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Young students making textual changes during digital writing

Types, causes and consequences for the texts

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Abstract

In this small-scale study young students' digital writing as it unfolds in real time via screen recordings is discussed. The students attend the first and third year of schooling in Sweden and are recorded during lessons. The aim is to describe students' digital writing as they use computers to create texts, with a specific focus on the changes the students make. The type of change, its cause, whether the change results in correct or incorrect language use, and the semantic and syntactic consequences of the changes are analysed. The results show that changes are made locally, and that the students focus on dealing with software underlining that indicates problems with spelling or grammar. Revisions on deeper meaning-making levels, such as additions, insertions or reorganisations, are generally not performed even though such operations are easily accomplished with digital tools. Seven different strategies when dealing with underlining are identified, and how the students' linguistic knowledge about spelling, rules for writing and digital literacy skills are used in explorative ways to avoid underlining is described. The students' responsiveness toward following a correctness norm affects the semantic depth of the texts as misspelled words get erased or exchanged for more non-specific words. Syntactic structure is also affected resulting in non-conventional punctuation due to misunderstandings concerning the reason for software underlining. The outcomes show a close relationship between operational literacy and meaning-making as the content of the students' texts often changes when underlining shows up on the screen. Identity formation is also at stake when a misunderstanding positions student as unaware of punctuation when the problem concerns the software's rule of spacing after full stops. Different aspects of operational literacy and their significance for a social conception of literacy is suggested to inform teachers' planning of text creation using digital tools in the classroom.

Keywords
Digital writing, operational literacy, revision, young students

Introduction

Young students' digital writing, as the text emerges on the screen in real time, is the focus of the present study. Writing, and especially digital writing, in relation to young students seems urgent to understand and appreciate as digital skills and text-making need to be viewed as prerequisites for being a competent, learning and developing child in the contemporary textual landscape (Selander and Kress, 2010/2017). In spite of this, research on

young students' digital literacies has been relatively neglected, concerning, for example, the different types of tools and applications used by children in text-making. The affordances of digital tools are different from those of pen and paper, which means that teachers meet new challenges when teaching literacy using digital tools. Mapping young students' digital literacy skills is also important in light of the recent changes to the Swedish primary school curriculum. From 2011 it has been mandatory to teach writing on computers from year 1 (when the children are 7 years old), but the extent to which schools actually supply digital tools and introduce students to digital writing is still quite varied (Skolverket, 2016). In a supplement to the curriculum introduced in 2018, digital text-making has gained importance. Formulations in the curriculum now point to the significance of using digital writing tools in, for example, revision and editing.[1]

This small-scale study is an attempt to uncover and describe a few of the characteristics of young students' digital writing by recording their writing processes. The aim is to describe students' digital writing as they use computers to create texts, with a specific focus on revision and performed changes. It has been suggested that young students need initial guidance when being introduced to digital technology at school, for example via a balance between invisible (weakly framed learning activities) and visible pedagogy (strongly framed learning activities), in order to exploit the potential of digital technology (Sofkova Hashemi and Cederlund, 2017).[2] As pointed out above, the curriculum places strong emphasis on the importance of the early introduction and subsequent use of digital tools for text-making. Since the results from the present study strengthen our knowledge of young students' digital writing process, they could contribute to ideas for the teaching of digital literacy in the early years of schooling.

Theoretical perspectives: Textual changes and operational literacy

Writing can be described as both a technology, meaning a tool for doing language and semiotic work, and a form of communication that is mediated by technologies or materials used (Lillis and McKinney, 2013, p. 425). This is true of both traditional forms of writing and digital, on-screen writing. Still, writing within a digital environment needs to be understood in other ways than in analogue ones (Kervin and Mantei, 2016). New technologies have other affordances than off-screen environments, for example in how texts can be planned, produced, changed and shared. Digital writing is part of the wider field of digital literacy, which in the research literature is defined in several different ways. Digital literacy can be defined fairly broadly as "a social practice that involves reading, writing and multi-modal-meaning-making through the use of a range of digital technologies" (Sefton-Green, et. al. 2016, p. 15). It is also possible to separate the operational literacy skills from the skills that pertain to cultural and critical aspects of literacy. The division into three different literacy competencies is named 3D-literacy by Green and Beavis (2012) (cf. Lankshear and

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1. Formulations in the Swedish curriculum:
    – Creating texts where words and pictures interact, both with and without digital tools.
    – Handwriting and writing with digital tools.
    – Simple forms of processing texts, such as subsequently going through their own and collaborative texts and making clarifications.
    – Handwriting and using digital tools for writing.
    – Structure of language with large and small letters, full stops, question marks, exclamation marks as well as spelling rules for frequently occurring words in texts closely related to pupils' daily life.
    (Curriculum for the compulsory school, preschool class and the recreation center, Skolverket, 2011 (revised 2017)).
2. The terms *invisible* and *visible pedagogy* were introduced by Bernstein (1975).

Knobel, 1998; Marsh, 2016). Operational literacy includes competencies needed for reading and writing, and involves learning to use the meaning-making systems such as the alphabet, punctuation, and other generic conventions (Marsh 2016, p. 200). With digital texts it presupposes access to a range of operational capacities with relevant hardware and software applications and procedures (Lankshear and Knobel, 1998, p. 7). Cultural literacy involves the understanding of different cultural and social contexts within different arenas, and critical literacy concerns the ability to engage critically, asking questions about power, positioning, voice, truth and possibilities to act. The three dimensions of the 3D-literacy theory are all necessary parts of literacy in practice and in pedagogy; in that sense, none has any priority over the others.

Operational literacy differs in substantial ways between handwriting and writing on screen as on the computer the forming of letters is made by the software and keyboard, and more effort may, in theory, be invested in content, and the text looks neat and "professional" whether the writer has good motoric skills or not (Agélii Genlott and Grönlund, 2013, p. 103). Words, sentences and paragraphs can be corrected and/or moved around (non-linear writing), and speech synthesis, spell check and grammar support are also available. These affordances must, however, be considered as theoretical meaning potential as they are only available if the text-maker knows that they exist and possesses the operational skills to make use of them in meaning-making.[3]

Consequently, digital writing in comparison to writing with pen and paper is not a matter only of integrating new tools into already existing writing practices (National Writing Project (U.S.) 2010, p. 4). Instead, digital writing involves learning new ways of making, designing and sharing texts, and digital writing can therefore be said to have the potential of changing the ecology of communication both with regards to the ways texts are being created technically, and the ways texts can be used for communication and identity formation. According to Merchant (2008, 2009), these contemporary ways of meaning-making, relevant also for young children both in school and at home, call for more exploratory research about children's digital writing with a focus on their experimentation in text production. Within new literacy studies (Lankshear and Knobel, 2006), the close relationship between technology and literacy practices is acknowledged, and writing, as one such literacy practice, needs to be viewed as meaning-making with its own conditions.

Previous research on digital writing and students' revision

Within the field of new literacy studies there is an absence of research on digital writing and word processing. The bulk of previous research that addresses writing and digital tools can instead be placed within the education technology field, where social aspects of writing are generally not central. In the present study, the focus on the dimension of operational literacy is believed to relevantly motivate comparisons to research within the educational technology field. The previous research accounted for starts with three research summaries, dealing with the digitalisation of schools, the effects of using computers in early literacy training, and young children's writing on screen. These more general perspectives are then expanded with small-scale studies on digital tools and revision.

The digitalisation of school is discussed in the research summary by Elf, Hanghøj, Skaar and Erixon (2015). One of their findings is that "technology" is conceptualised as "media", while "aesthetic", "critical" and "tool-oriented" perspectives are lacking. Media refers to the ways texts are produced and consumed with digital technology, for example films or other

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3.   "Non-linear writing" is sometimes synonymous to "hyper-text", but that is not the case here.

multimodal texts. Technology as aesthetics focuses on the effects of different semiotic choices, and critical perspectives focus on the relation between market and curriculum. Finally, the tool-oriented perspective is directed toward seeing technology as artefacts, which can be used by teachers and students to achieve particular learning objectives.

The effects of using computers in early literacy training is discussed in Taube, Fredriksson and Olofsson (2015). They conclude that the use of computers and tablets in the teaching of reading and writing generally has small, albeit positive effects on text length and some aspects of text quality. However, they stress that both teachers' digital competence and their interest in the teaching of writing are important factors, as are the software and the tools themselves.

The purpose of the review of Wollscheid, Sjaastad and Tømte (2016) is to assess literature comparing digital writing tools as computers and tablets with traditional writing tools like pen(cil) and paper on writing outcomes among young writers. They find some inconsistencies concerning the efficiency of digital tools versus pen(cil), but these seems to be linked to different theoretical perspectives. While studies with a cognitive psychological, neuroscience and learning perspective point in favour of handwriting, studies with a sociocultural perspective instead point in favour of digital writing.

There have been a few studies of ASL (in Swedish: Att skriva sig till läsning, in English: writing to read) (Trageton, 2003/2014), which is a method that advocates writing using digital tools before pen and paper, and views writing as an efficient path to mastering reading. In Hultin and Westman (2013), the use of ASL as writing pedagogy in young students' classrooms made a focus on text length and genre relevant. Digital tools lead to longer texts and an openness toward new textual genres, such as subject texts. Text length is discussed as a result of the affordances of the keyboard which makes writing less laborious in relation to motoric efforts. The keyboard is also described as making possible rewriting and erasing. But as pointed out by Hultin and Westman (2013, p. 1102) the possibilities for revision in texts are increased, but not guaranteed to actually take place.

Recent research on students' digital writing and revision shows that the affordances of software needs to be problematized. Musk (2016) notes that students rarely use the right-clicking function of the software Word, which gives suggestions for spelling. This could mean that the students consider it unnecessary, or they are unfamiliar with it (Musk, 2016, p. 51). Cekaite (2009) explores how pairs of students deploy digital tools (spelling software) to correct spelling errors. One important result is that the under-specification of the software's instructions concerning misspellings caused students to engage creatively with spelling issues (Cekaite, 2009, p. 335). More thorough descriptions of the types of tools that children use when writing on screen is called for by Kucirkova et al. (2019). They also stress a need for research that clarifies the different types of interactions taking place around the writing activity, such as instructions, suggestions or corrections coming from the digital tool.

Previous research recognises that that there is a lack of studies with a focus on writing with digital tools and that the specific affordances of digital tools need to be taken into consideration when studying and teaching digital writing. Also noticeable is that questions about whether digital writing or writing with pen and paper lead to "better" texts seem central. Such perspectives are not social orientations towards literacy practices and digital technologies, but rather place the digital technologies at the centre of research, supposing that some tools for writing are inherently better than others. Our assumption, on the contrary, is that writers of all ages need to master different types of tools for writing and creating texts, digital as well as analogue, depending on the context, the task, type of text, its function and distribution etc.

Methodology and material

The material used for the present study has been collected in two classes in Grade 1, called 1a and 1b, (students aged 7), and one in Grade 3 (students aged 9), in three different cities in Sweden during 2017 and 2018 (Table 1).

Table 1 Overview of the recorded text-making processes and writing conditions.

Grade	Number of recordings	Number of students (total number of students in each class)	Writing activity	Organisation of students
1a	10	10 (24)	Copying of sentences	Individual
1b	5	10 in 5 pairs (25)	Writing a subject text about bears	In pairs
3	10	10 (18)	Describing a school day from start to finish	Individual

The number of screen recordings is 25 (10 individual recordings in Grade 1a and 10 individual recordings in the Grade 3, and five recordings in pairs in Grade 1b). The length of the recordings vary from 20 to 50 minutes. Microsoft Word was used in all writing tasks. The computers were installed with screen recording software that generates a video film (mp4) of the entire screen activity.[4] Sound surrounding the students was only picked up in 10 of the screen recordings due to technical problems with the screen recording software. Two researchers were present in the Grade 1 classrooms during recordings and one researcher was present in the Grade 3 classroom. The researchers functioned as teachers during the recordings, circulating between students that needed help. In three of the pairs, the students changed positions so that they both wrote and in two of the pairs only one student wrote. This results in 27 students writing.

The students in Grade 1 wrote texts that were part of their teachers' normal teaching. None of the teachers let the students use computers for writing on a regular basis, but had the ambition to increase such activities. In Grade 1a the task was to copy sentences that were semantically unrelated (with the intention of offering the students keyboard training) where the students wrote individually. In Grade 1b the task was to write a subject text about bears from a mind map, for which the students wrote in pairs. The students in Grade 3 were given a subject by the researchers: describe your school day yesterday from start to finish. This task was meant to lead the students toward producing texts with a chronological description of events and consequently to rearrange the order of events if necessary, visualising the students' strategies to add, insert or reorganise the text.

None of the three tasks were self-chosen by the students, and may therefore be examples of tasks that are seen as pure writing exercise, not communication or purposeful meaning-making, and thereby less motivational for revision and changes (Oliver, 2018). Of course, the designs of the tasks are problematic for our understanding of writing as a social practice, and for our ambition to study spontaneous changes as the meaningfulness of a writing task is closely related to the investments in revising, including for younger students (McCutchen, 2006). Two of the tasks were, however, designed by the teachers themselves and therefore authentic to what these students engage in when writing on computers in school. The reason for the task designed by the researchers was, as stated above, to offer an insight into how corrections in chronological order were dealt with.

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4.   We used Icecream recorder, the pro version: https://icecreamapps.com/Screen-Recorder/

The analyses do not focus on potential differences between individual writing and writing in pairs, or on comparisons between age groups or tasks. Instead, the recordings are analysed as one material in an attempt at finding the different strategies that the students use on the whole. The analyses should be viewed as a first step in inventing a few perspectives on how young students' digital writing processes concerning changes and revision could be described. None of the teachers discussed affordances such as spelling and grammar checks to frame the writing activity, but the teacher in Grade 1b instructed the students to write "nice sentences", and the teacher in Grade 1a spent time on showing the students how to make a line break and how to save their documents.

We sought a balance between boys and girls to represent the normal variation in a classroom in that respect, but the participating students were not selected according to specific criteria regarding their reading and writing development or reading and writing difficulties. The students were asked by the researchers if they wanted to participate, and their guardians gave written permission.

The analyses of the recordings were carried out with attention to type of change (Surface: spelling, punctuation, grammar. Meaning: lexical choice, additions, deletions), its cause (software auto-generated via underlining, interaction with peers, teacher or researchers (only possible to study in 10 of the recordings), and whether the changes resulted in correct or incorrect language use. When the changes resulted in semantic and/or syntactic consequences for the texts, these were also analysed for how they affected the content and the correctness of the texts. The three first notations in the analysis of one of the 25 recordings is shown as an example in Table 2.

Table 2 Example of analysis from Recording 8, student in Grade 1a.

Change (from → to)	Type	Cause	Result
ensol (asun) → en sol (a sun)	Surface (Spacing)	Unknown	Correct
en sol . (a sun .)→ en sol. (a sun.)	Surface (Spacing)	Blue underlining	Correct
ock (misspelling of and) → och (and)	Surface (Spelling)	Blue underlining	Correct

Types: Surface-based changes made locally in the text

When the students make changes in their texts, these changes most often concern the local level – the immediate space in which they are writing, and involve surface-based changes. Spelling is one of the most time consuming and frequent revisions that the students engage in, in particular when a software underlining shows up. They also adjust spacing, especially before and after full stops, change pronouns, change a preposition for a special sign ("till" (to) to - ("10-15")), and exchange lower and uppercase in names and in abbreviations ("tv" to "TV"). Other surface level changes are size on letters, centring of headline, and changes in line break.

The students' writing process is characterized by linear writing in the sense that it is unusual for them to go back in the text to add or reorganise information. In Grade 3, where the students were asked to write about their previous day, one student writes "efter skolan åkte jag hem till L men innan vi åkte till han åkte vi till affären men sedan åkte vi hem till L" (after school I went to L's house but before we went to him we went to the shop and then we went to L's house). The chronology is corrected via the use of adverbs such as "before" and "then", which allow the student to keep writing without erasing or going back to change information in the text. The same student describes lesson number three before lesson

number two "på tredje lektionen hade vi engelska med K och den andra lektionen en läsandeklass" (On the third lesson we had English with K and in the second lesson a reading class). The words "third" and "second" make the chronology of the lessons clear even though they are put in reverse order in the sentence. One example of information being added to a text is when a student puts the cursor in a position further back in the produced text and adds names of teachers. This student has the operational digital skill to move the cursor from its current position with the intention of making an addition earlier in the text. One of the affordances of digital writing is that adding, erasing and rewriting is quicker and more effortless than the same operations by hand, especially when substantial changes are made. These types of operational digital skills seem important to make explicit and discuss when young students use digital tools for writing.

Causes and results: Underlining

Underlining, usually indicating a spelling error, is almost always taken into consideration by the students. Underlining is by far the most common cause for changes. In the material the students exhibit seven different strategies in dealing with them:

Strategy 1) Test different letters and letter combinations.
Strategy 2) Eliminate or insert spacing between words or word segments.
Strategy 3) Replace the misspelled word for a synonym or related word.
Strategy 4) Erase the word.
Strategy 5) Ignore and move on.
Strategy 6) Ask a peer, the teacher or a researcher.
Strategy 7) Go to "review" and press "ignore all".

When testing different letters and letter combinations (strategy 1) the exchange of vowels (for example the vowels "å" and "o" ("måronen"→ "moronen" → "morånen" → "mårånen" (the morning)) and double lettering ("mackaroner" → "makaroner" (macaroni)) are frequently used strategies. The sequences of testing can be extensive, as when the word "jobbigt" (hard or tough) is tried out with the following variants: "jobbit" → "jobbigit" → "jobbgit" → "jod…" → "jobb" → "jobigt".

It seems to be known among the students that eliminating or inserting spacing can be a fruitful way to obtain conventional spelling (strategy 2). The word "ungefär" (approximately) is at first written "unge" fär". "Unge" (child or kid) does not get underlined, but "fär" does. The student eliminates the spacing and gets the correct form "ungefär". The word *köttfärssås* (meat sauce) is spelled "sötfärssås" and an attempt at correcting it results in "sötfärs sås", with spacing between two of the segments.

An underlined word can be replaced by a synonym or related word (strategy 3). The target word *knäckebröd* (crispbread) is spelled knecke → kneke → kneckebröd and then erased and replaced by "macka" (which is an informal word in Swedish for *sandwich*). Above, the spelling variants of *jobbigt* were described and this sequence ends with an attempt at replacing the word. The target word here is *tråkigt* (boring), but the end result is (via "tår" → "trågit" → "tråggit"), "tråtigt", which is left in the text.

As an example of a word being erased (strategy 4) due to problems with spelling is *ta på sig kläderna och strumpor* (put on clothes and socks) (Figure 1) being changed into "ta på sig kläderna" (put on clothes) (Figure 2).

Min dag igår

Jag vaknade klockan halv sju på morgone▮ ▮g åt flingor med mjölk och ett bröd. Sen kläde jag på mig jag fick hjälpa ▮ ▮o med ta på sig kläderna och struporna

Figure 1 The word "struporna" (targetword *strumporna*, the socks) is misspelled and underlined by the software.

Min dag igår

Jag vaknade klockan halv sju på morgonen. Jag åt flingor med mjölk och ett bröd. Sen kläde jag på mig jag fick hjälpa ▮ med ta på sig kläderna. Sen borstade jag tänderna och h|

Figure 2 The misspelled word "struporna" is erased.

There are cases where the students ignore an underlining (strategy 5). This seems to be the case especially with proper names and English words ("gun", "ipad", "overwatch", "wars"), indicating that the students are aware of the unreliability of the software concerning these word categories. Everyday and informal words that are misspelled can also be left without intervention in spite of an underlining, for example "melis" which should be spelled *mellis*, (snack between meals).

The students sometimes asked each other, their teacher or the researchers about spelling, which of course also qualifies as a strategy in order to avoid misspellings (strategy 6). An example is a student that asks one of the researchers about the spelling of the word *fixa* (to fix), after having tried "fiksa".

In one instance, a student, after trying to accomplish a correct spelling of *morgonen* (see the variants above as examples of strategy 1), uses the software function *review* and then clicks *accept all* to get rid of the underlining (strategy 7).

Despite the careful attention to underlining, a number of spelling errors are still present in the final texts. The spelling errors depend on difficulties deciding on grapheme for vowel sounds, double consonants and the sch-sound (with many different spelling variants in Swedish). Other errors are due to influences from the oral language, for example "vakna", a conventional pronunciation for "vaknade" (woke up).

Consequences: Semantic depth and syntactic structure

The changes made in the texts at word level involve actions where a more specific and unusual word that is misspelled and underlined by the software gets replaced by a more general word, and, as exemplified above, there are also cases where a change involves the erasing of words that are underlined. *Knäckebröd* (crispbread) is replaced by "macka". The word

"macka" could mean both soft or crisp bread, which makes its semantic potential wider and less specific. An example of a word in a phrase that is begun but then erased is *jordgubbar* (strawberries) (*flingor med jordgubbar och mjölk*, cereal with strawberries), which is replaced by "flingor med mjölk", cereal with milk. Another example is *min lillasyster* (my little sister), which is replaced by the sister's name, due to an underlining of "lilasyster". This replacement obscures the relation between writer and mentioned person, making this part of the text less independent from a reader's perspective as one will have to be familiar with the student's family to know that the name represents her little sister. The phrase *ta på sig kläderna och strumpor* (put on clothes and socks) (Figure 1) is changed into "ta på sig kläderna" (put on clothes) (Figure 2), due to problems with the spelling of *strumporna* (the socks). These changes affect the semantic depth and specification of the texts as the words that are difficult to spell are replaced by others that are less semantically specific, or erased altogether.

In one of the recordings from the activity of producing a text about bears from a mind map, the students write correct sentences concerning full stops (Figure 3). However, they seem unaware of the convention that spacing is needed after a full stop. This causes the student who is writing to erase the full stops (Figure 4).

Björnen

Björnen är Sveriges största rovdjur.den

Figure 3 Correct sentence structure but no spacing causes an underlining.

Björnen

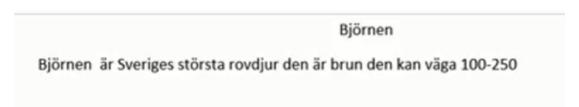Björnen är Sveriges största rovdjur den är brun den kan väga 100-250

Figure 4 Full stops are erased and the underlining disappears.

When the teacher stops at their desk, she looks at the text and asks how many sentences they have in their text. One student answers that every time they tried to write a full stop "it did not work". This explanation is interpreted by the teacher as a problem with the location of the full stop key on the keyboard. The students affirm that they know where it is and are told to point at the correct key on the keyboard. The teacher continues to ask where they think it would be suitable to insert full stops in their text. One student points correctly at three positions in the text they have produced so far. The interaction between teacher and students is primarily conducted by the teacher's interpretation of the problem, the need for full stops and capital letters, which differs from the problem that the students experience: getting rid of the underlining. The software's rule about spacing is the problem for the students, not the text-making practice of structuring complete sentences, which makes the teacher's questions and instruction unproductive for the problem that the students want to address.

Conclusion

The process-oriented methodology using screen recordings enabled us to follow the students' text-making, with specific focus on types of changes, their cause, result and consequences for the texts. In particular, the students make surface-based changes locally in the part of the text where they are writing at that moment. The meaning-based changes that occur are exchanges of words. With a few exceptions, the students do not move, insert or add words, phrases or sentences (cf. Hultin and Westman, 2013). However, the lack of more meaning-based changes should not automatically be interpreted as a lack of knowledge about how to accomplish them. The motivation for investing time into the text-making activities also needs to be problematized (cf. McCutchen, 2006; Oliver, 2018). It is none the less important to consider what types of digital operational skills young students need in order to progress in digital writing and text creation.

We identified seven different revision strategies in relation to software underlining, which is the most common cause for making changes. The list of seven strategies is most likely not an exhaustive one, but could be viewed as examples of strategies that these young students are able to test. When the students recognise the software's underlining they use their knowledge of spelling, language structure and operational digital skills in explorative and creative ways to eliminate the software-generated remarks. Even if the efforts are not always successful, it is clear that the young students are linguistically aware of problems concerning spelling and word formation. The affordances of the software allows for testing and trying out different variants that would appear favourable for young students' learning about different levels of text-making. However, as spelling correctly seems to be important for the writers in this study, the specific affordances of the software's spellcheck could preferably be explored in teaching. Awareness of the right-clicking function for spelling suggestions could in some cases have saved the students time and also helped them mediate their initial choice of words and phrases, facilitating their communication and meaning-making.

When it comes to the consequences of the changes, in some cases they lead to a reduction in semantic depth or specificity when a more common and less specific word than the original is selected. Underlined words are also erased without being replaced, and in one case full stops are erased as they were believed to cause the underlining. The ambition to follow spelling and grammar conventions thus overrides initial choices of words that result in underlining, and may be understood as a prioritisation of a "correctness norm" above other norms. "Correct" is, however, understood as free from auto-generated underlining, which in some cases lead students astray. As an example, the underlining disappeared when the students erased the full stops (Figure 4), but the rules for punctuation went from correct to incorrect. The problem was the auto-generated underlining due to lack of spacing between full stop and following capital letter.

The recognition in previous research that that there is a lack of studies with a focus on young students' writing using digital tools and a need for more exploratory research about children's digital writing with a focus on their experimentation and text production (Kucirkova et. al. 2019; Merchant, 2008, 2009) guided our approach in this study of young students' writing on computers using the software Word. We conclude that the dimension of operational literacy (Green and Beavis, 2012) is worth addressing within the field of new literacy studies since the variants of revision strategies that are tried out and deployed by young students, and which are not, provide useful information about the specifics of digital writing. The theoretical affordances of digital writing that were not used could be seen as untapped teaching and learning material for the lower grades, and could inspire the sort of

initial guidance that young students need in relation to digital writing and operational literacy (cf. Sofkova Hashemi and Cederlund, 2017).

As the revisions that the students make have consequences on semantic aspects of the texts, our study's outcomes show the close relationship between operational literacy and meaning-making. It is also shown that operational literacy and identity is closely related in the example where the teacher wrongfully positions the students as unacquainted with how and where to place full stops in their text. In relation to pedagogy, different aspects of operational literacy, and its significance within a social conception of literacy, could fruitfully inform teachers' planning of writing tasks and text creation using digital tools together with their students.

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