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Development of Digital Literacy—Translanguaging and Transmedia Note Taking Formats for Academic Reading

Abstract

Generative note taking, being one of the strategies applied to manage difficult texts, requires not only comprehension and selection of information but also production. The current study focuses on note taking formats for a text read with the intention to summarize. Its focal aim is to improve both practical and theoretical understanding of this activity. It involves the investigation into note taking behaviors of 103 second-year English Department students, how they, as readers of FL, engage with complex texts, how they were instructed in note taking and what note taking strategies they employ for comprehending academic texts.

The analysis of the collected data attempts to identify how readers' (n = 103) translanguaging and transmedia (n = 103) note taking formats help increase their engagement in and access to difficult texts in L2. It shows that the subjects have not transitioned from the paper interface to the digital one, since they still display the screen inferiority effect in their reading habits. The collected data shows that only some subjects (n = 42/103) received some form of instruction in paper note taking techniques or digital applications facilitating note taking. The students were not able to enumerate more than four note taking applications which would be conducive to their formation of a coherent interpretation of the digital text they read.

The author contends that overt note taking instruction in both paper and digital mode will create avenues for encouraging, interacting and engaging in reading. Instruction in that field needs to be modified with regard to digital note taking/annotating tools to make use of the note taking formats available for processing digitally interfaced texts.

Keywords: note taking, screen inferiority, reading strategies, note taking applications, translanguaging

Digital Literacy—Instruction

Literacy instruction is under challenge to change because the pedagogies have to be integrated with students' everyday technology practices. Students do not only need to excel in paper but also digitally interfaced texts, drawing information from a text and forming coherent interpretation of it (Grabe & Stoller, 2020). One of the strategies aiding the formation of coherent interpretation of the text is note taking (Muller & Oppenheimer, 2014; Morehead et al., 2019). An analysis of note taking has a potential to illustrate the process of forming coherent interpretation of texts. Long before having access to the digital interfaces, readers' process of paper-based interpretation text was accompanied by physical actions of a reader such as using bookmarks, tracing the text with a finger or pencil, making notes on the margins, that is, annotating, plain scribbling or doodling. Such interpretation facilitating tools appearing as comments on the margins (marginalia) can be traced back to 500 B.C. in the form of scholia (Dickey, 2007), which contained additional clues to the interpretation of the texts that they accompanied.

Now, with education shifting into the online realm, we have to take into consideration Lorenzo and Dzuiban's (2006, p. 2) claims that "students aren't as net savvy as we might have assumed." The problem is that students might not be savvy in interaction with paper text either. Both paper and digital note taking formats need to be overtly taught to foster digital literacy that will support learning and skills, allowing students to manage enormous amounts of information that they have to filter and organize to form coherent text interpretations.

The paper begins with a brief characteristic of the reading purposes and a discussion of the imprecise use of the terms note taking and annotating for reading in both paper and digital interface. Next, the research on the use of translanguaging and transmedia note taking formats as well as the increase in cognitive effort conducive to the engagement in reading a text is reported. Then the collected data is presented and discussed. The conclusions from the present study indicate that students have to be provided with environments in which they can both build knowledge and increase their skill-sets to manage difficult texts, thus teaching implications involve an overview of available digital note taking applications conducive to interpretation of digitally interfaced texts.

Note Taking Techniques in Reading to Integrate Information and Write

Undoubtedly, students must be equipped with strategies to cope with difficult texts (Afflerbach et al., 2008; Grabe, 2009; Chodkiewicz, 2015; Kiszczak & Chodkiewicz, 2019; Grabe & Stoller, 2020). Strategic readers begin with a purpose for reading and recognize that different goals require different types of reading (Schwanenflugel & Knapp, 2016, p. 219) and—consequently varied note-taking techniques. Grabe and Stoller (2020) enumerate the following purposes of reading: (i) reading to search for simple information; (ii) reading to skim quickly; (iii) reading to learn from texts; (iv) reading to integrate information; (v) reading to write (or search for information needed for writing); (vi) reading to critique texts and (vii) reading for general comprehension. All of the enumerated purposes will require generative note taking, however, for the purpose of the present study only reading to integrate and to write will be taken into consideration.

Generative note taking (summarizing, paraphrasing, concept mapping) requires three important activities: comprehension, selection of information and production (Piolat et al., 2004). The major function of taking notes is to gather and transmit information conveyed in a text that needs to be remembered (Armbruster, 2000; Piolat & Boch, 2004). In academic contexts, manipulating and anticipating relevant information are crucial because a note taker has to judge (Middendorf & Macan, 2002) and make decisions on what to prioritize (Castello & Monereo, 1999). Note taking in reading to integrate information and write requires the ability to select, critique, and compose information from a text. Thus, in the case of note taking with the purpose of summarizing the text, notes constitute the first step of the composition, as it requires additional decisions about the relative importance of complementary, mutually supporting, or conflicting information and the likely restructuring of a rhetorical frame to accommodate information from multiple sources (Grabe & Stoller, 2020).

The reader/note taker has to remember points of comparison or opposition, assess the relative importance of the information, construct a framework in which the information will be organized, and establish the main theme (Grabe & Stoller, 2020), thus note taking techniques may take the forms of substitutive techniques like mathematical (=) or iconic (→; ←; ↑; ↓, *), which are used not only to increase the speed of note taking (Piolat et al., 2004) but also to facilitate the hierarchy of items in lists; or to transform the physical formatting of a linear text into special organization of notes (Piolat, 2001). Comments referred to in literature as annotations (Marshal, 1997, p. 132) may take the forms of near or in the text markings, which record interpretive activity as the

result of careful reading. Marshal (1997, p. 134) views them as a visible trace of a reader's attention, a focus on the passing words, and a marker of all that has already been read.

As writers, note takers must select the information to record and format it in ways that differ from the source material (Pilat, 2001). Thus, notes may take the form of marginal jottings and interpolations—being the record of an interpretive activity; highlighting; underlining; circled words or phrases (Marshal, 1998) and help trace the progress through a difficult narrative.

Translanguaging and Transmedia Note Taking Formats

The use of mother tongue or other languages that one knows while taking notes has not been thoroughly investigated, however, Chaudron et al. (1994) and Clerehan (1995), conducted research, showing that some note taking formats are automatized sufficiently to be transferred from one language to another, which might be conducive to their effectiveness due to the fact that the more deeply information is processed during note taking, the greater the encoding benefits (Kiewra, 1985). Unfortunately, due to the omnipresence of foreign language immersion learning programs—deliberately discouraging learners from using languages other than the target language in any activity connected with learning—the potential of L1 in developing L2 competence has been overlooked. Using L1 for note taking purposes has many advantages as it serves as a sheer reference and a straightforward access to the concepts that are already well rooted in the brain, where the memory systems are intertwined to support the learning process. García et al. (2017) indicated the salient purposes for the strategic use of translanguaging in education in general. For the present study, the use of L1 (or other languages that one knows better than the target language—at least in the context of the text read) is of high importance as such a use of the other languages supports the students in comprehension of complex content of texts written in the target language. Second of all, translanguaging provides opportunities for students to develop linguistic practices for academic contexts, and finally it makes space for students' bilingualism and ways of knowing. Vogel et al. (2018) expanded the definition of translanguaging treating the concepts not only as encompassing the linguistic resources individuals draw upon to make meaning, but also as the unique social actions enabled by the use of technology like sharing ideas in social networking and gaming as well as video sharing.

The increasing uses of digital media for information seeking greatly expand the importance of both translanguaging and transmedia abilities needed

to integrate information (Van den Broek & Kendeou, 2017). Readers have to manage texts acquired from multiple both print and online sources adjusting their note taking formats accordingly. As far as research on longhand vs. typed notes is concerned, it still displays screen inferiority effect (Kong et al., 2018; Singer & Alexander, 2017; Ślęzak-Świat, 2019) as it indicates to the fact that that annotation on paper integrates more smoothly with reading than the on-line one (O'Hara & Sellens, 1997). Further neurolinguistic research (Vinci-Booher et al., 2016; James, 2017) corroborates such integration, proving that handwriting connects more visual and motor networks in the brain being conducive to memorization and retrieval of concepts that are written down. Such observations are also in line with the research of Fiorella and Mayer (2017) as well as Luo and colleagues (2018), reporting that there is a greater number of images in longhand notes than the laptop ones. Despite the screen inferiority effect, the issue of digital annotating will have to be attended as most of reading is done on screen generating greater cognitive effort.

Cognitive Effort in Note Taking

The digital culture has fostered immediacy expectation (Perez-Vega et al., 2016), which has led to general problems with focusing and sustaining attention in reading (Salmeron et al., 2018). Nevertheless, human cognitive capacity will have to adapt to accommodate to the rapid digitalization of educational context. Annotations can serve as a visible trace of the reader's attention (Marshal, 1997)—the reader can support their attention by means of note taking when the text is difficult; they can chunk the text into pieces which are easier to interpret— displaying negotiation for meaning strategy. What is more, students report that they prefer reading their own notes because of the change of/in the register of the text into less formal language (Marshal, 1998). Surprisingly the immediacy expectation makes students choose longhand, paper format of their note taking. As Kellogg and Mueller (1993) indicate, writing by longhand is less effortful than using a word processor even for skilled typists and Gérouit and colleagues' (2001) research shows that taking notes from a digitally interfaced text is more effortful.

Note takers as readers have to interweave both comprehension and production processes (Piolat, 2005, p. 305). They first need to comprehend information and only then try to store it in the long-term memory by writing it down (Piolat, 2001). Thus, notes might be referred to as an external memory, whose content is more or less explicit (Piolat, 2005, p. 292)—facilitating inferencing, memorizing points of comparison or opposition and functioning as compre-

hension monitoring strategies. Yeung et al. (1997) indicated that note taking viewed as an external working memory is a means to decrease cognitive load during reading. Following the abovementioned view, it can be assumed that the major function of note taking is to capture and preserve information in a form that most conducive for the recall of ideas convey in the text. Siegel (2018, p. 86) defines effective notes as selective, organized and elaborating on ideas expressed by the text authors so that the note taker can learn in generative and constructive ways.

Salmeron and colleagues (2018) note that a new set of advanced reading skills emerges with digitally interfaced reading, including focused searching and navigating of hypertext and multimedia sources as well as integrating multiple sources of information. Skillful digital note taking (annotating and marking the text) would provide a scaffolding for the abovementioned skills and support working memory decreasing cognitive load during digitally interfaced texts.

Description of the Study

The present study attempts to address the following questions: what kinds of note taking training the students received and who delivered the instruction; in what language students recorded their notes; what motivated the students' choice of language of note taking; what the declared and recorded note taking habits of the students were.

The participants of the study were 103 University students aged majoring in English who were 20–23, taking the on-site/on-line course of Academic writing in the summer term of 2020. As regards their learning history, the majority of the subjects (39) had a long English learning history covering the period of 10–15 years. The remaining subjects were placed in two extremes labelled as "less than 10" and "more than 15 years," represented by 25 and 36 students, respectively.

The main areas investigated involve the subjects' note taking habits concerning texts that they need to summarize. The study involved collecting data from a computer-assisted questionnaire at the Moodle platform as well as collection of note taking samples that the subjects were supposed to prepare before writing a summary of an article they chose to work on during a term-long course of Academic writing. The articles of their choice were supposed to comply with the APA style sheets, they were of various length and content as they were chosen according to students' interests. The subjects were allowed to perform the task at their own pace so there was no time pressure involved. The summary was to

be submitted in a common (all study group had access to it) Google Document as one of the assignments required for obtaining the credit.

The subjects in the current study can be considered as experienced but not distinguished note takers as they declare to have been taking all sorts of notes since they were 12 ($n = 56$) and 16 ($n = 29$) years old, and those ($n = 18$) who do not take notes at all. Subjects declaring not to take notes were not really consistent in their statements, as this number declined with the answers provided for further, more detailed questions, for example, in the question about which language they chose for note taking, only eight ($n = 8$) persisted on the claim that they did not take any notes at all but then they ($n = 18$) declined to submit the assignment in which they were asked to take notes for the summary they were supposed to write during the next classes.

Out of the subjects who declare to take notes ($n = 74$), instruction on note taking was received by 42. Instruction was provided by an English language teacher ($n = 20$); a computer science teacher ($n = 5$), a YouTube tutorial ($n = 5$); a Polish language teacher ($n = 3$), a parent ($n = 2$), self-study ($n = 2$); a schoolmate ($n = 2$); a website ($n = 1$) and the remaining two indicated others, unfortunately without listing them. As far as instruction of note taking in electronic documents is concerned, only three subjects ($n = 3$) reported to have received some form of instruction, enumerating the following note taking applications: Evernote, Onenote, Google Keep and Simple Note. None of them mentioned the application allowing for electronic annotating and note taking in Google document that the group has worked on throughout the summer term of 2020, tools like, among others, Stoplight Annotator, Highlight Tool, which are free, easily accessible Google documents add-ons.

Results and Discussion

The results presented and discussed demonstrate two areas of note taking conditions involving translanuaging and transmedia practices. The analysis found evidence for the discrepancy between what was declared by subjects in their questionnaire and what they performed in their notes taken. It is worth discussing these interesting facts in the light of the note taking applications available to digital readers.

Translanguaging Note Taking Practices

As regards the language the notes were taken in, most of the subjects de-
clared to use both L1 and L2 (*n* = 67). The group subdivides into those who
conditionally use either L1 or L2 (*n* = 52) depending on their goals, and those
who mix the two languages. Table 1 shows the categories of conditions of
language choice depending on the goal of the note taker.

Table 1.

The conditions of language chosen for notes taken to summarize a text in L2

I take notes in L1 (Polish) if …	I take notes in L2 (English) if …	Number
I have to memorise a lot of information quickly	I have ample of time to study	21
I need deeper explanation	I take general notes	17
I want to understand the text better	I want to see a particular phrase in context	15
I can't find a word in English	I need full, proper definition of a word	6
There is a word I don't know	I make general notes	3
I find the word useful	There is no good translation	2

As far as the condition for L1 choice for note taking is concerned, the goal-
oriented group can be categorized into representing three most salient choices:
the selection of L1 is determined by effective memorization of information
and shortage of time (*n* = 21) in contrast to the abundance of time for the use
of L2; issues relating to detailed explanation (*n* = 17) and general note taking,
and comprehension improving/monitoring (*n* = 15) in contrast to the need of
contextualizing a given word/phrase. The collected results indicate the fact that
the subjects strategically use translanguaging to take notes in a most efficient
and time-saving way.

Those who opportunistically mix the two languages (*n* = 15) substantiate
for their choice with the following arguments:

— opting for the language that is more conducive to memorization (*n* = 6):
    Polish or English depending on which of them is easier to memorize;
— their need for knowing the equivalents in both languages (*n* = 4): *I like to
    know equivalents in both languages*;
— linguistic economy (*n* = 2): *I mix English and Polish to make my notes
    shorter*;
— convenience (*n* = 1): *in whichever language it's easier*;
— immediacy of registering the idea (*n* = 1): *in language the idea comes to
    me first*;

— for thorough comprehension ($n = 1$): *in any language that allows me to understand it correctly.*

The group of subjects opting only for L2 notes when reading a text in L2 provided the following categories of arguments, which overlap with those given by the abovementioned groups. As far as the group declaring to use only L2 for their notes, they ($n = 24$) divided into the following categories:

— convenience ($n = 8$): *it is easier to take notes in English*;
— improved comprehension ($n = 2$): *because they are easier to comprehend in the same language*;
— consistency, being further subdivided into:
  • read in L2—think in L2 ($n = 7$): *the text is in English, so my thoughts are in English when reading it*;
  • L2 text—L2 notes ($n = 4$): *if a given text is in English then it's easier to make notes in the same language*;
  • L1 would be confusing ($n = 2$): *I think that taking notes in Polish would confuse me*;
  • L2 summary L2 notes ($n = 1$): *because it is easier to summarise the main topic if it is in the same language.*

Just like in the groups conditionally and opportunistically using translanguaging, in the group declaring to use Polish only, it is done mostly for facilitating purposes as the subjects ($n = 4$) claim that*: if I find the text difficult—polish notes help me understand the text* (original spelling); *to translate difficult vocabulary*; *the meaning is not clear enough*; *because it helps to focus on the main points.*
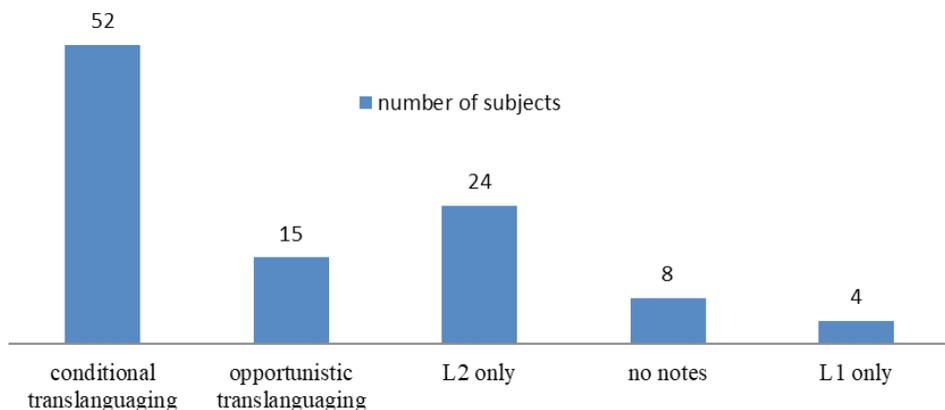
Figure 1. Language chosen for note taking (annotating)

Interestingly enough, out of those who initially declared not to take notes ($n = 18$) in the question concerning the use of L1 or L2 language for notes

only ($n = 8$) of them persisted on not taking notes at all ($n = 4$), claiming that it was unnecessary ($n = 1$), they did not see a point in taking notes ($n = 1$). Two of them ($n = 2$) declared that they do not take any notes apart from new vocabulary which allowed for determining the inconsistencies in their answers.

Transmedia ote Taking Practices

The choice of note taking strategy starts with the decision of printing the text to be read ($n = 75$) and only 28 subjects decided not to print the article they were required to summarize.

The group of subjects who decided to print the text emphasized first of all the physical aspect (i.e., eye fatigue, touch of paper, ease of navigating the text) of a paper copy that was important for them ($n = 21$): *I find it easier to work with a text when I hold it physically*, then general preference ($n = 14$), speed of taking notes ($n = 13$): *It's much faster to scribble something down than to open a program, choose a tool, and THEN scribble*; convenience ($n = 12$); conducive to concentration ($n = 10$): *It's easier for me to follow the text on paper*; improving comprehension ($n = 7$): *It helps me to understand better*; conducive to memorization ($n = 4$): I find it more effective to write right next to the tasks and writing helps me memorize; more organized ($n = 1$): *much less hassle*.

The answers provided by the group of subjects who did not decide to print ($n = 28$) can be categorized into those ecologically oriented ($n = 6$): *I'd rather go green*; *Paper is made from dead trees*; *Paper saving*; *I am eco-friendly* and those ($n = 6$) for whom the PDF document is enough. The next category with answers relating to being more technology oriented ($n = 5$) claims: *I think that it is high time to start working while using technology*; *I prefer digitalized version as my handwriting is bad and I write faster on a keyboard*, and there is a group of subjects who have an electronic device allowing for paper-like experience when taking notes ($n = 4$): *I have an electronic version on my iPad*. As in the previous groups, there is a group of subjects choosing an electronic note taking format out of convenience ($n = 4$) *Google Doc work became easier*, and general, not substantiated, preference ($n = 3$).

After having collected 85 note taking samples (18 subjects consistently declined taking notes, they even asked to do it as an assignment required for a credit) the notes can be divided into those generated on a separate piece of paper, printouts, e-text (pdf, print screen, referencing mode), and word-processing document (Microsoft Word). An interesting phenomenon is that only ten subjects (7.5%) out of those who decided to print it out ($n = 75$) decided to take notes on their printouts. It illustrates the fact

that note taking is strategic and purpose driven, as subjects adjusted the preferences to the purpose of writing a summary which had to be typed. Contrary to the declared reading preferences, most subjects ($n = 33$) decided to take notes in an electronic form. Figure 2 shows the distribution of the subjects' choices across the interface the subject chose for note taking. Neither the digitally-oriented nor the Word processing groups chose any of the enumerated note taking applications, neither of them chose the format of Google Document that is automatically supplemented with note taking applications such as Stoplight Annotator, Highlight Tool, MindMeister, and Lucidchart.
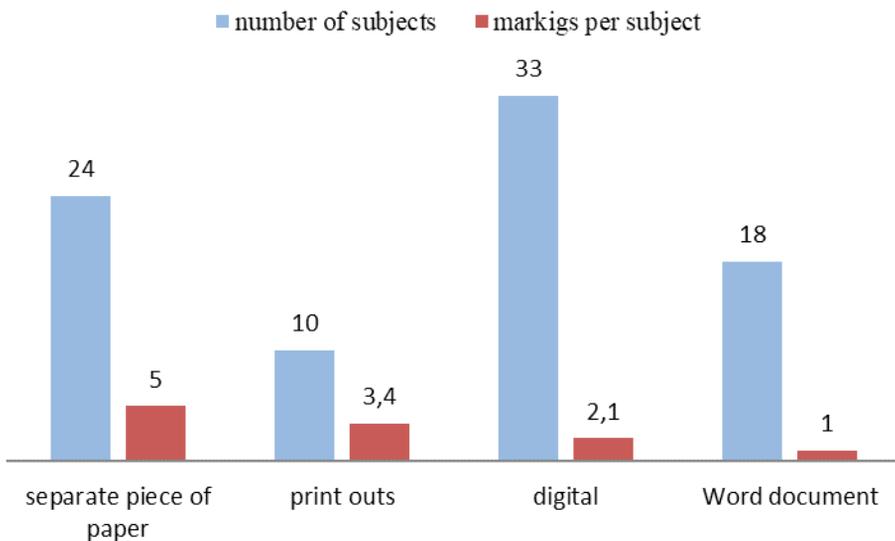
Figure 2. Interface chosen for note taking and average number of markings for a subject in a chosen interface.

As far as the diversity of the formats of markings in note taking is concerned, the greatest number ($n = 119$) was generated by the group who chose to take notes on a separate piece of paper then the digitally-oriented subjects followed with ($n = 70$), and those who chose to take notes on printouts ($n = 34$) and the least note-taking marking was registered in the group who took their notes on a word processed document ($n = 18$). It turns out that the most note-taking, flexible, and generative—as far as markings are concerned—were those who chose the paper interface for their note taking with average of four markings for a single note taker.

As for the formats of markings, they involve: paraphrase as a comment, character change (size, color, format of fonts), arrows (indicating the relationships between the concepts), lists, underlining, key words, color underlining,

highlighting, non-linear (e.g., change of writing from horizontal into vertical), graphic representation, mathematical symbols, exclamation marks and circling. Thus, when it comes to the registered formats of the marking ($n = 13$) used in the notes, the group who chose a separate piece of paper for their note taking medium was the largest ($n = 13$), which was followed by the printout ($n = 9$), word processing ($n = 6$) and with electronic ($n = 4$) as the last one. It adds up to the paper superiority phenomenon not only in reading but also in note taking, showing that it allows for grater creativity and less linearity of the note taking formats allowing to express concepts in radiant mind mapping fashion that allows for the categorization of the concepts presented in a linear text to become areas and allowing to prepare the conceptual map of the processed text Table 2 presents the formats of note taking marking for a given preference group.

Table 2.

Categories of note taking markings for a given note taking preference group

Markings	Separate piece of paper	Printouts	Digital	Word document	Total
paraphrase	24				
paraphrase as a comment		6	23	9	62
character change	17	3		2	22
arrows	14	4	2	2	22
lists	15	2		2	19
underlining	6	6	6		18
key word	12	3		2	17
underlining colour	10	3	2		15
highlighting	6	5		1	12
non-linear	6				6
graphic representation	6				6
mathematical symbol	1				1
exclamation mark	1				1
circling		1			1
Total	118	33	33	18	202

As Table 2 shows, a plain piece of paper allows for the greatest number of operations and manipulations of the ideas the note taker as a reader wants to present. As a result, it generates more engagement in the text. Paraphrasing, in all of the preference groups, is the most often used marking format of reference to the text. The next two in popularity are character changing and the use of arrows. They seem to be like the posts directing the note taker's

attention to the issues of interest, showing the relationships and connection between facts—they are also used together with lists (which were also very highly applied markings), allowing for hierarchical representation of the text. The next two important formats of note taking are key words and underlining with coded colors.

It is important to note here that when subjects were asked in the questionnaire about in what ways they indicated points of importance in the text, the answers they provided were not overlapping with the ones that were registered during their actual performance. The five categories that they enumerated were highlighting ($n = 73$), underlining ($n = 48$), paraphrasing ($n = 33$) and circling ($n = 18$). The abovementioned results highlight that students know little about note taking formats and their use is more intuitive than strategic. Thus, increasing awareness of the possible note taking formats will lead to more skillful and effective use of them, resulting in an improved ability to select, critique, and compose information from a text.

As far as the content of the comments provided near and within the text is concerned, most of the registered comments involved paraphrases of the text read ($n = 25$) identifying relationships to other concepts ($n = 8$) and key words ($n = 5$), which illustrate the interpretive activity as the result of careful reading and indeed show traces of a reader's attention.

Note Taking Applications

Once subjects craft commenting, the following note taking applications can be recommended: Evernote, Microsoft OneNote, Google Keep, and Simplenote. Their functionality and effectiveness shows best on a shared screen illustrating how it can be applied and tailored to the needs of paper-oriented subjects. Mastering their functionality may help in the transition from paper to digital note taking, preventing the screen inferiority effect. The four note taking applications enumerated by subjects, Evernote, Simplenote, Microsoft OneNote, and Google Keep are free applications whose functionality would cater for diverse needs and preferences of note takers.

When outlining the functionalities of the abovementioned note taking applications, it is Evernote which is the first and the most popular one. It is an application allowing for saving web pages for offline use as well as creating notes and tags. Notes can be accessed on laptops, mobile devices and through the web. It supports a wide variety of note types (text, images, audio memo, sketches, scanned documents, checklists, and clipped web pages). It also has tools for organizing and searching notes as well as its search text function in images. It can constitute a powerful note taking tool for subjects who rely on the use of key words which are a popular note taking tool in the present study

among paper-oriented subjects and hardly used among those taking notes digit-
ally. Both groups would benefit from an overt training in tagging (key word)
functionality, which is also available in Simplenote, which is accessible across
devices for working on text only. It has simpler interface than Evernote, which
makes it easy to keep track of notes and tags.

Then, having in mind that most of the subjects in the present study are
paper-oriented in their note taking, Microsoft OneNote is a note-taking ap-
plication that mimics paper and can help in transition to electronic note tak-
ing for those who are paper-oriented. Creating a new note involves clicking
anywhere on the page and adding content to that spot, just as if working
with paper. For the note takers relying on non-linear graphic representations
of their track of thought as well as those who use a lot of arrows this is the
application tailoring to their needs as sketches can be drawn. Note takers who
use a lot of color codes will also benefit from it as a background for notes
looks like textured or lined paper. A text can be typed and images and file
attachments can be dragged and dropped into notes. For note takers basing
their notes on highlighting, there is a digital highlighter; those who like to
create lists (that was a very often used marking in paper oriented subjects)
can easily create checklists in OneNote. As each note is meant to appear
like a piece of paper, it can be moved around the page, placing a sketch
memo next to a block of text. There is one feature which undoubtedly may
be appealing to both paper and digitally oriented note takers, namely, opti-
cal character recognition (OCR) that can make all the writing searchable. It
is important to highlight that for every note there is a record of its version
history and there is an ink-to-text feature lets handwritten text be converted
to type.

Finally, the simplest in use because of moderate functionalities is Google
Keep. Its interface has a form of digitized Post-it Notes (there are 12 bright
colors for each note that can be categorized). Note taking is done by typing,
drawing, or adding an image. It is used as the Google Keep Chrome extension,
URLs, text, and images can be saved while browsing the web. Everything that
is saved in Google Keep stays synced across all platforms. The most outstand-
ing feature of electronic note taking is the possibility of having them recorded
and searched through in a systematic way.

Apart from applications working independently from a browser, there are
also such that function as extensions to browsers (Liner, Weava Highlighter,
Super Simple Highlighter, Multi-highlight, Yellow highlighter pen for web) or
Google Document add-ons. They allow for highlighting the content of web
pages and tagging them with the key words. Google Documents, which were
used by the subject of the study, is accompanied with a number of applications
that can be downloaded, for example, Stoplight Annotator (simple comment-
ing tool), Highlight Tool, MindMeister (allows for mind map like note taking),

Lucidchart (for those who take notes in list-like fashion). Unfortunately, none of the subjects used them. Figuratively speaking, it is as if using only a pencil having a pen case full of other writing utensils and never using or just trying them out.

Conclusions and Teaching Implications

The results of the present study confirm that note taking formats are individual "writing signatures" (Van Waes & Schellen, 2003) and that "more heterogenous view of taking notes" would be beneficial for learners of English (Badger et al., 2001, p. 406). Notes are idiosyncratic signatures, however, signing requires knowing how to write. Knowing how to write requires training, which is planned and controlled. To develop handwriting, hours must be spent on tedious, repetitive exercises and, likewise, in the case of developing note taking, marking techniques would be conducive to the development of students' abilities to select, critique, and compose information from the text. Thus, students must be offered a range of opportunities to choose from so as to tailor it to their needs.

As far as the use of L1 in note taking is concerned, the obtained results show what potential it offers. The subjects' translanguaging practices provide fluid connections between the learned concepts without narrowing students' range of thought. In the case of note taking, the richness of information that a student is exposed to and the speed and reliability of the note that are being made are important. A particular piece of information that is being recorded in notes is to trigger memories in the form of words which facilitate recall. Translanguaging practices provide students with transitions they make between what they know and what they are yet to master. Unfortunately, these are only translation programs which focus on L1; however, the results obtained indicate to their encoding (improved memorization) and better comprehension benefits, confirming that the more information is processed and manipulated during note taking, the greater the encoding and organization benefits for the generated summaries in terms of integration of conceptual items expressed by specialized academic vocabulary.

Now, having so many applications available, the choice of them constitutes individual signature. Note taking while reading might be regarded as hyperlinking the text to the note taker's ways of knowing, which allows for constructing means by which new information is integrated with the existing knowledge and personalizing the text in a way that is meaningful to the reader. Lack of overt instruction on how to take notes presents possibilities of improving literacy in

general, be it paper of digitally interfaced. In the case of digital reading, such training will improve in general using, evaluating, and managing digital texts. To facilitate learning, technology needs to support it in authentic ways. Thus having collected data on the subjects note taking formats, building instruction on note taking can be built on what students already know without imposing on them solutions that would not be practical or feasible for them and for lecturers/teachers.

Instructing how to take notes, that is, decomposing texts into smaller components, has to be taught by providing a scaffolding for assigning significance to information processed. Such scaffolding can be provided by, for example, Annotation Studio (www.annotationstudio.org), which is an open source web application with commenting tools immediately accessible to students and lecturers. It facilitates the process of visualization of the readers' approach to texts in the context of commenting it on the screen as both the lecturer and students can see the comments made. The visualizations provided by the application show instructors which passages generate most interest or difficulties.

Yet another tool for social digital reading and commenting is *eComma*, which is a plug-in that works with most learning management systems such as Canvas, Blackboard or Moodle, it allows a group of users to annotate the same text together and to share their annotations with each other. Highlights can overlap. To distinguish which note corresponds to which highlighted passage, both light up when either is under the mouse cursor. If a passage of text corresponds to more than one note, both light up. Each annotation is associated with a specific username.

Considering a forced and accelerated transition of education into the digital realm, the collected data indicate that students' shift into digital note taking is not as rapid as could be expected. There was hardly any shift in students' note taking habits, which means that pedagogies must be focused on facilitating the transition to digital interface to model the effective use of different media platforms and teaching how to leave one's own trace on them to form a coherent interpretation. Thus, overt training on note taking on texts, images, and videos must be done to train students on dealing with performing reading tasks in digital media. Future research should consider the potential of note taking applications in developing not only digital but also general literacy.

References

Afflerbach, P., Pearson, P. D., & Paris, S. G. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher, 61*, 364–373.

Annotation Studio (2017). www.annotationstudio.org

Armbruster, B. B. (2000). Taking notes from lectures. In R. F. Flippo & D. C. Caverly (Eds.), *Handbook of college reading and study strategy research* (pp. 175–199). Lawrence Erlbaum Associates.

Badger, R., White, G., Sutherland, P., & Haggis, T. (2001). Note perfect: An investigation of how students view taking notes in lectures. *System, 29*, 405–417.

Castello, M., & Monereo, C. (1999). Strategic knowledge in note-taking: A study in high education. *Infancia y Aprendizaje, 88*, 25–42.

Chaudron, C., Loschky, L., & Cook, J. (1994). Second language listening comprehension and lecture note-taking. In J. Flowerdew (Ed.), *Academic listening: Research perspectives* (pp. 75–92). Cambridge University Press.

Chodkiewicz, H. (2015). Some insights into the academic reading experience of English philology students. *Konin Language Studies, 3*(1), 9–30.

Clerehan, R. (1995). Taking it down: Note taking practices of L1 and L2 students. *English for specific purposes*, *14*(2), 137–157.

Dickey, E. (2007). *Ancient Greek scholarship: A guide to finding, reading, and understanding scholia, commentaries, lexica, and grammatical treatises*. Oxford University Press.

Fiorella, L., & Mayer, R. E. (2017). Spontaneous spatial strategy use in learning from scientific text. *Contemporary Educational Psychology*, *49*, 66–79.

García, O., Johnson, S., & Seltzer, K. (2017). *The translanguaging classroom. Leveraging student bilingualism for learning*. Caslon.

Gérouit, C., Piolat, A., Roussey, J. Y., & Barbier, M. L. (2001). Coût attentionnel de la recherche d'informations par des adultes sur hypertexte et sur document papier. In M. Mojahid & J. Virbel (Eds.), *Actes du 4 Colloque International sur le Document Electronique* (pp. 201–215). Europia production.

Gross, M. D. (1996). The electronic cocktail napkin-computer support for working with diagrams. *Design Studies, 17*, (1), 53–69.

Grabe, W. (2009). *Reading in a second language: Moving from theory to practice.* Cambridge University Press.

Grabe, W. & Stroller, F. L. (2020). *Teaching and researching reading.* Routledge.

Igo, L. B., Bruning, R., & McCrudden, M. T. (2005). Exploring differences in students' copy-and-paste decision making and processing: A mixed-methods study. *Journal of Educational Psychology, 97*, 103–116.

James, K. H. (2017). The importance of handwriting experience on the development of the literate brain. *Current Directions in Psychological Science, 26*, 502–508.

Kellogg, R. T., & Mueller, S. (1993). Performance amplification and process restructuring in computer-based writing. *International Journal of Man-Machine Studies, 39*, 33–49.

Kiewra, K. A. (1989). A review of note-taking: The encoding storage paradigm and beyond. *Educational Psychology Review, 1*, 147–172.

Kiszczak, A., & Chodkiewicz, H. (2019). Text-based student questioning in EFL settings: Long-term strategy implementation in reciprocal reading tasks and its perception. *Theory and Practice of Second Language Acquisition, 5*(2), 39–57.

Kong, Y., Seo, Y. S., & Zhai, L. (2018). Comparison of reading performance on screen and on paper: A meta-analysis. *Computers & Education, 123*, 138–149.

Lorenzo, G., & Dziuban, C. (2006). Ensuring the net generation is net savvy. *Educause Learning Initiative*, ELI paper 2.

Luo, L., Kiewra, K. A., Flanigan, A. E., & Peteranetz, M. S. (2018). Laptop versus long-hand note taking: Effects on lecture notes and achievement. *Instructional Science*, *46*, 1–25.

Marshall, C. (1997). Annotation: From paper books to the digital library. In *Proceedings of the ACM Digital Libraries '97 Conference* (pp. 131–140). Philadelphia, PA.

Marshall, C. (1998). Toward an ecology of hypertext annotation. In *Proceedings of ACM Hypertext '98* (pp. 40–49). Pittsburgh, PA.

Middendorf, C. H., & Macan, T. H. (2002). Note-taking in the employment interview: Effects on recall and judgments. *Journal of Applied Psychology,* 87(2), 293–303. https://doi.org/10.1037/0021-9010.87.2.293

Morehead, M., Dunlosky, J., & Rawson, K. A. (2019). How much mightier is the pen than the keyboard for note-taking? A replication and extension of Mueller and Oppenheimer 2014. *Educational Psychology Review, 31*, 753–780.

Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard: advantages of longhand over laptop note taking. *Psychological Science, 25*, 1159–1168.

O'Hara, K., & Sellen, A. (1997). A comparison of reading paper and on-line documents. In *Proceedings of CHI'97* (pp. 335–342). Atlanta, Georgia (March 22–27, 1997).

Perez-Vega, R., Waite, K., O'Gorman, K. (2016). Social Impact Theory: An examination of how immediacy operates as an influence upon social media interaction. *The Marketing Review, 16*(3), 299–321.

Piolat, A. (2001). *La prise de notes* [Note Taking]. Presses Universitaires de France.

Piolat, A., & Boch, F. (2004). Apprendre en notant et apprendre à noter. In E. Gentaz & P. Dessus [Learning by Taking Notes and Learning to Take Notes] (Eds.), *Comprendre les apprentissages. Psychologie cognitive et éducation* [Understanding Learning. Cognitive Psychology and Education] (pp. 133–152). Dunod.

Piolat, A., Kellogg, R. T., & Farioli, F. (2001). The triple task technique for studying writing processes: On which task is attention focused? *Current Psychology Letters. Brain, Behavior and Cognition, 4*, 67–83.

Piolat, A., Olive, T., & Kellogg, R. T. (2005). Cognitive effort during note taking. *Applied Cognitive Psychology, 19*, 291–312.

Salmerón, L., Strømsø, H. I., Kammerer, Y., Stadtler, M. & van den Broek, P. (2018). Comprehension processes in digital reading. In M. Barzillai, J. Thomson, S. Schroeder, & P. van den Broek (Eds.), *Learning to read in a digital world* (pp. 91–210). Benjamins.

Sanchez, R. P., Lorch, E. P., & Lorch, R. F. (2001). Effects of headings on text processing strategies. *Contemporary Educational Psychology, 26*(3), 418–428.

Schwanenflugel, P., & Knapp, N. (2016). *The psychology of reading: Theory and applications*. Guilford Press.

Shulmann, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–22.

Siegel, J. (2018). Did you take "good" notes?: On methods for evaluating student note taking performance. *Journal of English for Academic Purposes, 35*, 85–92.

Singer, L. M., & Alexander, P. A. (2017). Reading on paper and digitally: What the past decades of empirical research reveal. *Review of Educational Research, 87*(6), 1007–1041.

Ślęzak-Świat, A. (2019). Complementarity of reading from paper and screen: Development of critical thinking. *Theory and Practice of Second Language Acquisition, 5*(2), 75–93.

Van den Broek, P., & Kendeou, P. (2017). Development of reading comprehension. In K. Cain, D. Compton, & R. Parilla (Eds.), *Theories of reading development* (pp. 283–305). Benjamins.

Van Waes, L., & Schellens, P. J. (2003). Writing profiles: The effect of the writing mode on pausing and revision patterns of experienced writers. *Journal of Pragmatics, 35*, 829–853.

Vinci-Booher, S., James, T. W., & James, K. H. (2016). Visual-motor functional connectivity in preschool children emerges after handwriting experience. *Trends in Neuroscience and Education, 5*, 107–120.

Vogel, S., Ascenzi-Moreno, L., & García, O. (2018). What counts as a literacy act? Examining pedagogical spaces created through digital translanguaging. In J. Choi & S. Ollerhead (Eds.), *Plurilingualism in teaching and learning: Complexities across contexts*. Taylor & Francis.

Wylie, J., Thomson, J., Leppanen, P., Ackerman, R., Kanniainen, L., & Prieler, T. (2018). Cognitive processes and digital reading. In M. Barzillai, J. Thomson, S. Schroeder, & P. van den Broek (Eds.), *Learning to read in a digital world* (pp. 57–90). Benjamins.

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**Die Entwicklung von digitalen Kompetenzen –
sprach- und medienübergreifende Notiztechniken für akademisches Lesen**

Z u s a m m e n f a s s u n g

Generatives Notieren, eine der Strategien zur Bewältigung komplizierter Texte, erfordert nicht nur das Verstehen und die Selektion von Informationen, sondern auch die Produktion. Die vorliegende Studie befasst sich mit Notiztechniken für einen Text, der mit der Absicht gelesen wird, ihn zusammenzufassen. Ihr Hauptziel ist es, sowohl das praktische als auch das theoretische Verständnis der Tätigkeit zu verbessern. Sie umfasst die Untersuchung der Art und Weise, wie 103 Studierende des zweiten Studienjahres im Fachbereich Englisch Notizen erstellen, sich als fremdsprachige Leser mit komplexen Texten auseinandersetzen und in Notiztechniken unterrichtet worden sind sowie der Strategien, die sie zum Verstehen von akademischen Texten anwenden.

Ziel der Analyse der erfassten Daten ist herauszufinden, wie sprach- und medienübergreifende Notiztechniken den Lesern (*n* = 103) dabei helfen, ihr Engagement für bzw. Verständnis von komplizierten fremdsprachigen Texten zu verbessern. Es zeigt sich, dass die Probanden vom Papiernotizbuch zu digitalen Notizen nicht übergegangen sind, weil der Bildschirm in ihren Lesegewohnheiten immer noch eine inferiore Stellung hat. Die erhobenen Daten weisen darauf hin, dass nur ein Teil der Probanden (*n* = 42/103) in irgendeiner Form in Notiztechniken auf Papier oder digitalen Anwendungen zur Erleichterung des Notierens unterwiesen worden ist. Die Studenten waren nicht imstande,

mehr als vier Notizanwendungen zu nennen, welche für die Erstellung einer kohärenten Interpretation des von ihnen gelesenen, digitalen Textes förderlich wären.

Die Autorin der Arbeit behauptet, dass ein offener Unterricht in Notiztechniken, sowohl auf Papier als auch in digitaler Form, zur Förderung, Interaktion bzw. zum Engagement beim Lesen beitragen würde. Der Unterricht müsste im Hinblick auf digitale Notizanwendungen bzw. Anmerkungswerkzeuge entsprechend modifiziert werden, um die für Bearbeitung von digitalen Texten verfügbaren Notiztechniken in Anspruch zu nehmen.

Schlüsselwörter: Notieren, Unterlegenheit des Bildschirms, Lesetechniken, Notizanwendungen, Translanguaging