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Predictors of Online Research Skills to Reduce Copy-paste: An Intervention in Middle Schools

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Abstract
The complexities of Internet sources have caused more challenges to school students, leading them in many cases to copy-paste ideas into their written assignments. Facing these challenges requires adopting and implementing evidence-based practices. This article builds on a mixed-methods, quasi-experimental study which investigated the effect of Internet Reciprocal Model (IRT) to lessen occurrences of copy-paste trend in the writing pieces of Grade 8 ESL students (n = 172) in three private schools in Saida, Lebanon. Eight teachers were randomly assigneed to experimental and control conditions along with their respective classes. The researchers collected pre and post-data on online research and comprehension assessment tool. Supported with current research and informed by the principles of the social-cognitive, socio-cultural, and the new literacies theories, regression analyses revealed a strong positive degree of association at post-test between the intervention and the subscale that measured copy-paste trend, indicating that teaching online research skills through one comprehensive model would decrease the copy-paste behavior. Theoretical and pedagogical implications were discussed. Recommendations for school policies and further research were provided.
Keywords: copy-paste trend, online research skills predictors, middle school, ESL/EFL, regression
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I. Introduction

Academic writing is confined to processes and rules. When students submit any written assignment for academic purposes, they are requested to use their own words and acknowledge original authors (Burg et al., 2007). However, the task of writing from sources is not an easy endeavor and requires much practice of different skills, labelled as research skills, whether students use print or Internet sources. In fact, the lack of these skills has caused many students to write assignments irresponsibly (Howard & Davies, 2009), a phenomenon labelled as plagiarism.

Actually, with the increase in the usage of Internet sources, the issue of plagiarism has become more complicated since students have immediate access to an array of sources (Pecorari & Petric, 2014). This access, considered by some teachers as more engaging and authentic (Fidaoui et al., 2010; Ghaith & Awada, 2014, as cited in Awada & Diab, 2016; Simon, 2015), has been a fertile ground for the emergence of a phenomenon labeled as *online plagiarism* due to the easiness of copy-paste feature available on the Internet (Howard & Davies, 2009). Even the usage of the term, *online plagiarism*, has been arguable, and many other terms have been suggested such as *"textual borrowing*", "*patchwriting"*, "*language re-use*" (Pecorari & Petric, 2014).

This has led many researchers to propose integrating effective practices within the curriculum to teach the skills of writing from Internet-hyperlinked sources. These skills include, but are not limited to, the ability to locate online sources, read information on websites, use self-regulated strategies when distracted by hyperlinks, and synthesize the information (e.g., Castek et al., 2015). These skills are currently labeled as new literacies of online reading and comprehension (Castek, et al., 2015; Leu et al., 2014), with many attempts to frame online reading as a web-based inquiry which involves the skills and strategies to generate a research question, locate needed information, evaluate it, and properly make use of it through synthesizing it into an original product. At the international level, policy initiatives have been taken to embed these skills in the national standards (in some countries such as Australia, Canada, and USA as cited in Leu et al., 2014). In the context of Lebanon, most research has been descriptive in nature both at university (Bacha & Bahous, 2010) and school level (e.g., Bacha et al., 2012; Fidaoui et al., 2010).

2.Theoretical Framework and Review of Literature

2.1 Theoretical Framework

Many theories could have informed the present study. However, three theoretical perspectives have been of

interest to the researchers as they are proper for application in classroom contexts. In fact, this study has foundations in the views of Vygotsky's (1978) socio-cultural theory. Specifically, the principles of instructional scaffolding and ZPD are mainly reflected in the Internet Reciprocal Teaching (IRT) model. This 3-phase model provide teachers with practices to foster an environment for teacher-student and student-student interaction as described later in this paper. Further, the present study draws from notions of the socio-cognitive theory of Bandura (1986) regarding the affirmative relation between modeling and achievement. Through the IRT model, teachers are required to explicitly model the skills and allow students to practice them through the three phases of the model. A third, but major perspective that guides the present study is that of new literacies of online reading and comprehension whose theorists and researchers (e.g., Leu, Kinzer, et al., 2013), coined *"online reading comprehension"* to reflect the Internet search and comprehension strategies leading to adopting a new perspective that frames new literacies of online reading and comprehension as a "problem-based inquiry" which requires new strategies, social practices, and skills to have students identify important questions, "then locate, critically evaluate, synthesize, and communicate" possible responses on the Internet" (Leu & kinzer et al., 2013, p. 325; International Reading Association, 2009), which led them later to coin the term online research and comprehension skills to reflect this process (e.g., Castek et al., 2015).

2.2 Review of literature

2.2.1 Plagiarism in the Internet Age

With the advent of Internet technology, a vast amount of information has become available for students' use and many students resort to these sources for academic purposes (Barlow, 1994; Boltler, 1991 as cited in Sutherland-Smith, 2008; Pecorari & Petric, 2014). For example, in a study by Sutherland-Smith's (2008), 91% of 186 university students in Australia reported using these sources for writing. Reports indicated that 93% of children and teens use the Internet mainly for accessing information (Putman, 2013).

However, a debate has emerged in media and literature regarding this use since some researchers have identified a relationship between the Internet, as a source for information retrieval by student-writers and its contribution to an increase in plagiarism (Pecorari & Petric, 2014; Sutherland-smith, 2008). Some researchers considered the role of the Internet itself as the main contributor to this increase in plagiarism (Balingit, 2008; Campbell, 2006; Sutherland-Smith, 2008). Universities reacted by revising student guides, adding supporting tips, and providing instructions on the new demands (e.g., *Harvard Study Guide* written by Burg et al., 2007).

However, a thorough examination of existing research reveals that plagiarism has always been a global issue (Pecorari & Pteric, 2014). Such perspectives have led other researchers and composition theorists in the field of English as a Foreign Language (EFL) and English as a Second Language (ESL) to argue against considering the Internet as a main factor for any increase in plagiarism. Some researchers have claimed that the Internet is not the direct cause, clarifying that this tool has paved the way for those who already plagiarize to increase their habit (e.g.,Sutherland-Smith, 2008). Others have seen plagiarism as rooted in the lack of language proficiency or research skills within the new social context, asserting that the availability of Word processors and access to an array of online sources have led student-writers to copy ideas directly from Internet sources (Flowerdew & Li , 2007).

Composition theorists have admitted that Internet plagiarism is really critical because it risks the main objective of writing assignments which intends to develop students' thinking and communication skills. However, they have argued that students would plagiarize due to their inability to find a proper way to express their ideas using their own words. They have attributed the issue to the lack of instructional practices that would help student-writers develop online research skills: (a) locating, (b) reading, (c) evaluating, (d) summarizing/paraphrasing, and (d) citing. They recommended uprooting the issue of copying words or ideas from the Internet by examining current instructional practices and developing ones that catered to the needs of the 21st -century learners (Howard & Davies, 2009-2016; Houth, 2017)

In literature, the term copy-paste trend is emerging as a new definition of textual plagiarism where students might unintentionally copy phrases or whole sentences from sources due to their lack of language proficiency and research skills (e.g., Flowerdew & Li, 2007; Howard & Davies, 2009-2016). Sisti (2007) coined this term in his study to refer to students' unintentional plagiarism. He surveyed the perceptions of 160 high school students (Grades 9-12) from 5 schools in Philadelphia and Pittsburgh area schools. His results indicated that 35% reported they copied and pasted ideas from the Internet sources without attribution. They justified their behavior for having no time (28%), inability to write a text using many sources by themselves (26.3%); and teachers' lack of clear instructions about plagiarism (14%). Lack of confidence and competency, inability to paraphrase, feasibility and adequacy of Internet text, and peer pressure emerged as additional factors in Sisti's (2007).

In Lebanon, the context of the present study, similar concerns exist. However, most of the studies in Lebanon, except for the study of Esseili (2019), have concentrated on examining academic integrity in general, with no or little focus on online research skills and on copy-paste trend (e.g., Bacha et al., 2012; McCabe et al., 2008). Studies remain at the level of exploring the awareness of students and instructors both at university

(Bacha & Bahous, 2010; McCabe et al., 2008) and school (Bacha et al., 2012) levels, even though researchers have emphasized and recommended teaching source use practices as an appropriate pedagogical approaches to address it (Esseili, 2019; Fidaoui et al., 2010). Interestingly, these skills are echoed in Lebanon's National Educational Technology Strategic Plan (The Ministry of Education and Higher Education, 2012).

2.2.2 Plagiarism Reduction Techniques

Studies reveal that plagiarism reduction techniques revolve around two different approaches: the reactive and the proactive (Pecorari & Petric, 2014). The first approach involves punishing the plagiarist assuming that the issue can be deterred through anti-plagiarism software such as Turnitin. In fact, Chris Harick, vice president of marketing for Turnitin, reported that institutions who subscribed to this tool saw 30% decrease in plagiarism occurrences, and after years 3 and 4, a 70% decrease (Glazer, 2013).

However, the reactive technique has been criticized as weak by those who perceive the power of education to correct the negative behavior (e.g, Houth, 2017; Howard, 2007; Sisti, 2007). This perspective, combined with researchers' interest to investigate students' actual performances in writing assignments while maintaining the teacher-student collaborative relationship, has prompted many researchers to seek a proactive pedagogical approach. (Pecorari & Petric, 2014). For example, as a professor of Rhetoric at the University of Syracuse, Howard's (2007) main argument against the reactive technique that seeks solutions through a machine, such as Turnitin, is based on three main pedagogical reasons: (a) a machine cannot teach ethics, (b) a machine does not help teachers detect whether students do it intentionally or not, and (d) a machine creates a sort of battle between teachers and students where "the students have to prove themselves innocent before their work can be read and graded" (Turner, 2014, Accident Vs. Intent section). Others have further discussed the technical drawbacks of this software. Fishman, an executive director of Academic Integrity Center, confirmed such a view, for he stated that students' use of the Google Translate option to translate an article from one language to another and then back into English is a way to avoid original wording (as cited in Glazer, 2013).

As a result, many researchers have called for adopting pedagogical approaches to teach online research skills so that students could succeed in academia and real life (Evering & Moorman, 2012; Howard & Davies. 2009-2016). This call has led to the emergence of new approaches that explicitly (a) teach about the issue and how to avoid it; (b) teach how to deeply read and write from these sources; and (c) use appropriate citation and referencing. In some cases, these approaches were combined, as is the case in this study, to gain a deeper pedagogical implementation (Pecorari & Petric, 2014). Most of these researchers are composition theorists who have affirmed that literacy instruction should be revised based on the way students acquire knowledge and think. They perceive today's students as well-experienced in using social media but their experience in this field does not help them practice the skills of comprehending the text, analyzing, paraphrasing, evaluating, and synthesizing (Howard & Davies, 2009-2016).

2.2.3 Teaching Source-Use Practices as a Reduction Technique to Copy-Paste Trend

Many Researchers view that the most effective method to abate this issue is by adopting the proactive technique, engaging students in inquiry-based instructions, and rethinking assignments and practices of research (Evering & Moorman, 2012; Ma et al., 2007). Despite such perspectives, the empirical work in this area tends to focus either on providing descriptive explanations of classroom practices or exploring students' perceptions. (Howard et al., 2010).

In a university context, Evering and Moorman (2012) have provided descriptive accounts of their classroom practices while guiding future teachers to design their instructions. Arguing that plagiarism is a social construct, they have shared an example of one explicit instructional practice they designed for their undergraduate teachers. They have started with an instructional conversation about academic integrity, copyright, citation rules, and building upon others' ideas versus theft etc. To gain deeper understanding, they have encouraged teachers to find examples of writers who built upon others' work. They used a two-column note strategy to scaffold the future teachers learning while practicing writing from Internet sources. In the first column, they were asked to type their thesis statement and the supporting main ideas; in the second column, they had to copy and paste the supporting details they googled for each main idea with the appropriate link. Then, they used the written notes to create an original essay, paraphrased the ideas using their own words, and provided an appropriate citation. In-class discussions focused on using APA style format, selecting and evaluating sources, and paraphrasing texts from Internet sources. The main purpose for teaching correct citation in their class revolved around the significance of "anchoring writers' ideas to theory and existing research in the field" (Evering & Moorman, 2012, p. 40). Researchers concluded with final thoughts about the significance of modeling the use of digital tools explicitly, "with the expectation that students will use them to engage in writing that produces coherent, thoughtful, and interesting discourse" (p. 43).

Empirical research regarding the effectiveness of explicit instructions to reduce occurrences of textual plagiarism was examined by Chao et al. (2009) who used several interventions to reduce the impact of plagiarism in written texts at a University level using a nonequivalent control group quasi-experimental design. One of the interventions used in their study was designed to scaffold students' learning by employing strategies

of explicit teaching and modeling. Their findings indicated that the quantity of plagiarized text was very high in the control group (18 out of 33 students-55%), and their regression analysis which intended to examine the relation between type of intervention and amount of plagiarism indicated the effectiveness of an intervention that provides explicit teaching and practices about plagiarism, paraphrase skills, and Turnitin. Same results with little variations were obtained in Houth's (2017) dissertation. Using a quantitative quasi-experimental design, the researcher intervened with a 4-hour plagiarism avoidance workshop on 43 first-year college students in Southern Colorado, after using a questionnaire that included specific criteria to recruit his 43 participants to avoid covariate effects. The participation questionnaire helped measure his participants' voluntary readiness to participate in this workshop and their background knowledge and experiences in the field, which were considered as covariates in his study that might twist the findings. However, another trainer delivered the lessons to avoid the researcher's bias.

As evident in literature, using digital tools is considered of interest to today's students (Fidaoui et al., 2010) since they comprised part of their everyday social life (Prensky, 2001; Putman, 2013). However, due to increased access, they tend to demonstrate copy-paste trend. Findings indicated that techniques of writing properly from sources should start at a younger age to help these students develop them as a habit instead of finding the process tiresome at later stages. Additionally, the findings of these studies demand an understanding of the new social context posed by the Internet and a need for an appropriate approach to teach the new skills of the new literacies, whose lack has been linked to copy-paste plagiarism (Evering & Moorman, 2012)

2.2.4 Internet Reciprocal Teaching, the Intervention in this Study

There is enough empirical evidence that the Internet Reciprocal teaching model (IRT), the intervention employed in the present study, is an effective model for teaching the skills of reading and writing properly from internet sources. The meta-analytic review of 16 studies conducted by Rosenshine and Meister (1994, as cited in Castek, 2017) indicated the large positive effect size of this model, with median effect sizes that ranged between 0.34 and 0.60 on tests designed by teachers. This effect size reached .88 on experimenter-designed tests (Castek, 2017). It is the most efficient model which has been previously employed by researchers at the middle and elementary levels (Castek, 2017; Robbins, 2010), and thus, it is more suitable to the context of the present study.

The IRT model was a result of a 3-year project entitled "Teaching Internet Comprehension to Adolescents" (TICA). TICA team piloted and refined it after controlling for all variables that would affect the results (Henry et al., 2012, as cited in Castek et al., 2015). The researchers designed the IRT model based on theoretical perspectives that underpin the Reciprocal Teaching (RT) model due to the empirical data that confirmed its effectiveness as an effective instructional model (Robbins, 2010). They modified many components of the original RT Model after piloting IRT in middle school language arts, middle school science classrooms, self-contained classroom, and preservice teacher education. Thus, some of the changes addressed the new complexities of reading hyperlinked texts online, while others meant to address all learners in the class with different learners' needs since the RT was designed for a small group of struggling readers. The final IRT model was created in three phases "that differ in degrees of strategy complexity, level of student responsibility for teaching and modeling for others, and degrees of independent inquiry and use" (Castek, 2017, p. 212).

Through the three phases, teachers provide students with many scaffolding activities within their Zone of proximal development (ZPD). Phase 1 includes mainly teacher-led discussion with a focus on basic skills of Internet use with teachers' use of high levels of scaffolding techniques and group work skills to create an engaging environment by inviting students to share their knowledge (Castek et al., 2015; Kingsley, 2011). Phase 2 of the model includes exchange of online research and comprehension strategies while the teacher and students engage in reciprocal exchange of ideas. Gradually, teachers' lessons present students with problem-based learning linked to the curriculum, and teachers explicitly employ moderate scaffolding techniques and gradually decrease their role and talk to let students engage with the task. In this phase, teachers model and scaffold instructions on the strategies of (1) questioning, (2) locating, and (3) critically evaluating before (4) shifting to synthesis and communication (Castek, et al., 2015; National Reading Conference, 2008 as cited in Robbins, 2010). In this phase, students learn how to effectively communicate findings through emails, blogs, and other ICT tools while thinking of audience and purpose (Castek et al., 2015). However, this part of the model was discarded since it is beyond the scope of the study, and instead, students communicated their ideas through written work to measure the frequency of occurrences of copy-paste from the Internet

Many studies were conducted to investigate the effectiveness of the IRT model in classroom contexts in primary and middle schools employing either mixed methods quasi-experimental design (e.g., Castek, 2008; Robbins, 2010) or quasi-experimental design (Ali, 2017; Kingsley, 2011). In the context of Egypt, Ali's quasi-experimental study in Grade 10 EFL students in Tanta during the first term of the academic year yielded significant results on all the skills of online research and comprehension ($\rho < .05$). Kingsley's (2011) quasi-experimental study at a middle school ($n = 418$) was conducted in Grade 5 in the United States; she randomly assigned teachers into experimental and control conditions and supported them with instructional materials (e.g. 13 online reading comprehension lessons and PowerPoints). She controlled for the preexisting differences

between the groups on pre-tests mean scores of standardized tests of traditional reading comprehension and on online research and comprehension assessment tool (revised ORCA) using ANCOVA analysis to remove the effects of the previously mentioned covariates. Her results indicated a greater statistical difference ($p < .05$) in favor of the experimental group. Additional analysis was conducted to scrutinize the effect of the intervention on the individual skills of locating, evaluating, and synthesizing, and significant differences between the experimental and the control group, in favor of the former, were revealed on the skills of locating and synthesizing ($p < .05$) using MANCOVA analysis. However, her study did not investigate the variables that best predict performance on online research skills measurement, specifically communicating ideas from online sources through written work with less occurrences of copy-paste trend.

3. Purpose of the Study

This article reported on the results of a quasi-experimental design which was employed to investigate the strength of the relationship between the first three components of the Online Research and Comprehension Assessment measure (Locate, evaluate, synthesize) and the fourth component of this measure (communicate ideas responsibly) which measured the occurrences of copy and paste trend**.** Thus, this part of the paper addresses the following research question:

1. How well do the first three individual measures of the Online Research and Comprehension tool, “locate”, “evaluate, and “synthesize” predict the performance of the fourth individual measure, “communicate ideas responsibly” as compared to the effect of the intervention?
    a. To what degree, if any, do these three measures affect students’ performance on the fourth subscale after the intervention, “communicate ideas responsibly”?
    b. Which is the best predictor of “communicate ideas responsibly”?

4. Methodology

This section of the article describes the methodology used in carrying out this part of the original study.

4.1 Research Design

This part of the study reported the results of the quasi-experimental pre-test /post-test design with non-equivalent control group as a quantitative approach to scrutinize the relationship between the variables [1] through testing hypotheses and making conclusions deductively (Creswell & Plano Clark, 2018). In this part the researcher investigated the effect of instructional lessons, designed based on the IRT model, on students’ performance on copy-paste reduction assessment[2].

4.2 Site and Selection of Schools

The study was implemented in three private high schools in the south of Lebanon using purposeful sampling in terms of bilingual curriculum, schedule flexibility, Internet connection, and co-educational school systems. Confidentiality was maintained by using pseudonyms (School A, B, and C).

4.3 Participants and Sampling Technique

Participants were Grade 8 EFL students ($n = 172$; 86 females and 86 males) along with 8 teachers. Most of them came from the same geographical area, had similar socioeconomic status, and were frequent Internet users. In all, the experimental classes included 118 students (2 sections per school) and the control classes included 57 students (one at each school). In order to identify to whom the findings of the present study might generalize (Graham & Harris, 2014), the intervention, the researchers of the present study conducted initial informal interviews with teachers and found out that they were equivalent (similar working experience, educational level, use of technology, and knowledge of their students’ Internet practices). All teachers were females, with a range of experience between 5 and 15 years. Each teacher, along with her intact class, was randomly assigned to treatment conditions (Gay et al., 2012). Prior to the intervention, these teachers received training on the implementation of the IRT model.

[1] The independent variable/predictors were the scores of Locate, Evaluate, and Synthesize, whereas the dependent variable was the scores of Communicate Ideas responsibly- which measures copy-paste behavior

[2] Online research skills are measured in terms of ORCA assessment measure. ORCA is composed of four individual measures/subscales, each of which measures a distinct skill of online research using a 5-scale scoring rubric. ORCA tool can be one composite score. The individual measures are: “locate”, “evaluate,” “synthesize,” and “communicate ideas responsibly.” The fourth factor, communicate ideas responsibly measures the frequency of copy-paste trend from Internet hyperlinked sources..

4.4 Measures

4.4.1 Pre-test/Post-test Revised Online Research and Comprehension Assessment (ORCA)

Revised ORCA measured whether the IRT model of instructin was effective on the gain of students' mean scores of online research and comprehension skills from pre-test to post-test . Castek (2008), the author of the original version designed it based on the perspectives of new literacies to obtain exact data on the performance of students on the skills of new literacies listed as follows :(1) ask questions, (2) locate online information, (3) evaluate such information, (4) synthesize information from different sources, and (5) communicate ideas to audience via online tools. ORCA instrument has a rating scale for each of these skills, which students had to show after having the pre-test/post-test ORCA performance tests/tasks. The researcher of the present study modified the five tasks originally designed by Castek to measure the five skills into two long missions where each included two tasks, with two steps each. Another essential revision was made on the rubrics that measured "communicate ideas", which was changed with "communicate ideas responsibly" to measure frequency of occurrences of copy-paste in students' written work. Revisions were also made to the score for each level scale to obtain a unified level of scoring scale (0-4) for each ORCA subscale A specialist in the field examined the content validity, while the reliability of the overall ORCA instrument revised for this study used in the present study was calculated at .71, indicating a high level of internal-consistency among items (Hinton et al., 2004).

Supported by existing empirical evidence regarding the relationship between the online research skills instructions (as one comprehensive model) and copy-paste reduction (e.g., Houth, 2017) and in response to the recommendations uttered in several other studies to examine this relationship (e.g., Fidaoui et al., 2010; Howard & Davies, 2009), the researcher in the present study identified the scores of the three subscales of revised ORCA (locate, synthesize, and evaluate) as contributing factors to the performance of the fourth subscale of ORCA (communicate ideas responsibly)-trying to explore their relevancy to the scores of communicate ideas responsibly. The researcher also aimed to investigate whether such relevancy and contribution would significantly change from pre-test to post-test as a result of the intervention

4.4.2 Pre-test/Post-test ORCA Informational Tests

The performance on a two-mission test titled "Kids Need Sleep." was measured using ORCA tool. The topic of the lesson was selected from the students' science book after conversing with the science and English language teachers. Each mission was composed of two tasks. In each task, students were asked to: (1) locate a source moving from simpler to more complex searching skills, (2) search for the main reasons kids have to sleep, (3) Identify ways that could help kids sleep without taking medicine, (4) evaluate critically the sources in terms of accuracy by finding at least one more site with similar information to support and confirm their answers, (5) summarize the ideas using their own words and providing proper citation. Two science and Language teachers validated the content and readability levels of online websites and pages.

4.4.3 Intervention lessons on Online Research Skills

Intervention lessons used in the present study were adopted from Kingsley (2011) following the three phases of the IRT model: (a) Phase I, teacher modeling; (b) Phase II, guided practice; and (c) Phase III, independent inquiry. The lessons were: (1) Nuts and Bolts, included activities that supported students with the basic skills needed to navigate the Internet; (2) Questioning, activities guided students to build a research question using Eagleton and Dobler's (2007) flow chart of the topic, theme, and focus; (3) Searching, included activities for strategies to search the web such as using appropriate key words; (4) Critical Evaluation, focused on the critical evaluation skill; and (5) Synthesizing and Communicating Ideas Responsibly Using Own Words, included activities to paraphrase ideas from more than one source using own words and citing references using an online platform, to generate a good end reference

4.5 Control Group

The control groups at the three schools completed activities related to their units such as exploring websites, getting information, etc. However, they were not provided with instructions on the skills of online research using the IRT lessons

5. Results

Collected data were first prepared on Excel. Then, they were cleaned for accuracy and missing cases were removed using listwise deletion. All files were then entered to the Statistical Package Social Sciences (SPSS) version 23 for running descriptive and inferential statistical analyses. To determine if the two groups were comparable and no initial potential differences on variable of interest exist , Independent- samples t-tests were run on the ORCA pre-assessment measure prior to implementing the intervention. Results of the data obtained from the Independent-samples t-tests revealed a statistically significant difference in scores of revised ORCA, where the experimental group reported a mean score (M = 1.58, SD = 0.31) higher than the mean score of the control group (M = 1.45, SD = 0.31); $t(170) = 2.68$, $\rho = .008$, CI [.04, .24].Such difference on was accounted for by including them as covariates in further statistical analyses. Following is a detailed analysis of the research

question.

5.1 Effect of the Intervention lessons on the Factors that Best Predict the Performance on Communicate Ideas Responsibly

This part of the study aimed to explore whether intervention lessons impacted the relationships between ORCA components and led to a decrease in the occurrences of copy-paste trend. Results of the studies (Chao et al., 2009; Houth, 2017) in addition to recommendations uttered in various research (e.g., Fidaoui et al., 2010; Howard & Davies, 2009) prompted the researchers in the present study to derive the hypothesis of an existing relationship between the online research skills instructions (as one comprehensive model) and copy-paste reduction. Thus, the researchers in the present study identified the scores of the three subscales of revised ORCA (locate, synthesize, and evaluate) as contributing factors to the performance of the fourth subscale of ORCA (communicate ideas responsibly), trying to explore their relevancy to the scores of communicate ideas responsibly. They also aimed to investigate whether such relevancy and contribution would significantly change from pre-test to post-test as a result of the intervention. To this end, they hypothesized that, due to the IRT model, a composite score (as a group /block) of the first three subscales of ORCA would predict the score on the fourth subscale rubric of the revised ORCA instrument, which measured copy-paste occurrences.

Given that, a multiple regression analysis using "enter method" was run at the pre-test and post-test level entering the mean scores of locate, evaluate, synthesize, and the group (dummy variable for the experimental group versus the control group) at once as equal possible factors of predicting the performance on communicate ideas responsibly. According to Pallant (2011), such method helps identify the extent this set of predictors "is able to predict scores on the dependent variable and "will also tell how much unique variance" each of the predictors "explains in the dependent variable *over* and *above*" the other predictors (p. 154). It is worth noting that including the *group* (dummy variable: experimental vs control) as a predictor at the pre-intervention period would reveal any selection bias. A moderate to high value in adjusted R^2 would indicate pre-intervention (initial) differences on these skills.

Results of the regression analysis prior to the intervention (see Table 5.1) included the adjusted R^2 (.140), ANOVA ($\rho < .001$) and the standardized β coefficient of each component variable. Relative to each other, pre-test mean scores of "evaluate" ($\beta = .217$, $\rho < .05$) and "locate" ($\beta = .201$, $\rho < .05$) exerted a positive influence (positive β) on "communicate ideas responsibly," while "synthesize" ($\beta = .077$, $\rho > .05$) and "group" (dummy variable) ($\beta = .079$, $\rho > .05$) exerted statistically insignificant results even though the positive β indicated that they both had a positive effect on "communicate ideas responsibly." Adjusted R^2 (.140) showed that the set of predictors accounted for 14% of the variance in students' performance on "communicate ideas responsibly", indicating a weak fit of the whole model (Muijs, 2004 as cited in Cohen et al., 2018).

Table 5.1. Linear Regression Table Investigating Possible Contributing Factors to the Performance on Communicate Ideas Responsibly at Pre-test

Dependent variable: Mean score of ORCA component "communicate Ideas Responsibly"; R^2=.160 ; Adjusted R^2 = .140; ($F_{(4, 167)}$=7.939 , $\rho < .001$)

Variable	*B*	*SE B*	*β*	*T*	*P*
(Constant)	.703	.048		14.510	.000
Synthesize mean	.023	.025	.077	.925	.356
Locate mean	.048	.020	.201	2.376	.019
Evaluate mean	.074	.025	.217	2.905	.004
Group	.024	.022	.079	1.073	.285

Note. *B*, unstandardized coefficient; *SE B*, standard error ; *β*, standardized coefficients; *Group*, the dummy variable (experimental vs. control)

However, the same regression analysis was conducted after the intervention entering post-test mean scores of locate, evaluate, synthesize, and the dummy variable (control vs. experimental) at once as potential contributors to the post-test mean scores of communicate ideas responsibly. The aim was to investigate whether the intervention affected predictors on "communicate ideas responsibly." Interestingly, the regression model yielded statistically significant effects. Findings are presented in Table 5.2.

As revealed in Table 5.2, " synthesize", "evaluate", and the "group" explained a significant amount of the variance in the post-test mean score of "communicate ideas responsibly" ($F = 230.183$, $\rho < .001$, $R^2 = .846$, Adjusted $R^2 = .843$). It was found that the "group" contributed approximately three times more than the mean score of "synthesize" and "evaluate" skills (Standardized Beta coefficient, $\beta = .633$, .181 and .117, respectively). In other words, relative to each other, the "group" exerted the greatest influence on 'communicate ideas responsibly' with 'synthesize' and 'evaluate' showing a small influence. In reference to adjusted R^2 (.843), this regression analysis revealed that the model accounted for 84.3% of the variance in the performance on "communicate ideas responsibly" post-test and indicated a strong fit (Muijs, 2004, p.164). Such results indicated that an increase in the scores of the "group" (dummy variable) would lead to an increase in the scores of

"communicate ideas responsibly."

Table 5.2 Linear Regression Table Investigating Possible Contributing Factors to the Performance on Communicate Ideas Responsibly at Post-test

Dependent variable: post mean Score of revised ORCA component "communicate ideas responsibly"; R^2 =.846 ; Adjusted R^2 = .843; ($F_{(4, 167)}$ = 230.183; ρ < .001)

Variable	*B*	*SE B*	*β*	*T*	*P*
(Constant)	-.040	.240		-.167	.868
Group	1.536	.126	.633	12.150	.000
Locate mean post-test	.124	.092	.066	1.343	.181
Synthesize mean post-test	.223	.073	.181	3.039	.003
Evaluate mean post-test	.116	.048	.117	2.439	.016

Note. *B* = unstandardized coefficient; SE B = Standard error ; *β* = Standardized coefficients; *Group*, the dummy variable (experimental vs. control)

With that, examining the results of the regression analysis conducted before (adjusted R^2 = 14%) and after the intervention (adjusted R^2 = 84.3%) revealed that the research hypothesis which assumed the existence of a positive relationship between the intervention lessons and students' performance on communicate ideas responsibly was supported. These results also supported the second hypothesis which assumed that the intervention, as compared to individual measures of "locate", "evaluate", and "synthesize" (the first three variables of the revised ORCA) would be the best predictor of students' performance on communicate ideas responsibly. In other words, it would have the most significant positive effect (as a group/ block/one composite score) on the scores of the fourth subscale of ORCA, communicate ideas responsible (which measured occurrences of copy-paste trend in students' answers).

To validate the results and control for pre-test scores of all variables, further multiple regression tests using different regression models were run. In one of these regression models, all pre-test scores of the predictors (locate, evaluate, synthesize) and the dependent variable (communicate ideas responsibly) and all post-test scores were entered in the equation. Results of this regression model yielded a significant model (Adjusted R^2 = 84.2 %). In another sample, pre-test scores and post-test scores of the predictors were entered along with the "group" (dummy variable: experimental vs. control) without entering the pre-test scores of the dependent variable (communicate ideas responsibly). Results yielded another significant model (adjusted R^2 = 84.3%). Interestingly, all regression models yielded similar effects, which confirmed the results of the regression test analyzed in this paper where adjusted R^2 was 84.3%. This indicates that pre-test scores had no significant effect on the performance on "communicate ideas responsibly." It also confirmed the strong effect of the IRT intervention on developing such performance.

In short, after the intervention, the set of predictors explained 84.3% of the variance in the dependent variable "communicate ideas responsibly," which measured the occurrences of copy-paste behavior from Internet texts. Results also revealed a unique contribution of the "group" (dummy variable: experimental vs. control) over and above the rest of these predictors. Thus, the set of "locate", "synthesize", "evaluate", and "the group" (as predictors) and "communicate ideas responsibly" (as a dependent variable) moved in the same direction. Since the "group" had the most influence, this suggests that any increase in the effect of IRT intervention would lead to an increase in the scores of "communicate ideas responsibly."

5.2 Validity of Scoring the Revised ORCA Instrument

To attain the accuracy of scoring revised ORCA, Intra-class correlation (ICC) using a two- way random-effects model was obtained. This model would serve the purpose of generalizing the reliability of findings "to any raters who possess the same characteristics as the selected raters in the reliability study" (Koo & Li, 2016, p. 157). Results are displayed in Table 3.

Table 5.3. Results of ICC Calculation for All Subscales of Revised ORCA: Two-Way Random Effects Model

		95% CI		*F Test with True Value 0*			
Scale	*ICC*	*Lower Bound*	*Upper Bound*	*Value*	*df1*	*df2*	*P*
Locate pre-test	.968	.942	.984	63.305	38	38	.000
Locate post-test	.893	.805	*.943*	18.510	38	38	.000
Synthesize pre-test	.869	.764	.929	13.911	38	38	.000
Synthesize post-test	.977	.956	.988	91.827	38	38	.000
Evaluate pre-test	.826	.694	.905	10.466	38	38	.000
Evaluate post-test	.897	.809	.945	19.649	38	38	.000
Communicate ideas responsibly pre-test	.800	.649	.890	8.778	38	38	.000
Communicate ideas responsibly post-test	.983	.968	.991	58.968	38	38	.000

Note*: ICC* = intra-class correlation coefficient; *CI* = confidence intervals; *df* = degree of freedom; Interpretation of ICC: < 0.50, poor; between 0.50 - 0.75, fair; between 0.75 - 0.90, good; above 0.90, excellent (Koo & Li, 2016)

6. Discussion and interpretation

As stated earlier, this paper reports findings of a larger mixed-methods, quasi-experimental study. The research question in this paper sought to answer how the IRT intervention impacted the factors that best predicted the performance on communicate Ideas responsibly from pre-test to post-test. This question was crafted as a response to the recommendations of researchers (e.g., Fidaoui et al., 2010; Harwood, 2010, as cited in Pecorari & Petric , 2014) who suggested that providing instructions on how to "locate", "synthesize", and "evaluate" Internet sources would develop students' performance on these skills, which would in turn lead to a decrease in copy-paste trend. Most importantly, the question was crafted based on the perspectives of proponents of new literacies theory (e.g., Castek et al., 2015) and composition theorists (Howard & Davies, 2009) who argued against teaching the skills of online research as discrete, proposing that teaching them within one comprehensive model would lead to the development of these skills as well as to less occurrences of copy-paste trend. The next section discusses the findings of this assumption.

Results of the multiple regression analysis conducted prior to implementing IRT intervention indicated that only the subskills of locate and evaluate explained a significant amount of the variance in the mean scores of communicate ideas responsibly ($\rho < .001$); however, the whole regression model indicated a weak fit, with adjusted R^2 accounting for 14 % of the variance in student performance on communicating ideas responsibly (Muijs, 2004, as cited in Cohen et al., 2018). As for the regression analysis conducted at post-test, results revealed that the whole regression model accounted for 84.3 % (adjusted R^2) on the variance of communicate ideas responsibly. Such results indicated a sizable gain as compared to the pre-test. With regards to the contribution of each predictor, a significant positive effect of evaluate subskill, synthesize subskill, and the experimental intervention ($p < .05$) was noticed. However, the effect of the intervention was encouraging, showing the greatest contribution to the variance of communicate ideas responsibly ($\beta = .63$, $\rho < .001$). Such results indicated that the "group" (experimental vs. control) effectiveness changed at post-test due to the intervention. Another improvement was noticed in the contribution of synthesis subskill at the post-test ($p < .05$) as compared to the pre-test scores ($p > .05$). It is worth noting that in a multiple regression test the obtained results of the contribution of the predictors are relative to each other and do not reflect the effect of each one individually (Cohen et al., 2018). Thus, results might be interpreted that the significance of synthesis skills changed from pre-test to post-test as a result of the change in the effect of locate and evaluate whose values affected synthesis. To justify this, group "experimental vs. control" was entered as another predictor. Once entered, the "Standardized Beta" significantly changed ($\beta = .63$, $\rho = < .001$). To validate the results of the reported regression model, many different types of regression analyses were run, where all pre-test and post-test scores were added as predictors to examine their contribution into the regression model. Interestingly, results of all the extra regression models confirmed the earlier ones, indicating the significant effect of teaching all the skills of online research skills as one comprehensive block/set, granting credibility to IRT model.

Given that, such analyses revealed the positive degree of association at post-test between IRT model and "communicate ideas responsibly". In other words, any increase in the scores of the intervention would lead to an increase in the scores of communicate ideas responsibly. Simply put, teaching the online research skills (locate, evaluate, and synthesize) at the same time through one comprehensive model (one block/set) would yield significant less occurrences of copy-paste behavior. However, if these skills were taught one at a time as was the case before the intervention, there would not be significant association. Such findings confirm the assumptions of new literacies theory whose proponents, as mentioned earlier, argued that the process of online reading requires proficiency of all online research skills, which are all inter-related (Leu et al., 2013).

The findings of the present study were echoed in the reviewed literature which provided evidence that teaching the skills of online research as discrete skills (one at a time) would increase the tendency to copy-paste ideas from online sources, while teaching it as one comprehensive model is associated with a decrease in the copy-paste behavior from the Internet (e.g., Chao et al., 2009; Dwyer, 2010; Howard & Davies, 2009; Howard et al., 2010; Pecorari & Petric, 2014). However, to the knowledge of the researchers of the present study, most of these studies focused on analyzing students' work (e.g., Howard et al., 2010) or comparing group differences on these variables (e.g., Houth, 2017). However, very few studies (e.g., Chao et al., 2009) provided statistical examination regarding the inter-correlation between these variables or the extent an intervention is associated with a change in such inter-correlation.

In their nonequivalent control group quasi-experimental study at university level, Chao et al. (2009) conducted a regression analysis where they investigated the association between the type of the instructional practice and the presence of plagiaristic text in the writing product. Having experimented with three varied instructional practices, their findings indicated that the best predictor was the comprehensive instructional practice characterized by teaching source-use practice in a supportive environment characterized by explicit teaching of online research skills, constructive feedback, and individual practice. Such findings might provide a logical valid explanation for the positive results of the regression analysis in the present study at the post-test, where IRT bears similar characteristics to Chao et al.'s (2009) instructional practice that yielded the best results. With that, it would be assumed that the performance of copy-paste behavior might be best predicted by performance on a composite score of online research skills such as ORCA. Interestingly, results by Chao et al. (2009) might provide a more comprehensive picture of the online readers' behavior in the present study and anticipate what their future behavior at higher education might be in case the issue remains unaddressed at an earlier age.

Results of the effect of the individual skill as well as the effect of the intervention on "communicate ideas responsibly" can be better understood by relating the results of the present study to Dwyer's (2010) longitudinal study where the researcher explored the development of each subskill of online research in different phases throughout 18 months. At earlier stages, Dwyer's baseline data showed students' inability (third cohort and fifth cohort) to perform a successful online search. Dwyer's (2010) observation revealed that students were disoriented due to the lack of appropriate effective strategies of web search. Their work demonstrated an inability to evaluate resources and their summary was characterized by copy-paste. Dwyer (2010) kept on revising and refining her instructions after every phase trying to address the challenges students faced through the timeline of her study. Results indicated a progress in communicating the retrieved information from phase 1 into phase 2. For example, in phase 2, participants of third/fourth class cohort created PowerPoints that mostly focused on factual information and contained "copied verbatim from the original text source" (p. 333). As an example of the difficulty of summarize, one student reported : "well, there could be loads of important bits, and one could be more important than the other bits so it's hard to find" (p. 214). However, in phase 3 (during the main study) participants showed progress by creating multimodal samples where they organized their findings in a form of Reale Books (a format of photobook and texts which uses multimodalities) that demonstrated more focus on conceptual knowledge, less copy-paste from original text, and more attention to source attribution details such as author's details. In fact, once students in Dwyer's (2010) study developed their ability to locate, comprehend, and critically examine the online source, they were able to develop the summarization skill (where fifth/sixth class cohort was better in rephrasing ideas) and started to pay more attention to source attribution.

One unexpected result emerged in the present study which might contradict with existing literature.. Existing literature included evidence about the significance of "locate" in the process of online reading, whose absence might hinder online readers from accomplishing any task (Henry, 2007, as cited in Leu et al., 2008). At pre-test, results showed locate subskill as having a significant positive effect on communicate ideas responsibly. Such results are consistent with research that emphasized the significance of locate subskill to accomplish an online task. Such findings are also consistent with the notion of Howard and Davies (2009) who asserted that the inability to locate online sources would lead the reader to feel frustrated, and thus would tend to copy and paste ideas from any source due to the lack of deep understanding. However, the results were completely different at post-test due to absence of significant association with "communicate ideas responsibly." One possible explanation might be attributed to the positive effect of the intervention which outperformed any other effect at post-test. As stated earlier, in a multiple regression each predictor is assumed as added the last in the regression model, and the results are relative to each other, not independent of each other (Cohen et al., 2018). So, relative to other predictor variables, "locate" subskill was not significant at post-test. In other words, "locate" subskill improved as a result of the intervention, but since it was analyzed in the regression as a component of the model, similar to synthesis, results were not significant at the post-test. One more explanation might be supported by the post-test scores of the locate skills, where both the experimental and control groups somehow achieved close scores (experimental: $M = 3.88$, $SD = 0.32$; control group: $M = 3.01$, $SD = 0.64$). This indicates that the control group showed development from pre-test ($M = 2.41$, $SD = 0.64$) to post-test ($M = 3.01$, $SD = 0.64$) in locating

information due to receiving traditional instructions and to the increase access to the Internet. However, such progress did not yield significant effect on communicate ideas responsibly since each skill was taught as discrete, not as component of a comprehensive model (e.g., Chao et al., 2009; Dwyer, 2010).

It is worth noting that the present study responded to the recommendations made by Fidaoui et al. (2010) regarding the effectiveness of teaching online research skills to Grade 4 ESL students as one comprehensive instructional practice in order to address the issue of copy-paste trend. Even though the focus in the study of Fidaoui et al. (2010) was not on investigating the relationship between online research skills and copy-paste trend, the interview the researchers conducted with the teachers echoed their voices regarding this relationship. Surprisingly, the interview revealed that these teachers required students to use online research skills and produce written work with no copy-paste trend without providing their students with adequate instructional practices on these skills.

In reference to the theoretical framework stated earlier, the results in the present study confirm the assumptions of the theories that inform this study. First, the positive degree of association at post-test between the IRT model and "communicate ideas responsibly" provide support to the principles of new literacies theory. The results indicate that online research skills (locate, evaluate, and synthesize) are inter-related and, thus, teaching them at the same time through one comprehensive model (one block/set would yield to a significant less occurrence of copy-paste behavior. However, if these skills were taught one at a time as was the case before the intervention, there would not be significant association (Leu et al., 2013). Furthermore, the organizational patterns of the IRT model with its three phases which moves students gradually from simpler to more complex strategies provide support to Vygotsky's (1978) principles of instructional scaffolding. Additionally, while implementing the IRT model teachers explicitly taught the skills and provided students with enough time for independent practice (last phase of the IRT model), for students were asked to employ all the strategies to perform tasks required by the teacher (given in class or taken home as a follow up) while working on the unit they were taking during the intervention. Such practices are only clues that support Bandura's theoretical work (1986, cited in Schunk, 2012).

In short, results of the regression analysis ran at pre-test and post-test to examine the change in the association between online research skills and the decrease of copy-paste occurrences suggest that students who receive an intervention which provides instructions on all the research skills as one comprehensive model would develop their online research skills and demonstrate less occurrences of copy-paste. Results also suggest that due to the intervention some skills such as synthesize might contribute to less occurrences of copy-paste performance, but such contribution is outperformed by the contribution of the intervention which demonstrates the effect of teaching all skills as one comprehensive model. Such results are consistent with the existing literature either through confirming their findings or responding to their recommendations in terms of the effectiveness of teaching the skills of online research to deter copy-paste trend.

7.Conclusions

In short, the findings in this paper indicated the interdependence of all the skills of online research. As evidenced from the regression analysis, the domains of online research skills are unique and should not be taught as separate entities. Such findings imply teachers must decrease preaching about academic integrity and, instead, embrace a systematic instructional practice that goes beyond focusing on individual scores to teaching these skills within an inter-related model that integrates the new literacies of online research skills into their classroom practices. Taking it a step further, it would seem significant for school administrators, teachers, and curriculum designers to consider such unique interrelatedness of the online research skills and use them as guiding principles while designing instructions.

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