SECOND LANGUAGE ON-SCREEN ACADEMIC READING COMPREHENSION MODELS OF POSTGRADUATE INTERNATIONAL STUDENTS

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ABSTRACT: *This paper contributes to the existing body of research on L2 academic reading practices in the 21st century by focusing on on-screen reading in the technological age. The study offers an insight into the nature of on-screen reading, and reflects the authentic on-screen academic reading experiences of international postgraduate readers. A case study and interpretive qualitative approaches have been adopted in the present research study where process-oriented techniques, namely demographic questionnaires, think-aloud protocol, field notes, stimulated recall and interviews have been employed to collect the data. Thematic and content analysis; and a constant comparative method (CCM) has been applied to analyse the data. The results from this study have led to the proposal of suggested models for interpreting on-screen L2 academic reading interactions. A number of pedagogical practices are suggested and recommended for preparing L2 readers for further academic study; including teaching models and instructions to accommodate and meet the needs of reading comprehension practices in the technological age and promoting L2 learners' digital academic strategy literacy (DASL).*

KEYWORDS: second language, on-screen, academic reading, comprehension, models, postgraduate, international students

INTRODUCTION

The commencement of the digital age has brought considerable change to educational sectors around the world, in particular the higher education sector, which has witnessed a proliferation of technology applications (Goodfellow & Lea, 2013). Universities and colleges have digitised their management information systems and now use virtual learning environments, digital tools and materials to assist teaching and learning (Sharpe, Beetham, Freitas, & Conole, 2010). Moreover, the increasing prevalence of digital libraries, including digital scholarly journals and publisher platform libraries, has brought dramatic changes to learning and knowledge related interactions in universities (Goodfellow & Lea, 2013). Digitisation in colleges, universities and libraries has therefore changed the widely known concept of academic literacy, 'the ability to communicate competently in an academic discourse community' (Wingate 2015, p.6) to digital academic literacy. In this regard, a complete transition from writing on traditional paper to typing on-screen has occurred, while the transition from reading printed paper to on-screen remains incomplete (Mark, 2015).

STRATEGIES FOR ON-SCREEN ACADEMIC READING

Recently, researchers have attempted to differentiate between the required reading strategies for paper and for digital reading. The literature raises questions, asking about the nature of the

differences between paper and digital reading strategies. In this regard, Park and Kim (2011) conducted a study to investigate the reading-strategies of three adult English language learners when they read digital texts in hypermedia learning environments. They found that most of the participants employed common paper reading strategies to read digitally. They also found that the participants used two new reading strategies for digital reading, namely hypermedia and computer accessories such as using a mouse pointer as a substitute for pen and pencil, using menu and navigation options and using multimedia resources.

Several studies have investigated and identified specific digital reading strategies used by readers when they e-texts. For example, Anderson (2003) conducted a study to examine the role of second language reading strategies within the context of digital reading tasks for 247 EFL and ESL readers. He adapted the Survey of Reading Strategies (SORS) that comprises of 38 items relating to three reading strategy categories; problem-solving reading strategies, support reading strategies and global reading strategies. He named it the Online Survey of Reading Strategies (OSORS). Another research study was conducted in the same field by Yutdhana (2007) on 205 Thai graduate students from three faculties; Social Sciences, Health Sciences and Sciences and Technology. The study used the OSORS survey to explore the digital reading strategies used by second language graduate students and to examine whether students from three faculties employed different digital reading strategies. The findings revealed that graduate students most frequently used the global reading strategies and the problem-solving strategies, while the support reading strategies were used the least.

Affordances and Limitations of On-Screen Reading

Digital affordances and the limitations of digital reading have been controversial subjects within the field of digital reading research. There are researchers who advocate the benefits that digital reading offers for readers, while others argue that digital reading is ineffective due to its limitations. Recently, a group of educators have realised the potential of computer technology and have demonstrated increased interest in using it as a tool to augment digital academic reading comprehension (Park et al. 2012; Labbo 2006; Day & Lloyd 2007). One digital affordance for reading is multimedia; Reinking (2001) noted that multimedia programs are not limited to textual information and can take the form of video, sound and pictures, all of which have an effective role in allowing the comprehension of digital texts. This sort of digital affordance provides digital second language readers with tools that have the potential to facilitate their L2 general, academic and technical vocabulary and also their reading comprehension (Abraham 2007). Moreover, digital readers have the opportunity to use several kinds of dictionaries or thesaurus's to look for word comparisons, related words, synonyms, antonyms, sample sentences, basic grammar, irregular verbs and word-by-word translations (Montelongo & Herter 2010).

Researchers also demonstrated that digital readers can easily read illustrated texts and navigate related topics as well as check information. Electronic text (via its navigational services) can aid with reading comprehension challenges that are due to limited background knowledge (Anderson-Inman 2009). For instance, readers can consult an online encyclopaedia to gain more information related to the subject under discussion (Montelongo & Herter 2010). Coiro and Dobler (2007) stated that the internet has support tools for digital reading comprehension, such as the use of

search engines to navigate multi-layered websites and monitor the appropriateness of their pathway through a complex network of connected text. Digital readers can use hypermedia technology presented in text embedded links, images, audio, video and discussion space in order to access a wider range of information. Liu (2005) found that digital texts gave the reader the choice of reading distinct parts of a text (in no particular order) and to navigate to other related sites for further information. In an early study of L2 reading with digital glosses, Lomicka (1998) conducted research on twelve college students enrolled in a French course in order to investigate the effects of multimedia reading software on reading comprehension. Lomicka (1998) found that glosses in a hypermedia played an effective role in helping students to understand the passage.

Annotations are directly integrated with printed reading material. However, electronic text has its own forms. There are a small number of existing studies that attempt to characterise or analyse markings made on e-documents. These include those undertaken by Marshall and Brush (2002) and Qayyum (2008). These studies established various kinds of annotations during electronic reading. These include: base markings; highlighting; underlining; compound markings; notes consisting of one to two sentences; cryptic expressions consisting of one to two words; symbols such as '?', '!' and numbers; circles; squares; asterisks; and stars. They also include other symbols, such as arrows, drawings, lines, and single or double lines in the margins. Moreover, Qayyum (2008) noted that the readers used electronic markings during digital reading to emphasise a passage, to separate the article into various topics or ideas and to remember certain aspects of the article that could be used in a later discussion. Digital readers also use symbols to link ideas and to create text zones for singling out similar ideas.

There have been further investigations on the positive effects of technological reading dynamics on readers' reading performance. For example, Piolat et al. (1997) noted that digital readers can increase the speed of their reading via several technical procedures. That is, they can move quickly through portions of text using the scroll bar. This also provides an approximation of the location of the reading matter, whether the reader is at the beginning, middle or the end of the text (Piolat, Roussey, & Thunin, 1997). Readers can also easily and quickly move the text using page-up and page-down keys (Ibid.). Further research studies have established that the ability to use large font sizes is another advantage of digital reading (Burk, 2001). Moreover, different web pages can be opened simultaneously on screen and placed either side-by-side or super-imposed upon each other. Readers can then easily switch between several windows. Szymanska and Kaczmarek (2011) stated that digital materials can be adjusted, zoomed and manipulated for comfortable and clear reading.

In the previously mentioned literature above, e-texts are presented as support tools that enhance academic reading and comprehension; however, some researchers claim that digital reading has several drawbacks. Olive and Rouet (2008) claimed that digital reading is suboptimal and less effective than paper reading. Liu (2005) supports this as he found that during digital reading, less time is spent on in-depth reading, and sustained attention. Levy (1997) maintained that digital reading is fragmented and less concentrated. Horton et al. (1995) also found that digital reading relies on flipping, scanning, browsing, selecting, and locating information in a text to get a sense of the whole document. Furthermore, Horton et al. (1995) believed that reading intensively is an absent feature during digital reading. Lynch (2001, cited in Chou 2012) claimed that students use

digital reading materials only for browsing, checking and deciding what to read, while they print longer texts for careful and deep reading. Moreover, Shabani et al. (2012) also maintained that printed documents are more suitable for in-depth reading and note taking than digital ones. They justified their claims with students' responses which demonstrated that taking notes from printed documents does not distract from the reading process, while in electronic reading, readers need to interact with the mouse and the keyboard to annotate. Dyson and Haselgrove (2000) and Brown (2001) reported that rapid scanning and skimming were most frequently used in digital reading, while detailed reading was not frequently used. It is clear that the majority of the studies mentioned above focus on the drawbacks of on-screen reading and seem oblivious to its affordances. They do not delve into its ineffectiveness when compared with paper-based reading due to characteristics such as nonlinearity, the ease of multitasking, and the manner in which it supports scanning.

However, this paper argues that digital reading offers a number of important intuitive affordances that help enhance readers' reading performance. Moreover, the positive characteristics of e-text outnumber the negative, especially for L2 student readers. These affordances of digital reading are lacking in printed text; interactivity, immediacy of accessing information, and the convergence of text, images, audio and video. Researchers may claim that digital reading is superficial and not efficient; however, this view maybe because students who prefer printed reading sometimes have limited knowledge of technology's benefits and are therefore unable to take advantage of them. They may also have spent most of their previous academic career reading from printed-paper and hard copies, so when it comes to digital reading they may find it confusing and therefore reject it. The negative factors mentioned above (see Olive & Rouet 2008; Levy 1997; Dyson & Haselgrove 2000; Brown 2001; Horton et al. 1995; Liu 2005) might be eliminated if readers knew how to use and manipulate digital materials effectively. Furthermore, these drawbacks of digital reading, such as reliance on browsing and scanning, are not sufficiently significant to outweigh the benefits of digital reading for L2 academic readers. Moreover, scanning and skimming are also considered essential reading strategies, which readers need to master and practice when reading texts whether in printed or digital format. The present paper puts forward a hypothesis in that on-screen reading is an effective practice capable of scaffolding and enhancing 21st century readers' reading comprehension and learning outcomes, particularly if readers are capable of effectively employing its affordances and overcoming its challenges.

METHOD

Aim of Study
The aim of this study is to gain an insight into a 21st century phenomena that requires more investigation, namely to investigate the nature of on-screen academic reading comprehension. It aims to propose a new element of academic reading which is called here 'digital academic strategy literacy' (DASL). To achieve the research aim, two questions were formulated to be answered:
RQ: How L2 readers interact with academic on-screen texts?
RQ2: What type of technological benefits (digital affordances) do L2 readers take advantage of when reading on-screen, and with what frequency?
The qualitative approach was deemed to be the best method to employ for the purposes of this investigation. The researcher in the current study interacted directly with the research participants, via observations (think-aloud protocols and stimulated recalls), diary and interviews.

Procedure

The main study took place at the University of Southampton, in the UK. The research subjects were selected based on a non-random method (purposive sampling) to obtain the richest and most detailed information to answer the research questions. Twenty international postgraduate students; PhD and Masters who, at the time, were full time research students in the UK. They came from the school of Humanities; school of Management and Health Science. A brief introduction about the study was given to them and they were asked to prepare and bring two research articles from their field of study to read for the study purposes that they had not previously read; one printed and the other online. In the current study, the use of self-selected texts was adopted in the think-aloud protocols to gather data about the authentic reading experience of postgraduate students, their actual digital L2 academic reading strategies and the use of digital affordances while reading to comprehend research articles in their field of study. The participants individually met with the researcher and at first they were provided with the consent form to be read and signed. The participants then filled in the demographic questionnaire prior to starting the Think-aloud (TA). The think-aloud followed by the stimulated recalls (SR) were conducted with each participant twice; once with the participant reading from printed paper format and once with them reading on-screen. Prior to starting the first main think-aloud approach to collecting the data, a short training session was held (on the same day) with each participant to increase the content validity of the verbal report. However, the training does not guarantee that the participants expressed all their thoughts and described all the processes that they employed to comprehend the written text. Some of the participants spoke less than others, and gave very brief explanations during the think-aloud protocols. Thus, the SR sessions were necessary to collect more detailed data.

In order to record the data accurately, a video camera and a screen capture technique were both used to record the readers' digital reading strategies, to explore the challenges they faced, the strategies that they employed to overcome these challenges and their use of digital affordances while reading.Participants were then instructed by the researcher to verbalise their thoughts as far as possible in English or in their first language. They were also instructed to read the L2 research articles as they usually would. As each reader reached the end of the twenty minutes allocated for digital and paper reading, the SR technique was employed by replaying video recordings of the task (think-aloud protocol) to the participants. This enabled the observation of their spontaneous responses during the activity and elicited their comments on their own strategy and behaviour while reading the research articles. While the participants were watching the video, the researcher paused it where necessary, to request clarification and/or a description of the processes that they were employing during their silent reading. The SR sessions were recorded using a voice recorder for later analysis.

RESULTS

Reading as a whole: Strategic level of on-screen reading
It was found that the nature of the reading sub-strategies employed can be affected by the different levels of textual content interaction. The data clearly demonstrates that digital academic strategy literacy (DASL); including the nature of on-screen reading strategies can be divided into several ordered levels. Based on TA and SR data, the researcher proposes a model that demonstrates the ordering of the sub-strategies employed during reading for comprehension to deal with different

points of on-screen academic research article; namely text, section, paragraph, sentence, phrase and word levels. The model consists of four categories, sub-divided into a number of sub-strategies, presented in figure 1.
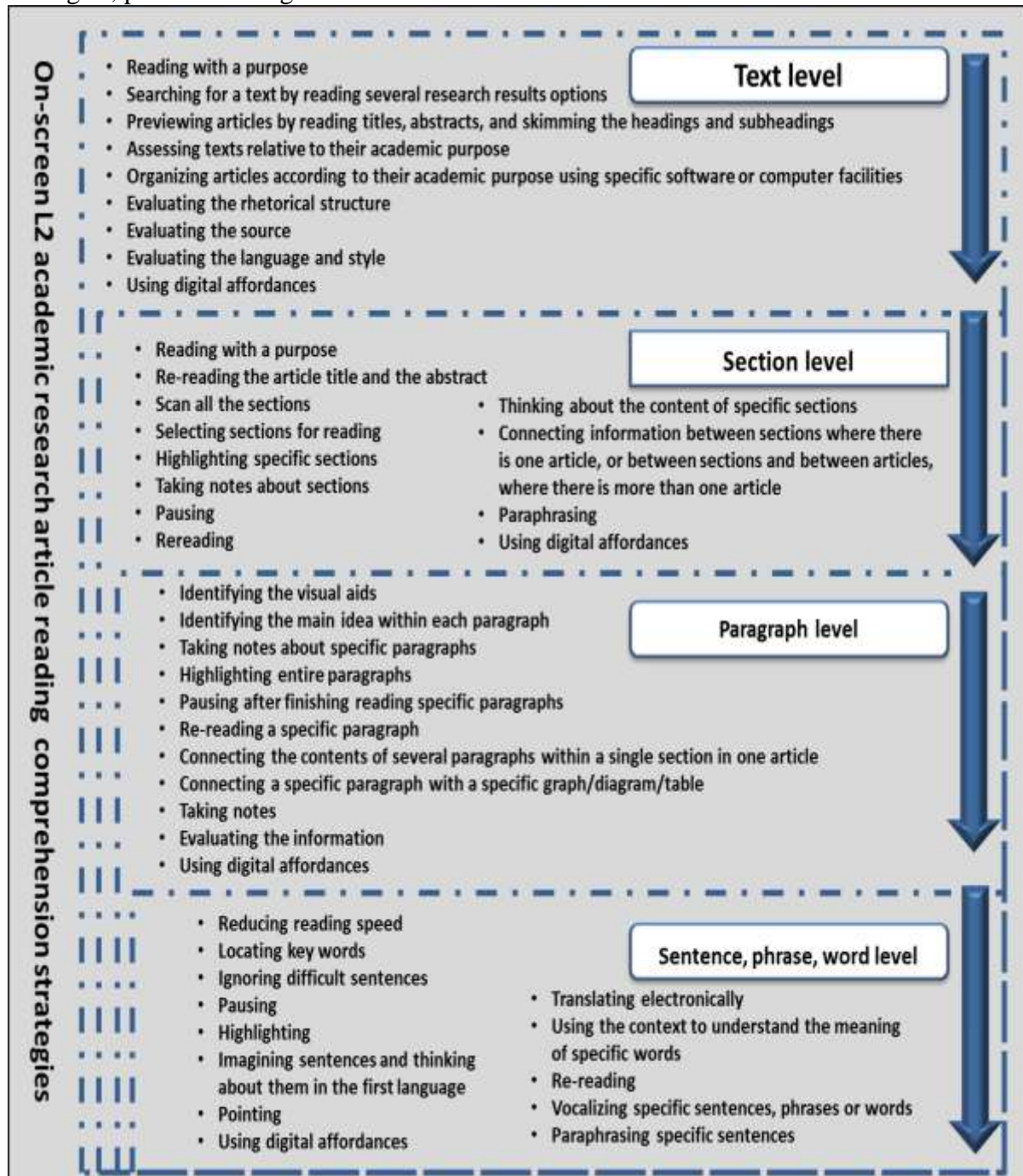

 Figure 1: The proposed model of strategic levels of on-screen L2 academic research article reading

The available analytical data also seems to suggest that interacting with a text on-screen involves an ordered process that is hierarchical and sequential in nature. The data suggests an additional level at which readers either re-interact with the text as a single piece of information, or print it out

to read in greater depth. Figure 2 presents the proposed patterns of on-screen academic reading interaction. The figure illustrates that the on-screen reading for comprehension begins with the text level and is followed by a process of deciding the relevance of the text, during which a reader either decides to proceed with reading the article or stops reading it. After that, if the reader decides to complete reading the article, he/she employs section, paragraph, sentence, phrase and word level sub-strategies. Thereafter, the reader again makes a decision about the relevance of the text to his/her academic purposes. This circular process finishes by either reviewing the text on-screen or printing it out for a closer re-reading. That is, if the article is very relevant, the reader frequently prints it off for full reading comprehension; and if it is partially relevant, the reader prefers to re-read only the relevant parts on-screen.
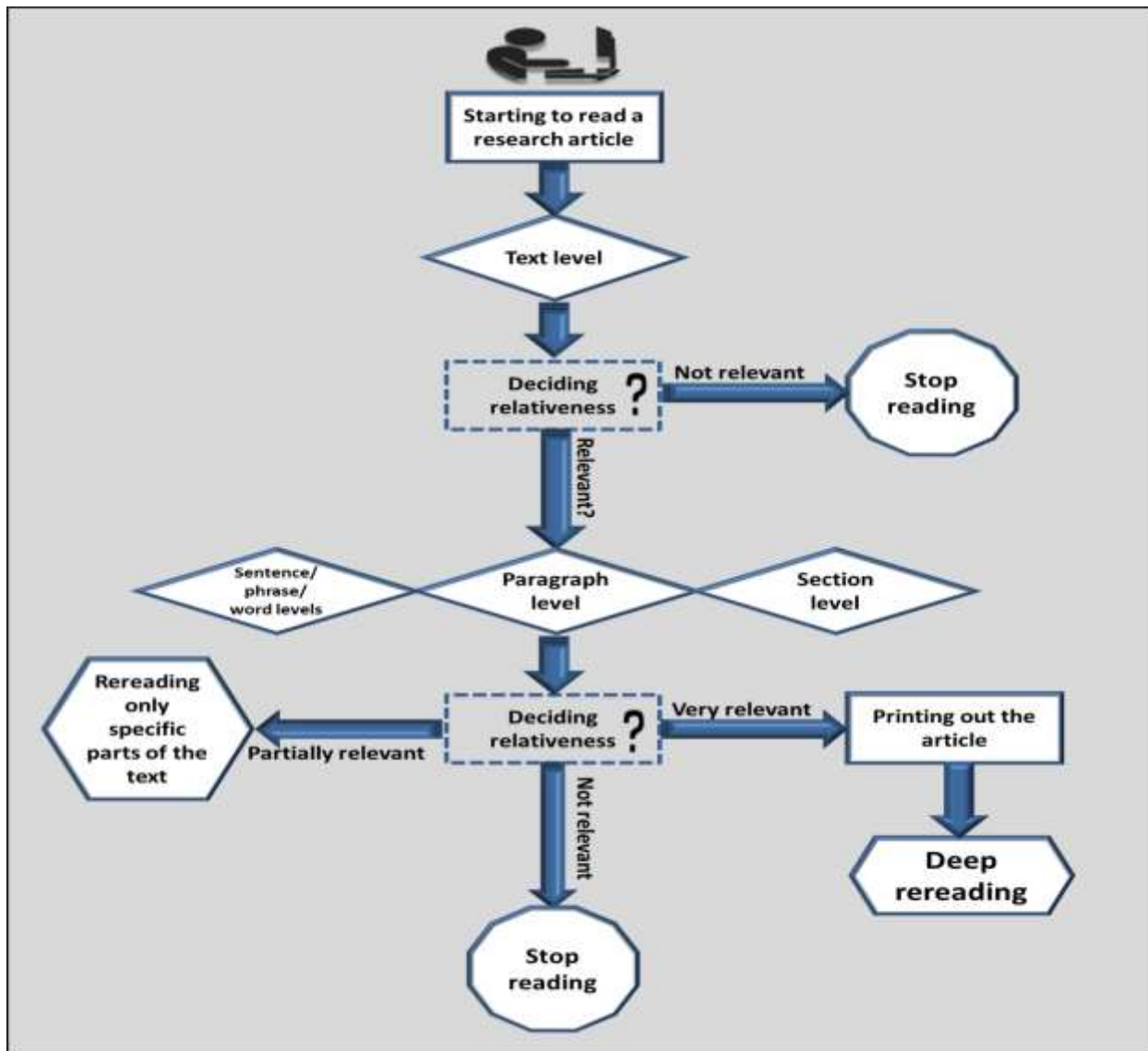

Figure 2: The proposed model of patterns of on-screen reading interaction (based on the research data)

TA and SR data show that there are some specific sub-strategies that follow on from one another during on-screen academic reading as presented in figure 3. For example, the re-reading strategy is linked to multiple types of strategies that either precede or follow it during on-screen reading. Highlighting of specific sentences before re-reading them and/or highlighting, re-reading and connecting ideas is linked to some strategies. The suggested model illustrates different sequences of the most frequently employed associated sub-strategies. This presented model that is based on the research data suggests that readers highlight specific parts of the text during reading comprehension either for immediate re-reading or for future re-reading.
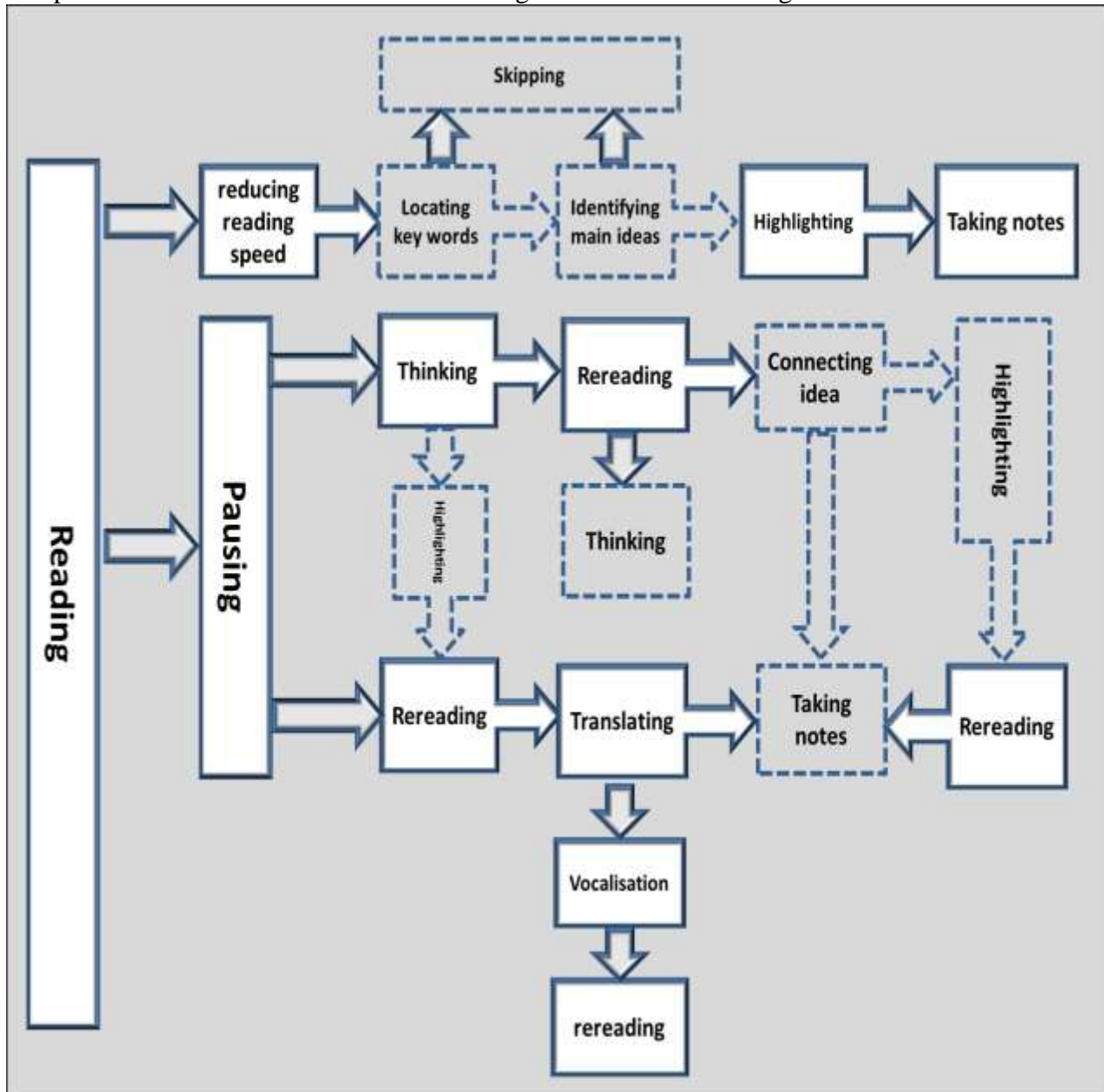

Figure 3: The proposed model of patterns of the associated sub-strategies (based on the research data

Use of e-resources

Throughout the present study, it was found that digital academic strategy literacy (DASL); including on-screen reading comprehension strategies often entails the use of digital affordances to enhance comprehension. The reader's utilised different sorts of e-resources while reading on-screen, including digital presentational, navigational, translational, explanatory, illustrative, summarising, notational and collaborative resources. Figure 4 presents the frequency of use of several e-resources when reading an academic e-text followed by the number of instances of occurrence within the data.
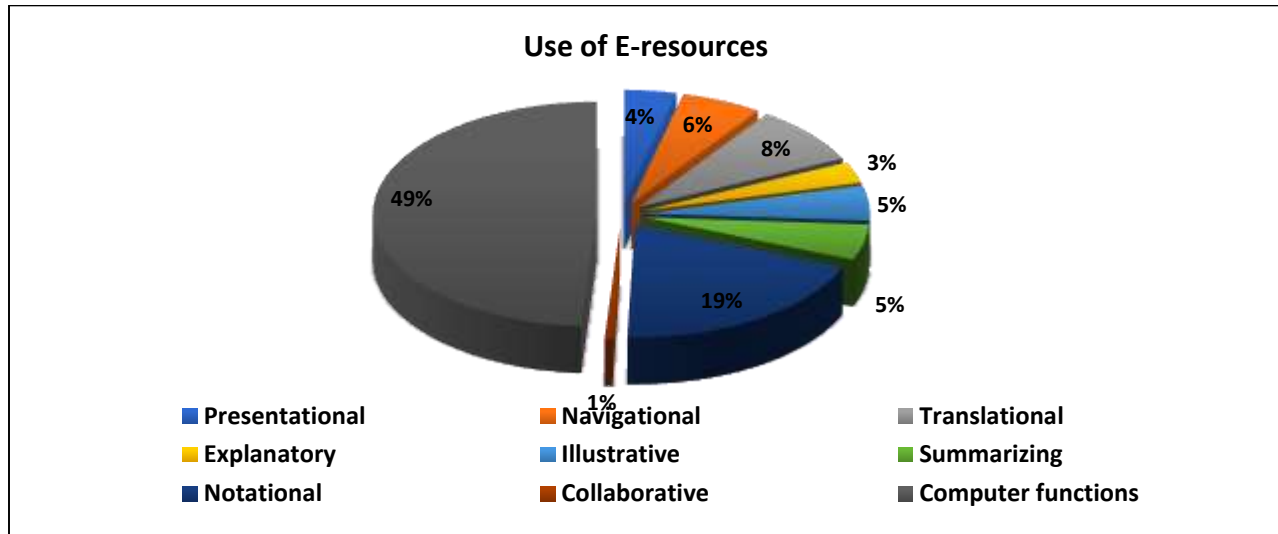

Figure 4: The frequency of the use of e-resource

Several sorts of digital affordances were utilised by readers during reading on-screen. However, the participants' employment of these affordances was not extensive. It was found that 4% (32 instances) involved presentational resources, 6% (50 instances) involved navigational resources, 3% (26 instances) involved explanatory resources, 5% (43 instances) involved illustrative resources and 5% (44 instances) involved summarising resources. However, other e-resources were used somewhat more frequently; 8% (72 instances) involved translational resources, 19% (166 instances) involved notational resources and only 1% (5 instances) involved collaborative resources. This paper also contributes a new element, namely a computer function, which proved to be the most frequently-used source at 49% (419 instances). Furthermore, three elements of the Anderson-Inman typology (enrichment, instructional and evaluative) (Anderson-Inman 2009) have been omitted from the new scheme as these were found to be inapplicable to on-screen academic reading comprehension. The use of these e-resources is exemplified in the following sections by presenting quotes from readers' actual reading.

Figure 5 presents an overview model of the affordances that digital resources offer for the L2 academic reader. The model consists of a number of digital affordances divided into sub-categories that are used by the participants during on-screen reading, namely navigational, presentational, explanatory, illustrative, summarising, notational, translational, and collaborative and computer functions. This model presents an important component of digital academic strategy literacy (DASL).
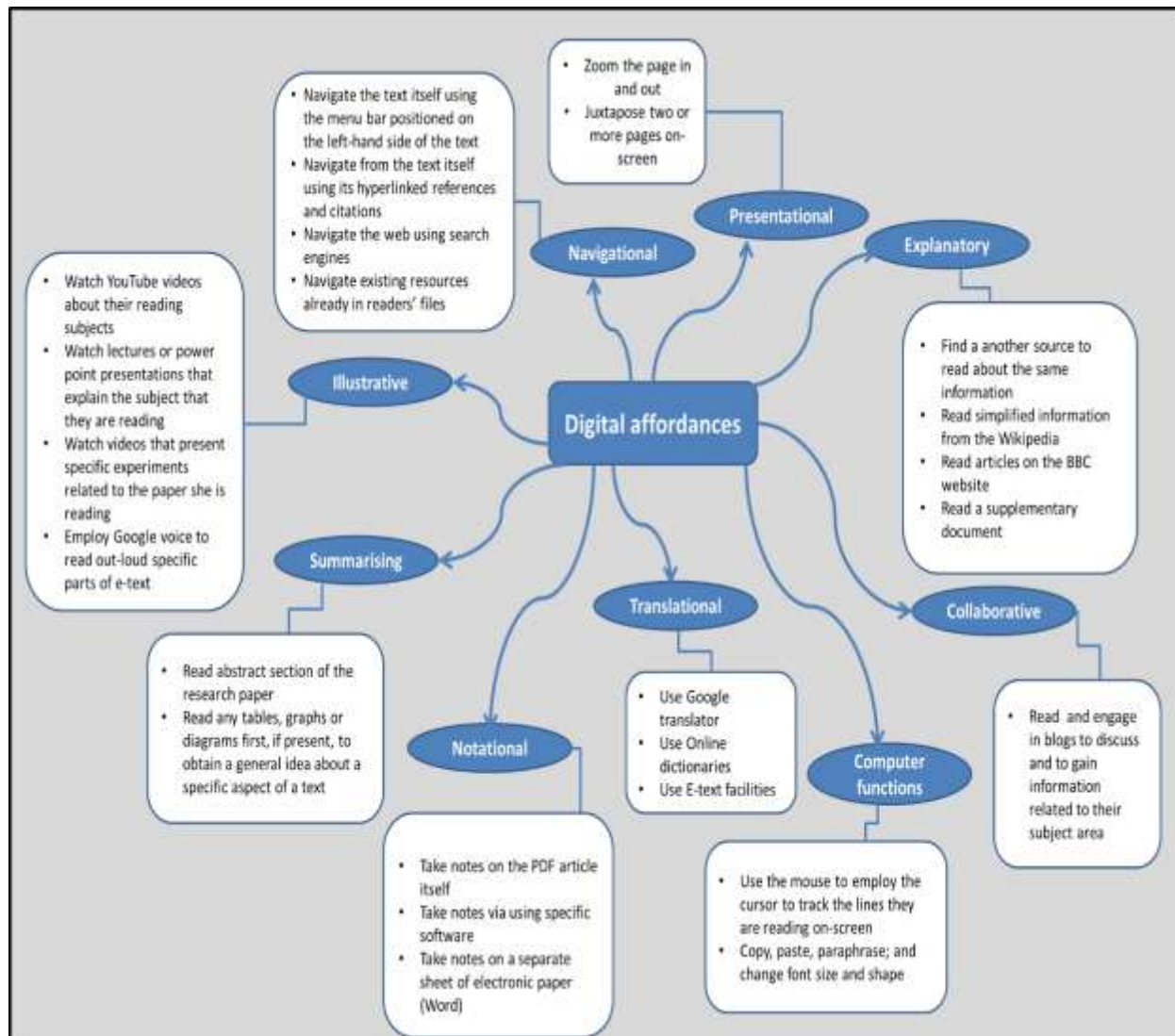
Figure 5: Use of digital affordances of L2 academic reading purposes (an overview model based on the research data)

Presentational. The readers made use of only a small proportion of the presentational e-text resources, i.e. when they were enlarging or minimising the font to suit their reading preferences and facilitate their reading. In this regard, only 20% of the readers utilised presentational resources during reading academic text on-screen. None of the readers had attempted to make use of the other presentational resources such as changing text and background colour, page layout and graphics.

Navigational. The results of the current study led the researcher to scrutinise different patterns of navigational processes, which had not been anticipated as likely to emerge in the current study. These patterns were categorised into four types of navigation for use when reading an e-text; navigating the text itself using the menu bar positioned on the left-hand side of the text, navigating

from the text itself using its hyperlinked references and citations, navigating the web using search engines and navigating existing resources already in readers' files

Translational. 100% of the readers employed translational e-resources during their on-screen reading in order to translate a complete paragraph, sentence, phrase and/or a word. It was found that readers were utilising three types of translational e-resources while reading on-screen to enhance their reading comprehension; Google translator, Online dictionaries and E-text facilities

Explanatory. 50% of the readers used other websites to gain an explanation for specific information in their e-text. They used either Google search or Wikipedia to find simplified explanatory information that clarified the relevant content of the text they were reading.

Illustrative. 45% of the readers resorted to illustrative resources to enhance their comprehension of the text being read on-screen. 40% of the readers declared that they sometimes watch YouTube videos while reading on-screen to enrich their knowledge about their reading subjects. By doing so, readers unintentionally enhance their reading comprehension, summarising. The data reveals that all the readers attempted to obtain condensed information about the research article. In this regard, 100% of the readers were observed directing their attention to the abstract section of the research paper in order to gain a general understanding of the text content.

The abstract section is not the only way to get a general idea of the text; the readers also used other methods to gain a recapitulating view of some aspects of the text. 60% of the readers mentioned that they read any tables, graphs or diagrams first, if present, to obtain a general idea about a specific aspect of a text. The data also reveals that readers employ multiple strategies when interacting with a summarising resource. Notational. 100% of the readers utilised notational e-resources. However, analysing those readers' use of notational e-resources reveals that readers are reluctant to highlight texts while reading more than note-taking. The data also reveals that there are four different kinds of electronic note taking.

1.   Taking notes on the PDF article itself
2.   Taking notes via specific software
3.   Taking notes on a separate sheet of electronic paper
4.   Taking notes manually on a paper notebook

Collaborative. Readers were not effectively activating collaborative e-resources while reading on-screen and they engaged mostly in individual cognitive reading processes. 100% of the readers were poorly involved with all collaborative e-resources while reading on-screen, such as online chat, email links and podcasts. None of them used any of the collaborative e-resources (apart from blogs) to gain further explanatory information about a subject during their on-screen reading. Only 30% of the readers declared that they sometimes read blogs to gain information related to their subject area in order to enrich their knowledge.

Computer functions. On the other hand, the readers frequently utilised other digital affordances not mentioned in Inman's e-text support taxonomy (Anderson-Inman 2009), such as software applications, copy and paste and multi-tasking. For example, 40% of the readers used specific software to tag relevant articles, to mark the articles that have been read or not read, to mark the highly important articles to their field and to save, and sort the articles into specific folders.

10% of the readers used their mobile phones to translate specific words that they came across while reading on-screen. The data also reveals a number of interesting findings regarding the use of e-resources. Firstly, there is no specific sequence of utilising the e-text resources. Readers are able to employ any of these e-resources in a different sequence, according to their needs. For example, the reader can watch a YouTube video to gain an illustration, read explanatory documents, highlight, take notes and translate, while others might read the article first, watch lectures or presentations about specific subjects and then re-read the article. Also, during their on-screen reading task all the readers used computer facilities to enhance their on-screen text interaction. They copied and pasted text using the mouse to track or focus on specific sentences, phrases and/or words. In addition, there were a few readers who used different sorts of software applications while reading in order to facilitate their reading.

DISCUSSION

The findings show that readers used various types of e-resources during the on-screen academic reading task: presentational, navigational, translational, explanatory, illustrative, notational, instructional, collaborative and computer functions. However, these results were disappointing, as the use of most of these e-resources was low. This suggests that readers are not competent in terms of their media and computer literacy as they lack a broad understanding of what tools to use on-screen and how to use them effectively to achieve their purposes. They were not even aware of the existence of some of these e-resources, and their knowledge was limited to specific digital resources.

There are a number of potential explanations for the lack of use of the presentational e-resources while reading on-screen. Readers are unfamiliar with presentational e-resources and unaware of their benefits. Also, readers themselves made no effort to enhance their reading via the presentational e-resources and this could be due to a lack of engagement with the e-text. In addition, readers' use of notational e-resources reveals their lack of ability to annotate e-text. The readers were highlighting specific parts of the text but rarely taking notes on-screen. The data also reveals that none of the participants were observed (or reported) underlining, writing in the margin or drawing while reading on-screen. However, this could be due to the lack of provision of these types of resources in any of the PDF files used by the majority of readers when reading academic articles on-screen.

The high volume of use of navigational resources while reading on-screen matches reports in other recent studies; for example, Akyel and Erçetin (2009) and Lawless et al. (2007) who found that readers spend a large proportion of their on-screen reading time navigating links embedded in the text. During each of the four types of navigation, the readers navigated, searching for relevant or specific information that was required for academic purposes. In accordance with the present results, previous studies found that readers navigate using a menu driven navigational scheme. Others navigated websites, and text embedded links (Lawless et al. 2007). In addition, Protopsaltis and Bouki (2005) found that readers navigate when reading on-screen, as they apply different navigational strategies: linear, mixed and mixed review.

The current study also revealed that readers use simplified websites to uncover relevant information to provide them with more explanation of specific sections in their reading texts. These include Wikipedia, blogs and/or website search engines, such as Google. In addition, videos are the most common illustrative e-resource used when reading on-screen. Readers watch videos to enrich their knowledge of specific subjects, to increase their vocabulary relating to their field of study and to understand technical experiments. Overall, these results indicate that a number of the participants enhanced their on-screen reading comprehension by utilising these varied illustrative e-resources: they watch videos and power point presentations and listen to reading texts. These findings are consistent with Park and Kim's (2011) findings, in which readers acknowledged that they watch videos and look at pictures during on-screen reading as they feel that these enhance their reading and comprehension.

The reader is typically involved in several tasks alongside their reading comprehension, such as translation, writing, searching, reading, watching videos and reading again. This provides a significant insight into on-screen reading techniques, including tasks comprising other reading processes. For instance, readers read, search, save, copy, paste, modify, evaluate and re-read. Thus, on-screen reading enables readers to perform several tasks while reading. They can search, display more than one text, connect information, evaluate, take notes simultaneously and write. It can thus be suggested that the use of these e-resources is a form of scaffolding for reading comprehension, which can improve readers' ability to comprehend challenging texts that are beyond their unaided comprehension abilities.These results match those observed in Park & Kim's (Park et al. 2012; Labbo 2006; Day & Lloyd 2007), where readers used computer functions, such as the computer mouse and spell and grammar check while reading on-screen. Furthermore, reading on-screen is a multi-tasking activity. The reader adjusts the font of the article, opens a new webpage, reads in another document, returns to the original, uses an online dictionary, translates a word, and then returns to the original text.

The current paper suggests that the use of these digital affordances while reading on-screen improves readers' linguistic knowledge, builds their content knowledge, and improves their overall digital strategies literacy. The use of some of these e-resources, such as translational, notational, and summarising sources decrease over time as readers do not need to use them as frequently to achieve comprehension as their knowledge improves. On the other hand, other e-resources, such as collaborative and navigational sources, will continue to be relevant as they are useful not only for comprehension purposes but also possibly for critical reading.

IMPLICATION

Theoretical model for teaching reading strategies for L2 language learners
This Paper, based on its own results (finding out what readers do and do not do during on-screen reading and what they need to do to comprehend and why proposes the following model that reflects the sequential steps of a suggested design for on-screen academic reading comprehension strategies instructions (see Figure 6). This model includes the following interrelated facets; explanation, modelling, practising, collaboration and scaffolding, reflecting, thinking and sharing, practicing, creating and practicing that English language teacher ought to consider during the three

phases of teaching reading skill; before, during and post-reading. Each of these facets in the suggested model includes sub-elements presenting the actual procedure.
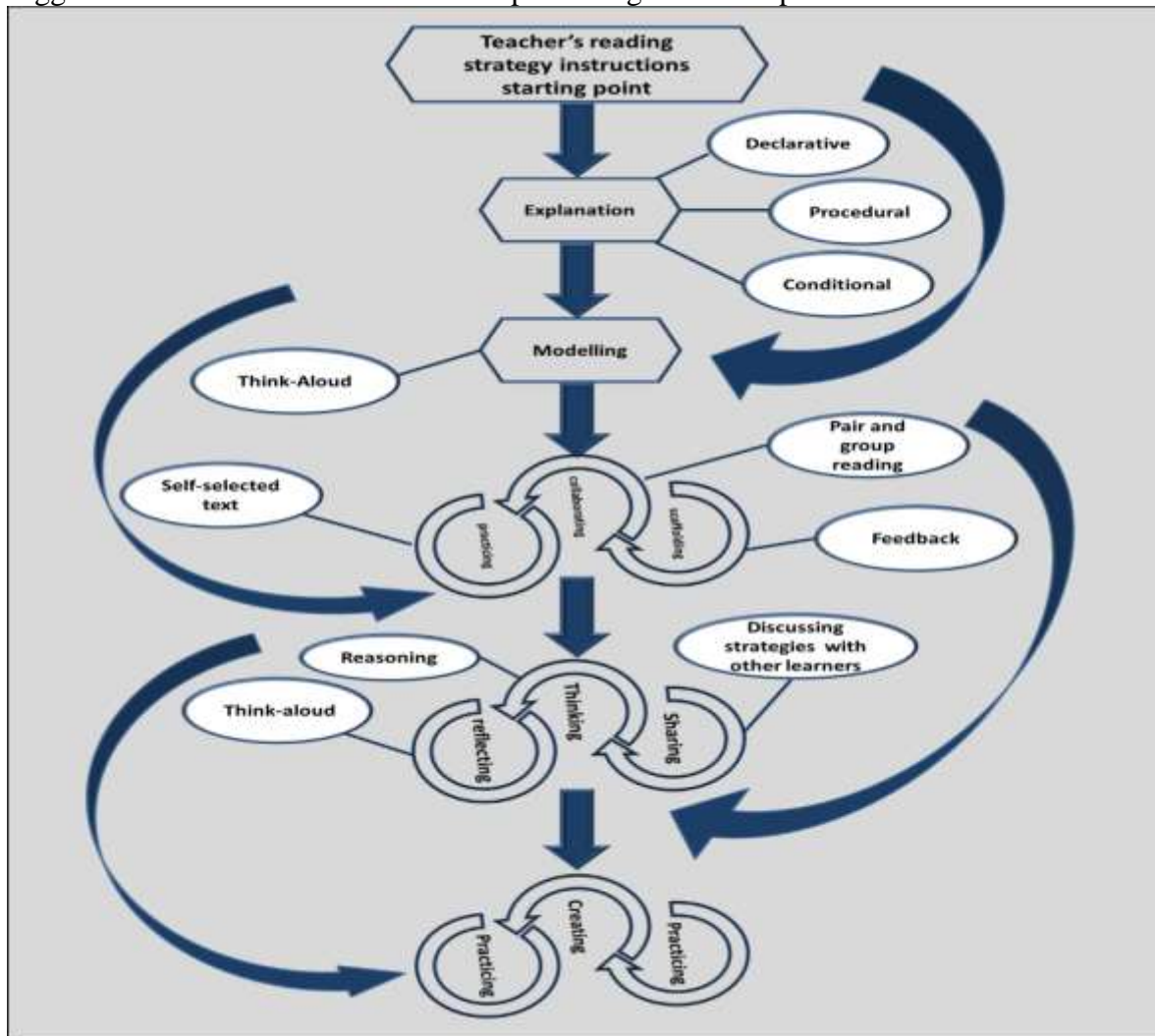

Figure 6: A Proposed model of a teacher's reading strategy instruction

Explanation. Before the actual reading, the teacher provides explicit descriptive knowledge about the reading strategies to be taught, including declarative, procedural and conditional knowledge. This knowledge is based on the type of strategy, why it is used, when it is used and how to implement it in a specific situation along with why it is helpful and how to perform the strategy in order to raise the readers' awareness of on-screen reading sub-strategies, hierarchal interaction with on-screen text and associated strategies. Modelling. After the explanation process, the teacher demonstrates the strategy by performing a think-aloud exercise, vocalising thoughts that occur while reading. In other words, the teacher models the cognitive processes that occur while interacting with a text using the models. Practising, collaborating and scaffolding. During reading, readers read and practise the taught strategy in pairs or in groups using self-selected texts. During this process, the teacher plays the role of a guide; scaffolding learners' reading strategies. The teacher provides the learners with feedback and enables them to evaluate their own use of

strategies. Over time, the teacher gradually transfers responsibility for interaction to the learners themselves until they are capable of engaging in the process entirely on their own. Reflecting, thinking and sharing. After reading the text, the teacher encourages the learners to think aloud and to reason strategically when they encounter barriers to comprehension when reading. Readers think about and discuss mental processes and cognitive strategies, creating interactive exchanges between learners in the classroom. Practicing, creating and practicing. At the end, readers should be able to create their own style of interacting with e-texts effectively and practicing it.

Teaching L2 reading
To date, a solid understanding of how to teach reading strategies in terms of L2 on-screen reading instruction in the 21st century is lacking, just as there is a lack of understanding of the concept of digital academic strategy literacy (DASL). The question of what makes teachers of reading skills successful needs to be addressed. What is needed to make teaching on-screen reading comprehension strategies effective in order to achieve the maximum positive impact on learners? In the current study, three fundamental factors involved in successful digital academic strategy literacy instruction are presented and briefly discussed. In this regard, for on-screen reading teachers ought to consider the following recommendations:

a.   Integrating technology into reading lesson classrooms and
b.   Implementing a suggested on-screen reading teaching pedagogy
Technological reading classrooms: Enhancing digital academic strategy literacy (DASL). In order to enhance students' on-screen reading and DASL; to allow them to be able to make use of digital affordances while reading and to adapt students to read on-screen either in their home country or when they travel abroad to complete their studies, the following recommendations should be followed:
a.   Teach DASL for students as a core skill alongside writing, listening and speaking.
b.   Allow students to bring and use their own electronic devices to practice reading and to exchange information about the different devices they use to read.
c.   Include e-readers in classrooms and motivate learners to use them. It would be beneficial for reading teachers to include e-reader devices in their classrooms (if the funding is available) or to provide reading classes at workstations equipped with computers and screens.
d.
Teachers need to encourage learners to read from multiple sources on-screen to enable them to assemble ideas on a specific topic from varying points of view. In reading for specific academic purposes, reading instructions should be based on readers' self-selected texts to boost readers' content schema. Teachers should instruct students to apply the taught strategies and practise using them on their own self-selected texts. The teacher gives learners a task and the associated strategies to achieve specific reading purposes, and then the students practise and extend these strategies to their own self-selected texts and employ different strategies based on their own needs and preferred reading styles. The results of the current study reveal that the actual process of reading requires not a single strategy at a time but rather involves a combination of associated strategies. Thus, teaching ought to include lessons on how to use particular combinations of strategies in addition to one at a time.

CONCLUSION

This paper extends knowledge of a sub-element of digital literacy, namely digital academic strategy literacy (DASL). It suggests that digital academic strategy literacy (DASL) refers to a group of literacies that are associated and interacted both independently and simultaneously. This involves information literacy and computer literacy (ICT literacy). Together, these literacies fall under the bigger umbrella of digital literacy. Readers need competence and capabilities in terms of information and computer/ICT literacies to achieve competence and capabilities in digital academic strategy literacy (DASL). These include on-screen reading strategies, use of digital affordances, employing both reading processes; top-down and bottom-up, interacting with the academic text according to the hierarchal order and the associated reading strategies and practicing digital academic reading to master it.

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