

Models for Teaching Information Literacy: A Comparative Review of the Top Six Models

Israel Odede

<https://orcid.org/0000-0002-5428-4163>

Delta State University, Nigeria

israeldede@yahoo.com

Abstract

Information literacy is a necessary prerequisite for achieving educational, occupational, economic and personal goals in society. It has also become an essential skill to achieve individual goals. Many models have been designed for developing these crucial skills but few published scholarly studies have explored their effectiveness and none have compared them. The present paper reviewed the literature to select the most commonly used models for teaching information literacy, and analysed the reported strengths and weaknesses of the top six models. The top six models are the Information Search Process, the Big6 information skills, the Seven Pillars of Information Literacy, the Pathways to Knowledge, the PLUS model, and the Seven Faces of Information Literacy. The Information Search Process knowledge model stood out as the most useful prescriptive model especially through its ability across disciplines, beginning at the elementary educational level to the extensive university level. The paper also highlights the values of integrating information literacy into curriculum development to enhance students' learning experience and to develop skills and abilities necessary for the rapidly changing information environment of the twenty-first century.

Keywords: models, teaching, information literacy

Introduction

The information explosion in the twenty-first century that is characterised by innumerable choices of information available in print and digital formats has propelled the promotion and development of information literacy skills in learning institutions. These skills include possessing knowledge of what type of information is required, what types of resource are available for accessing that information, and the way in which to find the information and communicate the findings to others.

The growing significance of information literacy in this age of unprecedented access to information has led to the development of international literacy models for developing the necessary skills at school and higher education levels in order to create a common understanding and to provide a reference point from which information literacy can be integrated into other strategies as appropriate (Welsh Information Literacy Project 2011, 5).

Models relate to the philosophical basics on which a concept takes place with a view to explaining a phenomenon such as information literacy. After going through the review of literature, it was found that the models for teaching information literacy consist of a range of stages starting from defining to synthesising and evaluating applicable to all disciplines. Some of these models were developed to be used in curricula, beginning at the elementary educational level through to higher education. They served as guidelines for implementing information literacy programmes in various educational institutions. Each information literacy model explains a classification of information needs as an obligatory element of information literacy, and emphasises the value of the moral or behavioural use of information (Boon, Johnston, and Webber 2007, 206; Lau 2006, 17). In terms of curriculum development, information literacy models provide the foundation and structure for effective and efficient teaching and learning of information literacy skills.

Objective of the Study

Selecting an appropriate theory or model for information literacy is critical for researchers and curriculum developers because of the multi-subject nature of information literacy. There are many such models but few scholarly papers have reviewed information literacy models at the individual level (Uzuegbu and Naga 2017) and none could be found that compared their strengths and weaknesses. Hence, this paper aimed to review literature to select the most commonly used models for teaching information literacy, analysed the reported strengths and weaknesses of the top six models, and determined the most useful prescriptive model to teach information literacy from the elementary to the higher levels of education.

Methodology

The selection of the top six models is based on existing literature. The existing literature indicated a high number of research models and problem-solving models in information literacy. The top six models are the Information Search Process (ISP), the Big6 information skills, the Seven Pillars of Information Literacy, the Pathways to Knowledge, the PLUS model, and the Seven Faces of Information Literacy (Lawal et al. 2012). The present paper therefore, reviewed the existing literature to select the most commonly used and well-known models for teaching information literacy, and analysed the reported strengths and weaknesses of the top six models.

Information Literacy Models

Various information literacy models have been proposed by information scientists to explain the necessary competencies associated with individuals' information literacy skills. These models serve as a guide for developing information literacy skills in individuals and provide frameworks for information literacy curricula. The teaching of conceptual models for handling information through an integrated and incremental approach have provided students with a broad context for understanding the different forms, sources and structures of information which ensures the transferability of acquired skills for a lifelong experience (Baro and Fyneman 2009, 672; Lwehabura 2007, 321). There are many research models and problem-solving models in information literacy (Landøy, Popa, and Repanovici 2020), but the most prominent and most commonly used information literacy models are:

- the ISP, developed by Kuhlthau in 2004;
- the Big6 information skills, developed by Eisenberg and Berkowitz in 1990;
- the Seven Pillars of Information Literacy, developed by the SCONUL Advisory Committee in 1999;
- the Pathways to Knowledge by Pappas and Tepe in 2002;
- the PLUS model by James Herring in 1996; and
- the Seven Faces of Information Literacy developed by Bruce in 1997.

The Information Search Process Model

Carol Kuhlthau's ISP (Figure 1) is one of the first models of information literacy with an emphasis on an instructional team that leads students towards independent learning through skills in the use of a variety of information sources (Kuhlthau 2007, 3). It is one of the most outstanding models for understanding and examining in entirety the information-seeking process. Kuhlthau (2004) stated that "The model is located within the constructivist paradigm and addresses complex tasks that require information seeking and interpretation over an extended period of time." Furthermore, Mctavish (2007) noted that the model presents information seeking as a process of construction accompanied with uncertainty that decreases as the understanding increases.

The ISP model describes the various experiences that the information seeker goes through from the beginning until the end. Kuhlthau (2010) describes the experiences as "a series of thoughts, actions and feelings accompanying the information seeker." Though the process is mitigated by feelings, thoughts, and actions, it is thought to apply equally to individual and group work and has been tailored to different disciplines requiring different epistemologies and methodologies (Hayden et al. 2008, 114). Kuhlthau (2004, 90) researched and identified the feelings students are likely to experience along with strategies and their thoughts and actions that can lead them

through a productive search. “The model describes the information search process from the perspective of the user and is derived from an intensive study of a group of high school seniors” (Kuhlthau 2004, 51). According to Porarinsdottir and Palsdottir (2015, 2),

The model shows how users approach the research process and how their confidence (self-efficacy) increases as they proceed and it involves six stages: (i) Task initiation – uncertainty, (ii) Topic selection – optimism, (iii) Pre-focus exploration – confusion/frustration/doubt, (iv) Focus formation – clarity, (v) Information collection – sense of direction/confidence, (vi) Search closure/presentation – satisfaction or disappointment.

The first stage, initiation, is described as when a person becomes aware of the lack of knowledge or understanding. At this point the task is merely to recognise the need for information (Kuhlthau 1991, 364). The individual recognises an information need to solve a specific task, and then possibly search wider topics and usually encounter feelings of uncertainty and sometimes even depression. At this stage, the information seeker lacks not just confidence, but also the competence to search for the specific information that could help resolve the specific information task.

The next stage is the selection stage. During the selection stage, “The task is to identify and select the general topic to be investigated” (Kuhlthau 1991, 364). The course of choosing a particular topic that is broad is usually accompanied by feelings of confusion and sometimes anxiety. The thoughts during this stage are still vague, the feelings optimistic, and the actions are unfocused. Selection is followed by “exploration”, which is also characterised by feelings of confusion, uncertainty, and doubt (Kuhlthau 1991, 364). During the exploration stage, the user and the system must communicate in order for the individual to find the necessary information, since the task at this stage is to examine all possible information with the intention of finding a solution. This stage is usually referred to as the “actions stage” which involves the ability to locate wide-ranging information on a topic to become informed in order to relate new information to what is already known (Kuhlthau 1991, 364). During this time, the individual becomes informed about his/her topic and relates that information to what he/she already knows. However, the information seeker still lacks the self-confidence at this stage. It is not until the “formulation stage” is reached that the feelings of uncertainty diminish and confidence increases (Kuhlthau 1991, 365). At this point, the user develops a plan to move forward and find ways to engage with the topic. This stage is usually referred to as the turning point.

“Collection” is the next stage, in which the users and the information systems function most effectively and efficiently (Kuhlthau 1991, 364). Relevant information is gathered and a focused search is developed. In the final “presentation stage” the feeling of relief comes to the users. However, according to Kuhlthau (1991, 365), “A sense of satisfaction follows if the search has gone well and disappointment if the search is not

successful.” Kuhlthau (1991, 366) found that the negative feelings associated with the beginning of the search process began to change as the user began to find a clearer focus.

Kuhlthau’s (2004) model incorporates “three realms of experience; the physical (actual actions taken), the affective (feelings experienced during the search process), and the cognitive (thoughts concerning both process and content).” The physical realm deals with actions such as the ability to find information, whereas the cognitive (intellectual) and the affective (emotional) realms deal with the ability to comprehend information and the ability to be comfortable with the presentation of the information, respectively. According to Luo, Nahl and Chea (2011, 2), “The model is significant due to empirical evidence of the fundamental role of emotion in information problem solving, thus retaining relevance throughout the continuous development of information technologies and diverse research contexts.”

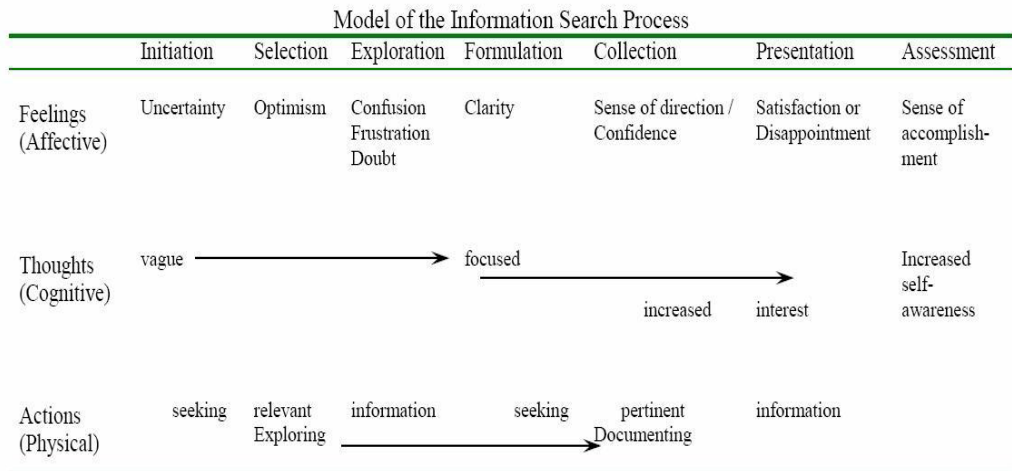


Figure 1: The Information Search Process model (Kuhlthau 2004, 82)

The different stages of the ISP model reflect a pattern of thinking, feeling, and acting at each point of the process” (Kuhlthau 2004, 185). According to Lawal et al. (2012), each of the stages indicates a progressive development that would lead the user in attaining a sense of ownership in the area of expertise which constitutes an important component of information literacy and lifelong learning as well as the primary tasks to be accomplished which provide an opportunity to test the way in which theoretical knowledge can be transferred to practical situations through the process. However, the ISP model has its own weaknesses. For example, the model has been criticised for not considering gender differences as one area that could determine the confidence of the user during the search process. It was revealed that girls are more likely to show increased levels of confidence as they begin their works, but are suspicious and indecisive towards the end, whereas boys have a propensity to become more confident as they complete their projects (Burdick 1996).

A further weakness in the model is noted with respect to the structure of the process itself. According to Melton (2003), the steps seem to indicate that they can be achieved either simultaneously or at different times, and placing an individual in any of the stages, besides the initiation or presentation stage, does not sufficiently describe the user's current state. Also, the possibility that any of the stages may be reverted to or entirely skipped throughout the process is not expressed clearly in the model.

Despite the criticism, the ISP model remains a useful prescriptive model to help guide students through the search process to become information literate. The model has had important implications for students who are in the process of constructing meaning from a variety of sources of information including electronic resources as thoughts become clearer during interaction with systems. They are able to construct meaning from multiple sources of information, especially those that link information behaviour to information impact as a result of the sequential holistic experience captured from the search process.

Big6 Information Skills Model

The Big6 (Figure 2) information problem-solving approach is an information literacy model developed by Mike Eisenberg and Bob Berkowitz of the USA in 1990. It is one of the most well-known models in information literacy which states the way in which people of all ages solve an information problem. It integrates information search and use skills along with technology tools in a systematic process to find, use, apply, and evaluate information for specific needs and tasks (MacDonald and Darrow 2003, 1). The model is relevant to the acquisition of information literacy skills owing to the inclusion of technological skills. The process encompasses the way in which individuals learn to recognise their specific information needs and to progress through the various stages to effectively and efficiently solve their information problems. These skills can be applied in all situations at school, personal, and work settings. It is applicable to all subject areas across the full range of grade levels.

The Big6 skills are best learned when integrated with classroom curriculum and activities. It is the most widely known and widely used model to teach information and technology skills in the world. The Big6 model consists of six logical steps or stages:

- **Task definition:** At this stage, the individual needs to define the problem from an information point of view. The students must be conscious of the need to search for information in fulfilling a specific task.
- **Information-seeking strategies:** Once the individual has clearly defined the information problem, he/she must decide which and what information source is most appropriate to solve the task.
- **Locating and access:** After the individual determined their priorities for information seeking, he/she must locate information from a variety of resources including electronic resources and access-specific information.

- **Use of information:** After finding potentially useful resources, the individual must engage (read, view, listen and others) the information to determine its relevance and then extract the relevant information. Once the necessary information has been found, the individual can employ skills to use the information.
- **Synthesis:** Is the application of all information related to the defined task? It involves restructuring and repackaging the information into a new different form.
- **Evaluation:** Evaluation is the examination and assessment of the information problem-solving process. It determines whether the information found met the defined task.

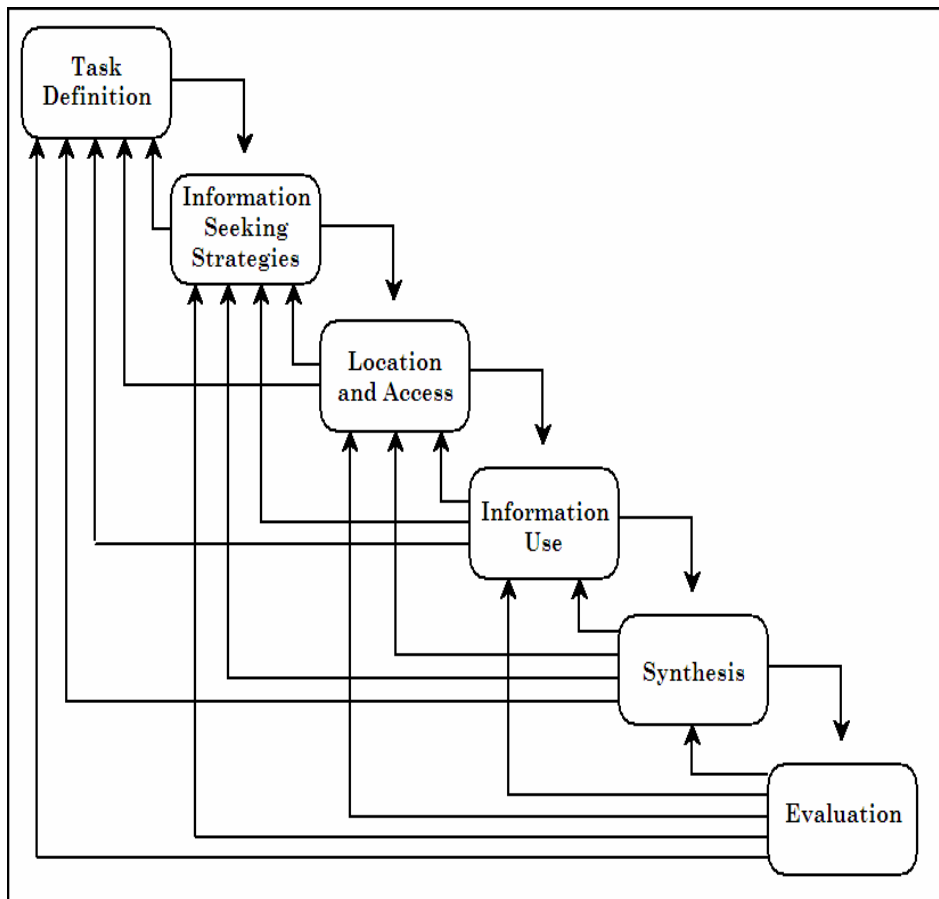


Figure 2: The Big6 as a feedback process (Eisenberg 2008, 42)

The Big6 information problem-solving requires the completion of each stage at some point in time.

People work through these Big6 stages, consciously or not, when they seek or apply information to solve a problem or make a decision and the structure appears to enhance levels of engagement in students, especially when they are working on a specific task. (Wolf, Brush, and Saye 2003)

However, the stages do not necessarily need to be completed in any particular order or in any set amount of time but all the stages must be completed for overall success. Eisenberg (2008, 41) noted that:

A particular stage can be repeated or revisited a number of times. Sometimes a stage is completed with little effort, while at other times a stage is difficult and time consuming. The Big6 approach is systematic and it differs in a significant way as it provides a broad based and logical skills set that can be used as the structure for developing a curriculum or the framework for a set of distinct problem-solving skills.

In terms of information literacy education, the six steps are used to encourage “metacognition” which is perceived as an awareness by learners of their mental states and processes (Eisenberg 2003, 21). Hence, the Big6 is seen as a problem-solving model that can be applied to many situations. While the Big6 approach has a great deal of power, it also has serious weaknesses. Paramount among these is the fact that users often lack well-formed statements of information needs, as well as the model’s reliance on the problem-solving rhetoric. Often, the need for information and its use are situated in circumstances that are not well-defined (Doty 2003). Another weakness of the Big6 model could be seen from its failure to delve into legal or ethical issues which is paramount in any teaching and learning activities. It fails to consider any form of ethical features and does not contain a collaborative element (Walton 2009, 25). Moreover, Eisenberg (2004) recognised that there are a number of challenges to effectively apply the Big6 skills, not the least of which is an information overload which can overwhelm students during the learning process.

The Seven Pillars of Information Literacy Model

The SCONUL Seven Pillars of Information Literacy model (Figure 3) is one of the most widely known models of Information Literacy. It was first published in 1999 and has been revised in 2011 to remain valid and relevant in the present changing information environment. This model defines the core skills and competencies (ability) and attitudes and behaviours (understanding) at the heart of information literacy development in higher education (SCONUL Working Group on Information Literacy 2011). The key skills and competencies of an information literate person identified in the Seven Pillars Model are: managing, evaluating, presenting, gathering, identifying, planning, and scoping information. The main attitudes and behaviours of an information literate person identified in the Seven Pillars Model are: understanding the gaps in his/her personal knowledge; developing a learning habit so new information is being actively sought all the time; and the ability to use different search tools, while recognising the

disadvantages and advantages of different search tools and understanding the value of controlled vocabularies and taxonomies in searching.

The circular nature of the model demonstrates that becoming information literate is not a linear process; a person can be developing within several pillars simultaneously and independently although in practice he/she is often closely linked to the pillars. Each pillar is further described by a series of statements relating to a set of skills or competencies and a set of attributes or understandings. This model describes a set of generic skills and understandings for different user communities as a lens that can be developed which highlights different attributes, adds in more complex or simpler statements, and uses language recognised by the specific community which it represents. In this way, this model can be used flexibly by individuals and teachers who can adapt it as appropriate to personal circumstances.

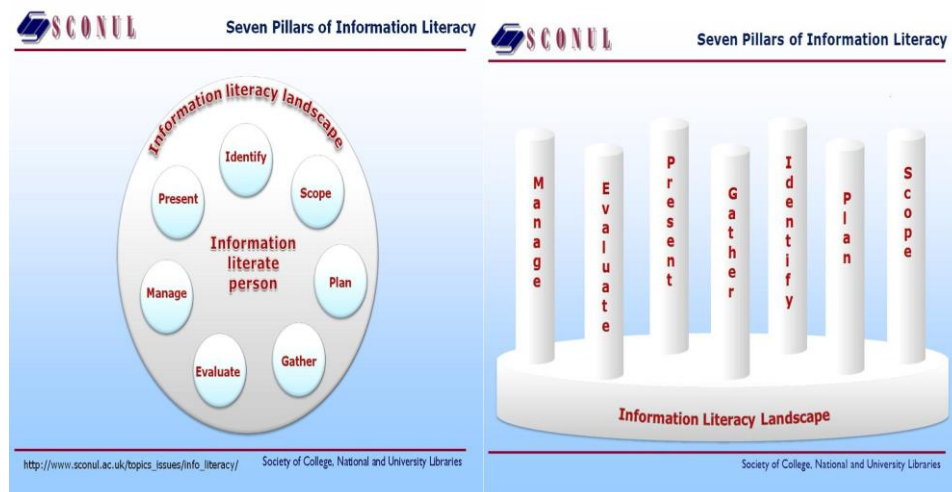


Figure 3: Seven Pillars model (SCONUL 2000)

The Seven Pillars model views library and IT skills as essential to the conceptualisation of information literacy. The model also views five classes of expertise which indicate a non-binary approach to identifying and possessing information literacy skills. “Within each of the seven pillars, an individual can progress from novice to expert or, if he does not keep up with the requirements of a constantly changing information environment, also regresses” (Mertes 2014, 21). Although all seven skills are equally fundamental to information literacy, there is the recognition that an individual’s progress will be restricted by his/her level or experience. The clarity of the seven components’ (pillars) interaction to support information literacy skills has been a major concern as the model fails to holistically define information literacy as a process. In this instance, Kim and Choi (2014, 8) observe that the “reflective process is regarded as an exclusive expert skill rather than part of the learning (and therefore) process itself which contradicts notions found within models of critical thinking.” Hence, the Seven Pillar model “does

not reflect more clearly the range of different terminologies and concepts that we now understand as information literacy which is used broadly; covering concepts such as digital literacy, computer literacy, information handling, information skills, data curation and data management, to name just a few” (Bent and Stubbings 2011, 48).

Pathways to Knowledge Model

The Pathways to Knowledge model was developed by Marjorie Pappas and Ann Tepe in 2002. It is a model on information seeking and the research process with an emphasis on constructivism and enquiry-based learning that is designed for both students and adults (Zimmerman, Pappas, and Tepe 2002). “As a model of process, it covers many of the aspects that are applicable to information literacy and cultural heritage awareness in the context of lifelong learning” (Baker 2014, 38). The Pathways to Knowledge model is intended for information literacy training in a framework presupposing online searching and it is designed with the potential to help students to find, use and at the same time evaluate information which is the core essence of information literacy. The model “does not necessarily require students to complete one step before moving to the next stage and it incorporates continuous reflection on the information retrieved and most importantly on the research process itself” (Pappas and Tepe 2002, 3). “It provided detailed descriptions of the principles of learning, content standards, the tenets of democracy, technology and the knowledge and behaviour required” (Pappas and Tepe 1995). The model is designed to motivate students to constantly explore and reconsider using information through a positive attitude. The model consists of six steps:

- **Appreciation:** At this stage, individuals explore a topic for information seeking through sensing, viewing, listening, reading and enjoyment.
- **Pre-search:** Individuals at this stage explore what they already know and what they want to know about the topic, establish a focus, develop an overview, and explore relationships.
- **Search:** This stage is when individuals seek appropriate sources, plan and implement a search strategy, identify information providers, select information resources and tools, and seek relevant information.
- **Interpretation:** At this stage, individuals assess useful information and reflect on research results to develop personal meaning and interpret information.
- **Communication:** Individuals at this stage organise and apply their research in an appropriate format.
- **Evaluation:** This stage involves thinking about products and processes through evaluation. Ideally this should occur at each stage.

Each of the six stages of the pathways model includes a variety of general and specific strategies which enable searchers to carry out the function of that particular stage. According to Pappas and Tepe (2002, 4),

The Appreciation and Evaluation stages transcend all the others. Appreciation is not necessarily a stage that must occur at the beginning of information seeking but rather continues throughout the process. Evaluation must occur within each stage and not just at the end of the process.

Information seeking has its genesis in the appreciation of the arts, media, literature, and nature which foster curiosity and imagination, so appreciation is an essential component to information literacy. School library media specialists who are committed to the promotion of literature, reading, and lifelong learning cite this affirmation of appreciation as one of the model's strengths. The second stage, "pre-search", enables learners to engage in exploratory searching and to make connections between their prior knowledge and their topic with procedures to reduce their focus (Pappas and Tepe 2002, 6). In this stage, students think, plan, and plot their course or task. Eisenberg (2008, 41) noted that "Planning is a step that students do not always take naturally more often; they jump right into the middle and begin doing their assignments. The key is getting them to understand its importance."

The third stage "search", is where learners seek and identify appropriate information sources, including electronic information sources. During this stage, researchers identify appropriate information providers, resources and tools, then plan and implement a search strategy to find information relevant to their research question or information need (Pappas and Tepe 2002, 8). Searchers are open to using print and electronic tools and resources and cooperative searching and interacting with experts such as librarians. For many years, the skills in this stage, the identification and location of information tools and resources were the primary focus of library instructions to enhance users' access to a variety of information resources. While still acknowledging the importance of information skills, this model further defines this stage for the learner by identifying different types of search strategy such as browsing and hierarchical searching which constitutes the information literacy of the researchers. Information requires "interpretation" in the fourth stage.

The interpretation stage engages searchers in the process of analyzing, synthesizing and evaluating information to determine its relevancy and usefulness to their research question or information needs. Throughout this stage, searchers reflect on the information they have gathered and construct personal meaning (Pappas and Tepe 2002, 16).

This recursive reflection emphasised by Pappas and Tepe allows the students to gain a broader understanding that information literacy is an active means of participation in our information world rather than a mere set of skills:

The fifth stage of communication allows searchers to organise, apply, and present new knowledge relevant to their research questions or information needs. They choose a format that appropriately reflects the new knowledge they need to convey, then plan and create their product (Pappas and Tepe 2002, 19).

This communication can be visual, oral, and/or multimedia in nature. The pathways model also emphasises the ethical use of information and respect for intellectual property which is paramount in today's information literacy. "Evaluation" (self and peer) is listed as the final stage, but is ongoing in this nonlinear information process.

This allows searchers to use their evaluation of the process to make revisions that enable them to develop their own unique information seeking process. It is through this continuous evaluation and revision process that searchers develop the ability to become independent searchers (Pappas and Tepe 2002, 21).

This model, according to Milam (2004, 22), is based on constructivist methods and an enquiry-based approach that acknowledges individuals work and learn best when building on previous knowledge. This model also encourages individuals to become adept at constructing knowledge using a number of sources and creating a variety of end products. The pathway to knowledge model is comprehensive and deals with all three areas of the information literacy process, namely the affective domain and searcher's thinking; the usual information searching strategies; and multiple, general and specific strategies. However, the model has been criticised for its complexity, particularly with early learners. Seland (2014, 45) opined that the Pathways to Knowledge model is based on methods for enquiry learning, hence, its emphasis on the process rather than its content. Also, Baker (2014, 38) noted that "the model was devised specifically for learning in schools, with instructions for teachers and learners that are not appropriate for higher institutions and a lifelong and informal learning environment."

The PLUS Model

The PLUS information literacy skills model was developed in Scotland and was first published in 1996 by James Herring, who is an authority on information literacy and based at the Queen Margaret University College, Edinburgh. It is an information literacy model which encourages pupils to identify purpose (for example, brainstorming and concept mapping), to locate relevant sources (for example, using print and electronic sources), to use the ideas and information found effectively (for example, reading for information, and note-taking), and to reflect on their own information skills through self-evaluation (for example, evaluation of original plan or range of sources used). The model seeks to incorporate the key elements of:

[e]xisting theories from education and information literacy models that had been developed previously, including the Big6 and integrated and combined crucial elements that can be grouped under the following four, not strictly linear, interrelated steps (Herring 1996; 1999), namely: Purpose, Location, Use and Self-evaluation. (Herring, Tarter, and Naylor 2002).

The PLUS model as a successful information-solving process involves four interrelated steps and each step includes the range of skills required to be possessed by a student or an individual to solve an information problem, as shown in Figure 4.



Figure 4: The PLUS Model (Herring 2010).

According to Herring (2010), the popular “PLUS” is an acronym that both students and teachers will find easy to remember. It breaks information skills into four main steps:

- **Purpose:** The first step is the identification of the purpose of a research task that encompasses, for example, the identification of prior knowledge, the development of questions or keywords, reflections about potential sources, brainstorming or a combination of all.
- **Location:** In the second step, the user finds resources that are relevant to the purpose; it includes the ability to use libraries, the internet to access electronic resources, and human sources such as librarians. Also, it involves “selecting suitable information media as well as locating information using library catalogues, indexes, databases, CD-ROMs or search engines” (Herring 2010).
- **Use:** The third step is “the centre piece of the process and involves, for example, engagement with resources through reading, viewing and listening in order to identify relevant information; the ability to understand information and to combine it with prior knowledge; the purposeful selection of information; evaluation of information in terms of currency, authorship, and bias; note taking; synthesizing; communicating or presenting in written or oral format” (Herring 2010).
- **Self-evaluation:** The fourth step requires students to reflect on their achievements and performance, and to consider their own learning as a prospect for improvement. It should not only take place at the end but also constantly during the process (Herring 2010).

Herring (2010, 299), who emphasised information literacy for the school context, stated that the PLUS model is more than a set of skills or a routine process; it is a critical and reflective ability to exploit the current information environment including the online environment that houses a wide range of information resources, and to adapt to new information environments, as a practice. The application of the PLUS model has been

investigated empirically in the context of education (Herring 2006; Herring, Tarter, and Naylor 2002) and used by various studies. Like the Big6 model, it has also been criticised for the lack of well-formed statements of information needs, especially in the description of ideal paths as well as the neglect of early phases and affective dimension that is of relevance to the acquisition of information literacy skills.

Seven Faces of Information Literacy Model

The Seven Faces of Information Literacy model was developed by Christine Bruce in 1997. Bruce (1997, 14) uses “faces” as a synonym for “conceptions” and explains that:

Conceptions of information literacy may be defined as qualitatively different relations between individuals and some aspect of their information environment which could not be predetermined. Varying conceptions are also often described as different ways of seeing, experiencing or understanding a phenomenon.

The Seven Faces of Information Literacy model contains seven ways or faces through which an individual sees and experiences information use. In the model, these seven faces are:

- **Information technology conception:** Information literacy focuses on the use of information technology. Experience acquired is based on an individual’s ability to access, retrieve and communicate information using information technology.
- **Information source conception:** This concept pegs information literacy under the ability to find information from located resources. Information literacy is thus seen in terms of knowledge and the ability to access and use information resources.
- **Information process conception:** Within this concept, information literacy focuses on the process. These processes are the strategies used in tackling and executing an information task.
- **Information control conception:** The focus of this concept is the ability of an individual to control information through various filing systems, the brain or human memory as well as computers to be able to store and retrieve information.
- **Knowledge construction conception:** Under this concept, knowledge is seen as building up a personal knowledge base in a new area of interest. An individual uses information critically by analysing and evaluating it for constructing a knowledge base. Information becomes an object of reflection that appears to individual users.
- **Knowledge extension conception:** Here, information literacy is seen as working with knowledge and personal perspectives adopted in such a way that novel insights are gained. Users gain intuition and creative insight in using

information. The main emphasis is the ability to use information as a tool for solving a problem.

- **The wisdom conception:** At this stage, information literacy is seen as using information wisely for the benefit of others. To use information wisely involves the adoption of personal values that include judgement and critical decisions. It also involves consciousness of the need for the ethical use of information. Bruce (2002) therefore, sees the acquisition of information literacy skills as a mastery of process and learning tools.

Bruce (2002) emphasised that each of these faces of information existed within the context of technology. The Seven Faces model emphasised the relationship between technology and information, in addition to defining core literacies and it is represented in seven different faces.

The Seven Faces model differs considerably from the other models as it is mandatory to follow the structure compared to other models such as the Big6 and Seven Pillars models. According to Mitchell (2007, 16), the faces use a faceted structure rather than a linear or iterative structure in describing elements of literacy and instead focus on broad concepts without predicting the exact relationships between the faces. Regardless of these differences, the Seven Faces model does include many of the same ideas such as the importance of finding and understanding sources, being able to define the structure and scope of an information problem, and being able to synthesise and create knowledge (Bruce 2002).

Whereas this model tends not to focus on social contexts very much as it does in a personal perception, its positioning of information within a technological context reinforces the initiative that an evolution to digital formats is having a considerable impact on the way in which information is used in a technologically advanced society.

Conclusion

Information literacy models are important as they lay solid foundations for fostering independent learning especially in the education sphere. This paper reinforced the need to integrate information literacy into curriculum development to enhance students' learning experience and to develop skills and abilities necessary for the rapidly changing information environment of the 2020s and beyond. Six most commonly used models for teaching information literacy were reviewed in this study. Based on their strengths and weaknesses, the ISP model stood out as the most useful prescriptive model to teach information literacy from elementary to the higher levels of education. Therefore, this paper argues, the application of ISP model for teaching information literacy provides the opportunity for instructors to develop good teaching plans irrespective of the level of education in which they are operating. As a teaching model, it encourages teacher-student commitment and participation.

Furthermore, the study's finding that among the six top models, the ISP model shapes learning experiences across disciplines, thereby making it the best available guide to frame information literacy curriculum objectives and learning outcomes for all levels of education. A good information literacy model is able to support structure that fosters the development of problem-solving and metacognitive skills through the collaboration of the classroom teacher. The ISP model offers the best solution to allow students to gain deeper understandings of subject area curriculum content in developing skills and abilities necessary to actualise their academic potential and become successful in their academic endeavours.

References

- Baker, D. 2014. *The Schooled Society: The Educational Transformation of Global Culture*. Stanford: Stanford University Press.
- Baro, E. E., and B. Fyneman. 2009. "Information Literacy among Undergraduate Students in Niger Delta University." *Electronic Library* 27 (4): 659–75.
<https://doi.org/10.1108/02640470910979606>.
- Bent, M., and R. Stubbings. 2011. "The SCONUL Seven Pillars of Information Literacy: Core Model for Higher Education." Accessed 1 July 2020.
<http://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf>.
- Boon, S., B. Johnston, and S. Webber. 2007. "A Phenomenographic Study of English Faculty's Conceptions of Information Literacy." *Journal of Documentation* 63 (2): 204–28.
<https://doi.org/10.1108/00220410710737187>.
- Bruce, C. S. 1997. *The Seven Faces of Information Literacy*. Adelaide: Auslib Press.
- Bruce, C. S. 2002. "Information Literacy as a Catalyst for Educational Change: A Background Paper." Paper presented at the White Paper prepared for UNESCO, the U.S. National Commission on Libraries and Information Science, and the National Forum on Information Literacy. Accessed 1 July 2020.
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.113.3967&rep=rep1&type=pdf>.
- Burdick, T. A. 1996. "Success and Diversity in Information Seeking: Gender and the Information Search Styles Model." *School Library Media Quarterly* 25 (1): 19–26.
- Doty, P. 2003. "Bibliographic Instruction: The Digital Divide and Resistance of Users to Technologies." http://www.ischool.utexas.edu/~l38613dw/website_spring_03/readings/BiblioInstruction.html.
- Eisenberg, M. B. 2003. "Implementing Information Skills: Lessons Learned from the Big6 Approach to Information Problem Solving." *School Libraries in Canada* 22 (4): 20–23.

- Eisenberg, M. B. 2004. "Information Literacy: The Whole Enchilada." Accessed 1 July 2020. <https://slideplayer.com/slide/7718657/>.
- Eisenberg, M. B. 2008. "Information Literacy: Essential Skills for the Information Age." *Journal of Library and Information Technology* 28 (2): 39–47. <https://doi.org/10.14429/djlit.28.2.166>.
- Hayden, K. A., C. Graham, S. Rutherford, J. Chow, and C. Cloutier. 2008. "WISPR: A Constructivist Approach to Information Literacy Education in Blended Learning Environments." In *Using Technology to Teach Information Literacy*, edited by T. P. Mackey and T. E. Jacobson. New York: Neal-Schuman.
- Herring, J. E. 1996. *Teaching Information Skills in Schools*. London: Library Association.
- Herring, J. E. 1999. *Exploiting the Internet as an Information Resource in Schools*. London: Library Association.
- Herring, J. E. 2006. "A Critical Investigation of Students' and Teachers' Views of the Use of Information Literacy Skills in School Assignments." *School Library Media Research* 9 (1). Accessed 1 July 2020. <http://www.ala.org/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume9/informationliteracy>.
- Herring, J. E. 2010. *Year Seven Students, Information Literacy Skills and Transfer: A Grounded Theory*. Bathurst: Charles Sturt University.
- Herring, J. E., A. M. Tarter, and S. Naylor. 2002. "An Evaluation of the Use of the PLUS Model to Develop Pupils' Information Skills in a Secondary School." *School Libraries Worldwide* 8 (1): 1–24.
- Kim, S., and H. Choi. 2014. "Still Hungry for Information: Information Seeking Behavior of Senior Citizens in South Korea." *iConference* 889–894. <http://doi.org/10.9776/14300>.
- Kuhlthau, C. C. 1991. "Inside the Search Process: Information Seeking from the User's Perspective." *Journal of the American Society for Information Science* 42 (5): 361–371.
- Kuhlthau, C. C. 2004. *Seeking Meaning: A Process Approach to Library and Information Services*. 2nd ed. Westport: Libraries Unlimited.
- Kuhlthau, C. C. 2007. "Reflections on the Development of the Model of the Information Search Process (ISP): Excerpts from the Lazerow Lecture, University of Kentucky." *Bulletin of the American Society for Information Science and Technology*.
- Kuhlthau, C. 2010. "Guided Inquiry: School Libraries in the 21st Century." *School Libraries Worldwide* 16 (1): 1–12.

- Landøy, A., D. Popa, and A. Repanovici. 2020. "Basic Concepts in Information Literacy." In *Collaboration in Designing a Pedagogical Approach in Information Literacy*, 23–38. Cham: Springer. <https://doi.org/10.1007/978-3-030-34258-6>.
- Lau, J. 2006. "The Impact of Information Competencies on Socio-Economic Development in the Southern Hemisphere Economies." In *Digital Literacies for Learning*, edited by A. Martin, and D. Madigan. London: Facet.
- Lawal, V., C. Stilwell, R. Kuhn, and P. Underwood. 2012. "A Contextual Study of the Information Literacy of Aspirant Barristers in Nigeria." *South African Journal of Libraries and Information Science* 78 (2). <https://doi.org/10.7553/78-2-110>.
- Luo, M. M., D. Nahl, and S. Chea. 2011. "Uncertainty, Affect, and Information Search." *IEEE Computer Society Digital Library* 1: 1–10. <https://doi.ieeecomputersociety.org/10.1109/HICSS.2011.461>.
- Lwehabura, M. F. 2007. *The Status and Practice of Information Literacy for Teaching and Learning in Four Tanzanian Universities*. Pietermaritzburg: University of KwaZulu-Natal.
- MacDonald, C., and R. Darrow. 2003. "Information Literacy Models and Comparison Chart." Accessed 1 July 2020. <http://www.infopeople.org/training/past/2004/k-infolit/handoutinfolmodels.pdf>.
- Mctavish, M. S. 2007. *Towards the Knowing Organisation: An Investigation into the Information Behaviour of Trainee Solicitors within a Law Firm Environment*. Newcastle: University of Northumbria.
- Melton, G. 2003. "The Convention on the Right of the Child as a Framework for Research." In *Indicators of Child Poverty and Well-Being*. Cape Town: Children's Institute, Idasa UWC, Department of Health and Social Development.
- Mertes, N. 2014. *Teachers' Conceptions of Student Information Literacy Learning and Teachers' Practices of Information Literacy Teaching and Collaboration with the School Library: A Grounded Case Study*. Berlin: Humboldt University.
- Milam, P. 2004. "Destination Information: A Road Map for the Journey." *LibrGLY Media Connection* 22 (7): 20–23.
- Mitchell, E. 2007. "Organization as Meta-Literacy: Evaluating Student Use of Metadata and Information Organization Principles in the Classroom." Paper presented at the SIG-CR workshop. <http://hdl.handle.net/10150/106254>.
- Pappas, M. L., and A. E. Tepe. 1995. *Pathways to Knowledge*. Illinois: Follett Software. Accessed 1 July 2020. <http://www.intime.uni.edu/model/information/proc.html>.
- Pappas, M., and A. Tepe. 2002. *Pathways to Knowledge and Inquiry Learning*. Greenwood Village: Libraries Unlimited.

- Porarinsdottir, P., and A. Palsdottir. 2015. "Information Literacy Instruction: Theory and Practice." In *Research in Social Sciences*, edited by M. H. Helga, R. Olafs and S. Thamar. Erindi: Company and Humanities Department.
- SCONUL. 2000. Society of College, National and University Libraries Information skills in higher education: A Position Paper." SCONUL.
- SCONUL Advisory Committee on Information Literacy. 1999. "Information Skills in Higher Education." In *A SCONUL position paper*. Information Skills Task Force, on behalf of SCONUL.
- SCONUL Working Group on Information Literacy. 2011. *The SCONUL seven pillars of information literacy: Core Model for higher education*. SCONUL Working Group on Information Literacy.
<http://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf>.
- Seland, G. 2014. *User Revealmnt Revisited: Knowledge Formation in the Prefocus Stage of Information-Based Work Tasks*. Aalborg: Aalborg University.
- Uzuegbu, C. P., and M. M. Naga. 2017. "Information Literacy Model: A Framework for Orally-Rural Publics." In *International Conference Proceedings on Library and Information Services in Knowledge Society: Innovative, Value Added Services and Best Practices*, edited by R. K. PravakarRath, R. Ngurtinkhuma, and R. N. Mishra, 123–134. Aizawl: Excel India.
- Walton, G. L. 2009. *Developing a New Blended Approach to Fostering Information Literacy*. Loughborough University.
- Welsh Information Literacy Project. 2011. "Information Literacy Framework for Wales: Finding and Using Information in 21st Century." Accessed 1 July 2020.
http://librarywales.org/uploads/media/Information_Literacy_Framework_Wales.pdf.
- Wolf, S. E., T. Brush, and J. Saye. 2003. "Using an Information Problem-Solving Model as a Metacognitive Scaffold for Multimedia-Supported Information-Based Problems." *Journal of Research on Technology in Education* 35 (1): 321–341.
<https://doi.org/10.1080/15391523.2003.10782389>.
- Zimmerman, N. P., M. L. Pappas, and A. E. Tepe. 2002. "Pappas and Tepe's Pathways to Knowledge Model." *School Library Media Activities Monthly* 19 (3): 24–27.