to contribute to the design of learning courses. The author proposed to upgrade the definition of IL as it was in constant evolution and impacted by the advances in technology. The term had become elusive leading the author to prefer the concept of 'information-related competencies'. This notion was a useful research construct comprised of IL-related competencies and strategic goals.

In her results, Virkus (2011) demonstrated that IL was a confusing term. This welter might well be an obstacle to the development of information-related competencies. The author also identified some other difficulties, lack of awareness on how to integrate IL-related competencies into learning, lack of illustrating examples of Il-related competencies development, lack of human resources and time, work overload, few leaders, lack of positive attitude, lack of pedagogical skills, and lack of collaboration.

Virkus (2011) concluded that the importance of information-related competencies was acknowledged by all the studied institutions; nevertheless, its meaning was not always correctly understood. Information-related competencies development was at the early stages and students and staff did not possess these competencies. Despite some evidence that teachers in collaboration with librarians were delivering some information-related competencies, a solid framework to guide and register the whole process did not exist.

Conceptual precision was also the topic of Weiner's (2011). He aimed to explore the existing literature to determine if some differences between critical thinking and IL. He identified and organized terms that served as attributes for keywords. He explained that this method allowed combining insights from many specialists in a traceable way.

Weiner (2011) found that IL and critical thinking had much in common. The former had been the object of study of academic librarians and the latter the focus of faculty discipline specialists. The author summarized the differences in two dimensions: degree of formalism and learning behavior employed. The first one associated with cognitive processing (private) and the second one with delivering information (public). After reviewing the American Library Association (ALA) competency standards, linked to critical thinking and IL, and Bloom's cognitive domain, the author proposed to integrate the strengths of each model to create and develop a more effective curriculum and a set of actions. From IL, one could assume the identification and retrieval of documents and from critical thinking, the expansion of the cognitive processes to all fields. This way, one could provide the individual with the necessary tools and skills to accomplish lifelong learning, and effectively managing knowledge in personal and workplace environments.

In 2012, the Association of College and Research Libraries (ACRL) revised an already approved document consisting of guidelines for IL programs. As they wanted to illustrate best practices, this document intended to articulate elements of exemplary IL programs. The characteristic identified in the referred document, did not seek to define IL, as other reviewed articles, but to identify and describe the elements that constituted best practices. Through this document, the authors aimed to help professionals who wanted to

develop, assess, and improve IL programs.

The categories presented were ten: mission, goals and objectives, planning, administrative and institutional support, articulation with curriculum, collaboration, pedagogy, staffing, outreach, and assessment/evaluation. Each category included a set of characteristics to specify and make them operative. This document provided all the elements needed to develop a functional IL program. Additionally, it gathered successful experiences of over a decade, enhancing its value and adequacy.

Peter, Leichner, Mayer, and Krampen, (2015) offered a new vision of IL instruction efficiency by relating it to individual feedback. They understood that all students had strengths and weaknesses, and that only a few of them were consistent literate users. According to the authors, this situation led to two new challenges for IL programs: how to deliver instruction in a time-efficient way, and how to design instruction programs to cope with individual differences. To overcome these issues the authors suggested

> adjusting training materials individually to previous knowledge using a remedial strategy that is to provide additional instruction for learners deficient in a particular field. This allows dealing with fragmented prior knowledge as learners can tackle their knowledge gaps. At the same time, instruction is delivered in a very time-efficient manner as participants selectively work on individual deficits instead of completing all materials available. (p. 1114)

Computer-based instruction would help to make this instruction method possible. Peter et al. (2015) aimed to introduce an approach to IL instruction based on an investigation that integrated online learning and one classroom seminar. The former imparted most of the content, while the latter served to reflect on the online material and to practice.

As expected, the students showed fragmented knowledge and their strengths and weaknesses. Consequently, the authors matched instruction to individual differences following a remedial strategy. The authors expected students who completed more chapters to evidence more learning progress than those who completed fewer.

After applying three tests to check their hypothesis, Peter et al. (2015) proved that a blended teaching approach could be efficient when adapted to the users' needs. Key elements were customized feedback and students following the recommendations.

Information Literacy years 2016 -

Teaching IL was the topic of Burkhardt's (2016) work. The author intended to make the Framework for Information Literacy for Higher Education more understandable and to imagine how instructors might help students cross those thresholds. Additionally, she wanted to focus on determining how memory and transfer of learning might apply to IL teaching. The third aim was to offer some recommendations for the design of IL programs.

In Burkhardt's (2016) opinion, the referred Framework presented some limitations. For example, its actual usefulness was yet to be proved. Being a conceptual document, it lacked practical information. There were many gaps individual instructors would have to fill.

Institutions would also have to determine how to “dress” it. It conveyed the need for involved agents to work together in creating a program for every subject and level. It described a literate person’s profile but did not present a roadmap to follow. The six threshold concepts included in the Framework were difficult to understand and to teach.

Burkhardt (2016) offered a starting point to help users understand and then teach the six threshold concepts listed in the Framework document: authority was constructed and contextual, information creation as a process, information had value, research as inquiry, scholarship, and conversation, and searching as strategic exploration. Besides, she hoped her book would help instructors to design their IL instruction programs considering their educational contexts. According to the author, The Framework discussed “the relationship between information literacy and technology, higher education, and pedagogy. It describes the goals of assessing competency in information literacy and the relevance of assessment of information literacy skills and concepts” (p. 2). The author presented five criteria to identify threshold concepts: transformative, integrative, irreversible, troublesome, and bound.

For Burkhardt (2016), the concepts included in the Framework were not self-explanatory and did not offer much to the instructors due to their theoretical nature. Furthermore, she considered that the Framework was unnecessary for people who had achieved the expert literacy level. After finishing her critical analyses, the author provided a series of ideas and exercises as starting points for IL instructions. First, take the students from the familiar to the unfamiliar. Second, make students mentally stretch to make a lesson memorable. Third, the selection and application of information is critical. Fourth, get students to think about the consequences of plagiarism. Fifth, the role of the individual in the information world is expanding. Finally, apply the same skills to the ‘real world’.

To conclude, the author affirmed that students had to learn concepts and skills that helped them to become information literate citizens. To do so, she suggested making students active participants in their learning processes through discussion, exploration, challenging questions, ethical issues, and social inquiries.

Innovation in IL research was also a topic that captured the interest of several investigators. In their paper, Bruce, Demasson, Hughes, Lupton, Abdi, Maybee, Somerville, and Mirijamdotter (2017) developed some challenging ideas. The authors introduced the relational approach to IL on which they based some theoretical innovations. They considered the relational approach as a concept that comprised different manners to think about IL, IL research, and IL education. The approach was based upon understanding variation in people’s experience of that phenomenon; hence, the idea of ‘information experience’ was deeply associated with ‘learning experience’ as key elements of the IL experience. The conceptual innovations presented were inclusive informed learning, informed systems, expressive window and spaces for informed learning, information experience design, informed learning design, cross-contextuality, and experience identity.

That same year, Corrall (2017) addressed the issue of reflection and IL development.

She wondered whether practitioners thought enough about what they were doing. In her paper, she aimed to review the concepts of reflection and reflective practice and their professional application. The author argued that reflection should be used to enhance the practice and make it more effective. Also, she stated that the reflection process could be highly challenging, as some in-context reference models might be needed. These reflection exercises could be carried out individually and collectively, considering the local community, since context made the reflection process more meaningful.

Corrall (2017) identified some common elements in existing definitions of reflection. The main ones were a mental process used to fulfill a purpose, applied to complex structures, no obvious solutions, outcomes came in a represented form, grounded on multiple disciplines, occurred in a given context, might happen before or after an event, done on something significant, and conscious action one could do alone or with others.

In her literature review, Corrall (2017) got to identify four common views of reflection: inaction, on action, for action, and with action. According to the author, some approached the reflection process from its nature, being technical, descriptive, dialogic, critical, and contextualized; while others considered the role of the individual who reflected; i.e. reflective person, reflective professional, and reflective citizen. After

> …having seen how both educators and practitioners had observed benefits from using reflective journals and other tools at an individual and organizational level in a range of practice contexts, including subject liaison, information literacy instruction, and leadership development programs. (p. 34)

Corrall (2017) seemed to be convinced that reflection should enhance not only professional development, but also the teaching role of librarians and the learners' support.

The changing contexts and enduring challenges was the theme of Fister's paper (2017), which was based on a long experience in the IL field. She initiated her account describing the changes society had suffered in the last two decades. Her goal had always been that IL could help provide her students with an integral education that allowed them to succeed and influence the world. In her opinion, that goal still stood, although the forms had been altered. What remained unchanged was the deep learning students need to experience, regardless of the form.

Developing a successful IL program is a matter of overcoming the structural, institutional, and entirely human difficulties we have in creating and sustaining meaningful learning experiences that involve students in exploration, inquiry, and creation. (p. 69)

The author reported that she used her experience as a map to cover three periods: the age of bibliographic instruction, the age of the IL standards, and the age of critical IL

From the first age, she recalled being responsible for educating her community in the new electronic catalog. Soon she realized that the new catalog was not a big challenge and that what they needed was something else. How to approach a topic to develop meaningful questions, how to learn the scholars' codes to open a search, and how to understand that

research was not simply finding other people's answers.

Fister (2017) reacted enthusiastically when the new literacy Standards appeared, but her reaction was not shared by many of her colleagues. They complained that the Standards did not explain what being able to find, evaluate, and use information ethically really meant. Besides, the document seemed to "evade the idea that students might have original, creative thoughts, that they did not merely produce products or performances but learned and shared what they had learned by making new things" (p. 73). Another area of discomfort was the long list of measurable performance indicators and outcomes.

In the following years, Fister (2017) discovered that many librarians had assumed an unquestioned standardization of IL, and that they had become meaningless library rules. As that was not the transformative experience she wanted, she initiated a project to address the following issues: the thresholds the faculty perceived, and what they could do to get the students to cross them. In the meantime, a revision of the Standards appeared under the form of a Framework based on six frames. Just as happened with the Standards, this document created a great controversy, mainly among those who associated the value of information with economic value. Another blunder was that the findings were similar to the ones presented in the six frames of the Framework, so they did not fare well in the community. Though librarians had common ground for discussions, Fister (2017) learned that IL needed a joint venture to include the faculty in the debate.

Future directions and developments for IL was the main theme of Todd's (2017) work. After years of studies, the author called for a meta-analysis to satisfy still existing necessities. "Our IL field needs some kind of cogent meta-analysis, to establish some powerful claims about the effects and outcomes of IL instruction. This is the missing piece to me" (p. 129). Individual efforts needed to be put together to develop a theory of IL that encompassed the complex variety of competencies individuals should develop. The role of literacy instruction was a powerful means to develop intellectual, social, and personal agency. For the author, this was the focus the field needed, one based on strengths, not on deficiencies. Propositions about the impact of IL and its instruction should be the result of empirical discoveries, and the findings had to be related to each theoretical perspective that conceptualized IL. He suggested that the collection of propositions should be presented as an IL metatheory to enhance discourse and practice, and to strengthen IL position.

Regarding IL pedagogy, Todd (2017) affirmed that there was not enough exploration of that particular aspect. Unlike subject teaching based upon sequences of skills and grounded on principles elaborated from educational theory, IL did not include the application of learning theories and pedagogical principles. This represented a deficiency needing solution. Another challenge the author identified were the librarians' educational qualifications to deliver instruction. The author was convinced that

> … IL practice needs to implement research-based and research-validated instructional models derived from learning theory and instructional design principles as a foundation for effective IL instruction in the educational context. (p. 130)

Unfortunately, very few such models existed. The information used was another of the highlighted challenges. Information deemed to be an elusive term as most researches had a focus on finding information, rather than on understanding it. Todd (2017) finished his paper honoring the past but looking to the future. He advocated for a disciplined debate about IL conceptions and practices. He perceived a need to develop an understanding of IL from various perspectives and theoretical approaches, and to develop research leading to professional frameworks that accounted for this diversity.

Being the students' perspective also important, Barrios (2020) conducted a mixed-method research that aimed to capture what students thought about their IL development process and the role of their school in this regard. Among the main conclusions, the author reported an overall conceptual confusion among informants who used as synonyms terms and concepts the revised literature has proved not to be the same. IL skills, digital and technological competencies, and computing capabilities were usually used indistinctively. When asked about adequate places for IL skills development, many informants associated this topic with places technologically well-equipped. Doubtless, technology may be of great help; notwithstanding, IL is much a broader concept.

Similar confusions became evident when informants related their IL skills' development level to the command of computer programs such as Word, Excel, and PowerPoint. Another conclusion was that students felt pretty well-prepared because they could use these skills to communicate and play. Students also identified formal and informal environments as adequate places for IL skills development. The growing importance of learning outside scholastic environments creates new challenges for teachers, their practice, and IL programs.

Ending the section, one may conclude that IL is a concept in constant evolution. It has proved difficult to acquire full comprehension of this notion, since there lacks consensus among authors and how they understand and thus define key terms such as 'competency' and 'skill'. Sometimes they are used as interchangeable synonyms, sometimes as totally different concepts. Other authors seemed to assume that their meanings were self-explanatory or evident. Something similar happened with the term 'information literacy' formed by two complex words with no agreed meaning, making it even more difficult to define.

What seems to be well established is that IL is more than technology, and that being computer literate is not the same as being information literate. The second concept is supposed to be broader and with deeper implications. As a result, many authors claimed for more precision in terminology and better-defined boundaries. Besides, new concepts

are being introduced such as metaliteracy and thresholds in IL. There is also much debate among those who considered IL as a discipline and those who suggested that it was common to all fields. Others advocated for instruction-standards-critical information literacy evolution, as a key to succeed in changing environments. Though there exist many studies and abundant literature, further development and research is still needed.

SUGGESTIONS TO ENHANCE IL PROGRAMS AT EDUCATIONAL INSTITUTIONS

The suggestions the author will present are based upon the literature review, his professional experience, and previous research on the current topic.

Suggestion 1: The timing

When developing skills, timing is essential. It takes time and practice to achieve command of any skills and to consolidate their application range. This is also true when referring to IL competencies; consequently, many would suggest that students should initiate the IL skills development process from the very early years of education.

The early stages of education are crucial for the students' physical, intellectual, emotional, social, and moral development. This is just the time where children need high-quality care, gratifying learning experiences, and an intellectually stimulating environment. In this context, IL skills, if properly adapted for this early stage, can play an important role in the students' development of life-long learning skills and in getting prepared for future demands and challenges. Students following introductory IL programs should expand their concentration ranges, achieve higher intellectual levels, and be more independent workers. Additionally, they tend to improve their social skills, to consolidate their networks, to enhance their command of their language, to require less support in oncoming years, to obtain higher qualifications and to present less behavioral and learning problems.

An ideal early stages IL program should be based on a playful component, as games are a central element in Pre School education Apart from learning; games allow students to acquire new and diverse abilities, where IL skills also have an important part. Well-conducted games should allow infants to establish relations, to socialize, to develop values and positive attitudes (ethic component), to generate motor skills, to stimulate creativity and inventiveness, to conduct problem-solving activities, to search for knowledge, to encourage discovering, to find and use sources and to share and spread what they learn.

Suggestion 2: Qualifications

Some experts suggested associating IL skills development with qualifications, as a means to encourage students to take their acquisition and development more seriously. To provide IL skills development a formal context may be advisable; notwithstanding, students should be aware of their importance beyond the impact they may have on their grades.

Future employers will look at the IL skills qualification as desirable working tools. They will be related to efficiency and successful professional careers. Some employers may even use them as selection and promotion criteria. Having IL skills qualifications may help workers to approach new knowledge systematically and to obtain better professional achievements. These qualifications should provide enough evidence of a worker's knowledge, skills, and experience.

IL skills should facilitate being more knowledgeable, developing problem-solving skills, and building a critical thinking model. Being IL skills qualified means being able to work inter-disciplinary or in any field of knowledge.

Suggestion 3: Affective factors

As learning also comprises some emotional facets, it seems advisable to relate IL skills development to some affective factors. One should not disregard that the affective domain has a direct impact on both interest and motivation. Not long ago, teachers, librarians, and educators considered the students' cognitive abilities as the only means to IL skills development. Nevertheless, many of the new redefinitions in society and education accept that during a skills learning process the cognitive and affective domains interact.

Suggestion 4: Personalized follow-up

There should be a personalized follow-up approach that helps prevent leaving slower IL learners behind. This is a pedagogical proposal, since learning rhythms are different, and any educational institution should be able to assist all their students.

As IL skills can be developed in formal and informal environments, follow-up activities should consider self-learning, peer collaborative learning, and family involvement. Students should be allowed to set their paces and to work at their rhythms. It would be ideal to design personalized learning plans to respond to all learning styles and foster motivation. Such a design would require personalized IL skills development goals, individual accompaniment, frequent process evaluation, and encouraging feedback. Furthermore, students should also become involved by keeping track of their progress and applying the necessary adjustments.

Suggestion 5: IL teaching

Though informal education also allows Il skills development, it is highly recommended to work on their acquisition in established settings, as well. This suggestion has clear programming and methodological implications that require analysis and consideration.

Some IL teaching steps you may find in the literature are: pose a question, find ways to look for an answer, determine the resources at hand, assess the resources critically, and share and spread the results. Professionally guiding and overviewing this process may enhance it, by providing gathering information models, teaching selected skills in real-life scenarios, rendering encouraging materials, and suggesting different ways to report and

communicate the learners' findings.

Suggestion 6: IL program

Solid IL programs are essential for skills development. A functional program should at least consist of problem recognition and questions creation, finding information and solution generation, hypothesizing and predicting, using different means to find the required information, effectively assessing the credibility of the source, organizing and spreading collected information and data, applying them to real-life situations, drawing conclusions, and process understanding.

Muniya, Naik, and Padmini (2014) provided a series of recommendations for implementing IL programs successfully. Some of them included, increasing the availability of library resources, more official support, additional staff members, improved computer support service, additional training, strategies for locating information, need for information recognition, locating and accessing information, assessing, organizing, and communicating information, interacting with knowledge resources, and accepting change and adopting new technological developments.

Suggestion 7: Conceptual precision

There still exists a lack of IL conceptual precision. Concepts related to IL, technological information, and computing skills and competencies are used indistinctively by many professionals. To gain conceptual precision and a systematic approach for developing IL skills, it may be advisable to adopt one of the existing IL frameworks and to adapt it to the local reality. An IL framework would provide enough background to generate an IL program suitable for the institutional needs.

If any educational establishment would prefer to develop a customized IL framework, a committee could be summoned to develop such a program based on the broad existing literature. Hence, conceptual definitions, standards, and learning dimensions and outcomes could be generated, and then communicated to the whole community. In turn, they could provide feedback to enhance and enrich the prospective framework with different perspectives.

Suggestion 8: Agents' role

The role of every involved agent is another crucial topic. As IL transcends the classroom, the roles and responsibilities of all participants should be specified. To avoid unnecessary fragmentation of duties, the generation of time and spaces for teamwork and collaborative efforts is essential. Most of the successful reported experiences attributed a vital importance to systematic collaboration and understanding, mainly between teachers and librarians. They should generate some consensus about IL concepts and their practice. A broad understanding should facilitate the recognition of the educational role of the librarians, the importance of IL skills development, the narrowing of the gap between class

and library work, and the determination of the pedagogical implications of IL.

Suggestion 9: Methodological issues

Methodological teamwork issues are also important. One may suggest, setting demanding but affordable goals, determining the levels of needed information, and using knowledge to enhance intelligence. Additionally, to foster understanding, IL skills development should be linked to higher-order thinking skills, such as analysis, synthesis, and evaluation. It would also be prudent to integrate IL into subject areas. This would allow teachers and students to work with them in a more concrete and applied manner. IL skills development should take place in real contexts, both individually and collectively. It would also be relevant to conduct diverse methodological activities that could cope with all the students' learning styles and preferences. As IL skills development also occurs in informal contexts, it would be convenient to provide students with some guidelines to conduct their analytical strategies and critical thinking processes.

Suggestion 10: IL integration

Integrating IL skills into subject areas implies aligning IL with the curriculum, and determining the specific level of understanding of knowledge disciplinary creation. Furthermore, teachers would have to bring together content, learning to learn (metacognition), and experiential phases. From the curricular point of view, incorporating IL into the subjects would also mean designing a sequenced program for each discipline.

It may also be recommendable to relate IL to reading and writing. Reading fosters understanding and critical thinking while writing deals with creating and communicating information, ideas, or feelings. All the components are closely related to IL.

Suggestion 11: Assessment policies

An IL program also requires some assessment policies. How are the students' advances going to be assessed? Who is going to be in charge of the evaluation process? How is feedback going to be provided? How are students in deficit going to be supported? Some suitable assessment instruments may standardized tests, performance appraisals, simulations, self-reports, exit interviews, reports, behavioral observations, portfolios of student work, classroom assessments, focus groups, satisfaction surveys, research diaries, self-assessment, and case studies. Doubtlessly, all these methods may have their advantages and disadvantages; nonetheless, they are worth considering.

Suggestion 12: International implications

The international implications of IL should not be disregarded. Though IL skills may be developed locally, they are immersed in a globalized world. Issues such as multiculturalism, cross-contextuality, identity, and inclusion have to be considered. IL skills should be a key element to face changing environments and demands. The curricula are

should facilitate students and professionals to move from country to country freely. Hence, IL skills development programs should be built on an international basis. They need to prove productive and competitive worldwide.

In this context, it is advisable to generate international partnerships and cooperation agreements, to develop IL programs that foster global understanding (languages, ethnics, religion, cultures, traditions, anthropology, etc.), to include as many knowledge fields and areas as possible, to create a multidisciplinary line of work and to allocate the appropriate means.

Suggestion 13: Administrative issues

The attention to some administrative issues is the final proposition. Developing an IL program implies having the necessary resources to ensure access to information sources, getting appropriate software, and counting with the right equipment. Human resources are even more essential. Teachers and librarians have to be trained, guided, and supported. There should also be an instruction program for them. Access to expert advice would also be desirable. Consequently, costs related to personnel, hiring new staff, training services, materials equipment, and infrastructure have to be considered.

FINAL CONSIDERATIONS

The author hopes that this article may have shed some light on the ever-increasing importance of IL skills, their development, and multiple implications. This topic is far from being exhausted and it will certainly face further developments worth following.

Some decades ago, a reduced group of committed and well-intended librarians conducted IL skills development processes. Though they evidenced great consciousness of IL importance, their efforts were not always well-coordinated or understood by the academic world and administrators. Most of their work was done at faculty libraries at a university level. Little was known about librarians or teachers IL skills work at schools or other educational establishments.

Due to the ever-increasing importance of IL skills as life-long abilities in a globalized world, the author is convinced that their development should be a priority from the very early years of education. Consequently, IL skills development should be a concern not only for librarians but also for educators, teachers, and professors at all levels and in every existing discipline.

In such a context, teachers and librarians will have to redefine their role and acquire new skills and working methodologies. They will have to update and enhance frameworks. Individuals will have to become part of cooperative networks and articulate common grounds for mutual and beneficial understanding. Educational institutions will have to design new strategic and methodological activities for systematic IL skills development and their application. Online IL education will certainly be another challenge educator and librarians

will have to face

IL methodological implications should also attract the researchers' attention. What strategies are being used? How are they interconnected among subjects and levels? How are slow or left-behind students being supported? How do IL skills impact students' and teachers' learning? What are the best ways to integrate IL skills in the academic world? What curricular integration models are more effective? How can one align students' IL skills development process with employability and the institutional strategies? What role should students have in their IL skills development process? There is still much to be done and learned.

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