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## CONSULTATION BEHAVIOR IN L1 ERROR CORRECTION

### An exploratory study on the use of online resources in the Norwegian context

**Abstract** This think-aloud study charts the use of online resources by five final-year MA students in Nordic and Literacy Studies based on the analysis of screen and audio recordings of an error-correction task. The article briefly presents some linguistic features of Norwegian Nynorsk that are not common in the context of other European languages, that is, norm optionality with regards to inflection and spelling. While performing the task, the participants were allowed to use all digital aids. This article examines their resource consultation behavior, and it makes use of Laporte/Gilquin's (2018) annotation protocol. The following research questions are posed: What online resources are used by the students? What characterizes the use? Are online resources helpful? This study provides new insights into an as yet little explored topic within the Norwegian context. The findings demonstrate that the participants relied heavily on the official monolingual dictionary *Nynorskordboka*. Indeed, the dictionary was helpful in the vast majority of the searches, either resulting in error improvement or the validation of a word; that is, many of the searches considered correct words. The findings suggest severe norm insecurity and emphasize the need to improve norm knowledge and metalinguistic knowledge as prerequisites for better utilization of aids. It is also suggested to include necessary information on norm optionality and other commonly queried issues in the dictionary architecture.

**Keywords** Consultation behavior; L1 error correction; dictionary use; online resources; Norwegian Nynorsk

## 1. Introduction and background

Despite the growing body of international research on the use and efficiency of online resources, including dictionaries, little is known about this topic in the context of Norway. To the best of the author's knowledge, this article is the first to report on consultation behavior in Norwegian as a first language (L1).

The Norwegian multinorm language situation stands out and affects the development, architecture, and use of language aids. There are two official Norwegian written languages, Bokmål (majority standard) and Nynorsk (minority standard), that have equal official status, and reading and writing in both languages is a part of the Norwegian subject curriculum in schooling (Udir 2013). There is no official pronunciation standard, and dialects are used in all oral contexts (Helset 2021).

Probably the most striking characteristic of Norwegian is that compared to other commonly known European languages, both Bokmål and Nynorsk include significant optionality in terms of spelling and inflection (regarding both single words and whole categories); see section 3. Although the two written standards are mutually intelligible and largely overlap in terms of lexis and syntax (see, for example, Faarlund 2003 and Helset 2021), they differ significantly in terms of morphology and orthography.

Educators are particularly exposed to both norm plurality and optionality in their work, for example, when teaching and evaluating students' writing. Based on the curriculum, teach-

ers of Norwegian are expected to master both written languages equally well (e. g., University of Stavanger, no date). However, recent research on student teachers' norm competence has indicated they do not have such mastery in Nynorsk (Russsdal-Hamre 2020). Using appropriate aids might help in bridging this gap. An online survey has revealed that 82% of the secondary school teachers who participated in the survey use digital dictionaries when correcting students' texts (TNS Gallup/The Norwegian Language Council 2014; Hovdenak/Ims 2016). The twin dictionaries Bokmålsordboka and Nynorskordboka (The Norwegian Language Council/University of Bergen, no date) are the most popular digital dictionaries for Norwegian (Hovdenak/Ims 2016; for a state-of-the art article on monolingual lexicography, see Grønvik et al. 2019). Yet, empirical research on the use of online resources and dictionaries in the context of the Norwegian language is scarce. This article aims to help fill this knowledge gap by focusing on the minority standard Nynorsk and providing insights on users' consultation behavior. The study design does not limit access to online resources and can thus provide insights regarding users' preferences for using other aids.

## 2. Aim

The aim of this article is to explore the use of online resources and their effect on L1 error correction in Norwegian Nynorsk, that is, to chart what a sample of students who are expected to master both Bokmål and Nynorsk equally well actually do when correcting a student text and what effect their consultations have on their corrections. Following are the research questions.

### 2.1 What online resources are used by the students?

Based on the survey mentioned above (TNS Gallup/The Norwegian Language Council 2014), it is expected that the participants are familiar with and use the official online dictionary Nynorskordboka. It is also not uncommon to rely on the built-in spell and grammar checker, which is still not well developed for less widely used languages such as Norwegian; for example, it is not able to track or automatically check for norm consistency.

### 2.2 What characterizes the use?

In accordance with Gilquin/Laporte (2021), individual variation is expected regarding how many searches the participants carry out. Quick and one-tool searches are expected to dominate. Following the user records and dictionary statistics (Rauset 2019; Jansson 2007), it is expected that a considerable number of the searches will concern common and frequent words.

### 2.3 Are online resources helpful?

In line with the findings of Gilquin/Laporte (2021), Müller-Spitzer et al. (2018), Wolfer et al. (2018), and Wolfer et al. (2016), it is expected that consulting resources will lead to successful error correction in most but not all cases. As shown in Wolfer et al. (2016) and Jansson (2007), being able to detect an error might be a challenge in the first place.

### 3. A brief overview of a selection of linguistic features in Norwegian Nynorsk and their presentation in Nynorskordboka<sup>1</sup>

This section very briefly illustrates some examples of norm optionality in terms of inflection and spelling, but it is by no means exhaustive (see, for example, Faarlund 2003; Almenningen/Søyland 2012 and Helset 2021). Screenshots showing relevant sections from the most popular Nynorsk dictionary, Nynorskordboka, are also provided. Consistency of choice is required within a text (see The Norwegian Language Council, no date-a, for more on norm consistency).

#### 3.1 Inflection

##### Infinitive

The official Nynorsk norm (Almenningen/Søyland 2012) allows no less than three systems: 1) all infinitives ending with -a; 2) all infinitives ending with -e; and 3) a system called *kløyvd infinitiv* (= divided infinitive) where some infinitives must end with -a and the remaining ones end with -e.

The screenshot below shows parts of the dictionary article about the verb to be, *vera*. The inflection pattern opens when the hyperlinked verb label is clicked.

vera	Infinitiv	Presens	Preteritum	Presens perfektum	Imperativ
v. kløyvd inf.	å vera å vere	er	var	har vore	ver

**Screenshot 1:** *Vera* = be (oppslagsord = head word, ordbokartikkel = dictionary article)

Both infinitive suffixes are shown in the head word list and in the inflection table. Clicking on *kløyvd infinitiv* reveals an explanation of the third system, but the hyperlink might be difficult to notice when all the text is blue. Beyond this, no more information on the optionality is provided here. The head word section within the dictionary article contains only the form ending with -e, which is also the type of infinitive used in the example section.

##### Inflection patterns

Most Norwegian nouns are of one gender only, resulting in one set of suffixes. This also applies to verbs, most of which have one set of tense suffixes and the optional infinitive

<sup>1</sup> A new version of the dictionary has recently been launched. This study was conducted using the previous version of the user interface that was launched in 2009 and is still available.

suffixes mentioned above. However, several commonly used nouns and verbs have more than one inflection paradigm. The noun *tekst* (= text) can be either masculine or feminine.

Oppslagsord Ordbokartikkel  
 tekst I tekst m1, f1 (norrønt *textr* m eller *texti* m, frå latin 'vev')

Bøying i samsvar med gjeldande rettskriving:

tekst	Eintal		Fleirtal	
	Ubunden form	Bunden form	Ubunden form	Bunden form
m.	ein tekst	teksten	tekstar	tekstane
f.	ei tekst	teksta	tekster	tekstene

Screenshot 2: *Tekst* = text. Norwegian nouns are inflected in number and definiteness

The verb *bruka* (= use) has no less than three inflection patterns.

Oppslagsord Ordbokartikkel  
 bruke bruke v1, v2, v3 (lågtyisk *bruken*)

Bøying i samsvar med gjeldande rettskriving:

bruke	Infinitiv	Presens	Preteritum	Presens perfektum	Imperativ
v.	å bruka å bruke	brukar	bruka	har bruka	bruk
v.	å bruka å bruke	bruker	brukte	har brukt	bruk
v.	å bruka å bruke	brukar	brukte	har brukt	bruk

Screenshot 3: *Bruka* = use

The last pattern is a mix of the previous two, taking the present tense form from the first pattern and the past and present perfect forms from the middle one.

Homographs might have different inflection patterns. For example, the verb *føla* can either mean to foal or to feel, each having its own set of suffixes, as indicated by the different codes in the dictionary (respectively v1 and v2).

Oppslagsord Ordbokartikkel	
føla	I føle v1 få føl; fole, fylje (I)
føle	merra har føla
føla	II føle v2 (frå lågtysk)
føle	1 qranske ved å ta på: kjenne (II,4)

**Bøying i samsvar med gjeldande rettskriving:**

føle	Infinitiv	Presens	Preteritum	Presens perfektum	Imperativ
v1	å føla å føle	følar	føla	har føla	føl

**Bøying i samsvar med gjeldande rettskriving:**

føle	Infinitiv	Presens	Preteritum	Presens perfektum	Imperativ
v2	å føla å føle	føler	følte	har følt	føl

Screenshot 4: Føla = foal/feel

### 3.2 Spelling

The spelling optionality covers alternative vowels (*lykke/lukke* = happiness), consonants (*dobbelmoral/dobbeltmoral* = double standard of morality), similar words (*bilde/bilete* = picture), and even completely different words/equivalents (*følelse/kjensle* = feeling).

Oppslagsord Ordbokartikkel	
lykke	lykke f2; el. I lukke f2 (norrønt
lukke	lukka og lykka, lågtysk (ge)lucke 'lagnad, lykke')

Screenshot 5: Lykke/lukke = happiness

The order of appearance of optional forms in the dictionary article is fixed no matter which one is used in the query. No systematic study has been conducted, but it appears that minor spelling differences between optional forms result in one dictionary article. Equivalents with a larger “spelling distance” are presented in separate articles. The one below is not even hyperlinked, although there is a dictionary article for *kjensle*.

Oppslagsord Ordbokartikkel	
følelse	følelse m1 kjensle (1-2)

Screenshot 6: Følelse = feeling

A word that deserves special attention is *ønske* (= wish), as it has a tremendous number of optional forms. The same number of optional forms is not allowed when it is a noun compared to when it is a verb.

#### Oppslagsord Ordbokartikkel

ynske ønske	<b>ynske n1</b> ; el. <b>ønske n1</b> (norrønt <i>ósk</i> f, formene med <i>-n-</i> kjem av innverknad frå lågtysk <i>wunsch</i> )
	<p><b>1</b> vilje, hug eller lyst til å få eller vinne fram til noko; lengsel etter å oppnå noko  <i>no får du kome fram med ynska dine / ho bar fram ynsket sitt / gå med på alle ynske og krav</i></p> <ul style="list-style-type: none"> <li>● inderleg von eller lengsel (om at det eller det skal skjje)  <i>hans høgaste ynske var å kome seg ein tur utanlands</i></li> <li>● oppfordring, krav (l)  <i>eit sterkt uttrykt ynske om å få fortgang i saka</i></li> </ul> <p><b>2</b> venleg, kjærleg tanke, von om noko (for eit anna menneske)  <i>ho hadde følgd dei med ynske og omsut / han kjem med gode ynske til brudgom og brur</i></p>
ynskja ynskje ynska ynske ønska ønske ønskja ønskje	<p><b>ll ynske v2</b>; el. <b>ynskje verb</b>; el. <b>ll ønske v2</b>; el. <b>ønskje verb</b> (norrønt <i>óskja</i>, <i>y-skja</i>; formene med <i>-n-</i> kjem av innverknad frå lågtysk <i>wunschen</i>)</p> <p><b>1</b> ha <i>ynske</i> (l,1) om; kjenne trong, lyst til; gjerne vilje; lengte etter  <i>eg skulle ynskje du slutta med</i></p>

**Screenshot 7:** *Ønske* as the noun wish, as indicated by the code n1, and as the verb wish, indicated by the v2/verb codes

## 4. Related work

### 4.1 International studies

Wolfer et al.'s study (2016) on the effectiveness of lexicographic resources obtained data from 78 L1 German students. Their findings suggest that being able to spot a language problem is crucial, and although access to relevant resources enables the highest number of successful revisions, it does not guarantee success.

A multi-method observational study on error correction and the use of online resources (reported on in Müller-Spitzer et al. 2018 and Wolfer et al. 2018) combined task results, screen recordings, and thinking aloud from 43 L2 learners of German. They were to correct 18 unrelated German sentences, each containing one unmarked error, using any aids they

wanted. The study showed that L2 learners resort to lexicographic resources to a great extent. The authors identified some important success factors, such as good metalinguistic knowledge and determination to complete the task. The present study and this project have many common features. However, the participants in the present study were working with a coherent piece of writing in order to lay the groundwork for possible norm consistency checks; cf. section 3.

Laporte/Guilquin (2021) studied the use of online resources by 84 L2 learners of English and the effect of those resources in a free composition task. The authors employed screen recordings to study the learners' consultation behavior. The screen recordings were annotated using ELAN software (Wittenburg et al. 2006) and an annotation protocol developed by the researchers themselves (Laporte/Gilquin 2018). They identified a total of 1,543 searches, most of them quick and utilizing one resource. The number of searches per participant varied greatly, from none to 49. The study showed that resource consultation had a positive impact in the majority of cases. The annotation protocol developed by the authors (2018) has been of great use for the present study. Some minor adjustments were necessary to capture the peculiarities of the Norwegian language context, as exemplified in section 3.

## 4.2 Norwegian studies

Karlsen/Rødningen's (2008) survey of 111 upper-secondary teachers of Norwegian revealed that 86% provide their students with instruction in using aids. However, it is not being given in a systematic way. The aids are mainly used to obtain formal information, such as about spelling, inflection, and optional forms. An important finding is that Nynorsk aids are the most used and that Nynorsk seems to facilitate and prompt instruction in aid use.

Nygaard/Fjeld (2008) examined a sample of unsuccessful searches based on search logs from Bokmålsordboka, the dictionary of the majority written language. Their study shows that misspelling is the main reason when the dictionary does not return any results.

User records and dictionary statistics reveal that users search for commonplace and frequently used words. This indicates that spelling and inflection in a production context are in question (Rauset 2019), which is not typical for L1 dictionaries (Svensén 2009). Rauset (2019) also shows that users open inflection patterns in Nynorskordboka more than twice as often as in Bokmålsordboka and that searches with the twin dictionaries side by side are most common.

The one study on Nynorsk norm competency and speller use (Jansson 2007) showed that secondary school students made fewer spelling and inflection errors when using a speller compared to when writing with no aids, and seven students out of 19 reduced the number of norm deviations by 50% or more. However, the writing of five students did not improve much. Jansson also charted the words that they would have looked up by asking the students to draw a circle around those words while writing without aids. In addition to words that were erroneous, there were many examples of correct commonplace words that the students would have looked up, which is also in line with what the user records for Bokmålsordboka and Nynorskordboka show (Rauset 2019). On the whole, many of the norm deviations were overlooked. Jansson points out that such behavior reflects norm unsteadiness (2007, p. 37).

## 5. The present study

The present study is process-oriented; that is, it is mostly concerned with resource consultation and its effect on the language issues rather than the corrected text itself. By combining screen recording and thinking aloud, this study aims to help make the Norwegian user lexicography less of a terra incognita.

### 5.1 Participants

Five final-year MA students in Nordic and Literacy Studies at the University of Stavanger in Norway volunteered to participate in the study.<sup>2</sup> There are two types of students enrolled and taking the same courses covering the subject content knowledge – future secondary education teachers of Norwegian (a five-year teacher program) and students who have completed a bachelor's degree and are now taking a two-year master's degree. Both groups of students are expected to master both written languages equally well (University of Stavanger, no date).

### 5.2 The experiment

The participants were asked to verbalize their thoughts and justify their choices during the experiment (Ericsson/Simon 1993); the data from the error-correction task are reported on in this article. The participants were instructed to 1) mark all language errors and 2) propose correct forms using the comment function. They were allowed to use any digital aids they wished.

An authentic text written by a final-year secondary school student was chosen for the error-correction task. It was approximately two and a half pages long (about 1,000 words). A variety of norm deviations were present, (most of) which were elementary and could easily be corrected with the help of an online resource. A coherent piece of writing was given to render possible norm consistency checks. The student text was available in Microsoft Word with the built-in spell and grammar checker turned off.

The author aimed for as natural and relaxed experiment settings as possible. The goal was to elicit the best Nynorsk competence with multiple occasions to reveal what aids the participants normally use and how they use them. The fact that they had unlimited access to aids and no time constraints as such gives reason to assume the participants were able to do their best in regard to norm competence and aids.

### 5.3 Screen and audio recording

All sessions were recorded using Active Presenter 8. This software allows for the unobtrusive registration of all on-screen actions and audio, which strengthens the ecological validity of this study.

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<sup>2</sup> Participants received a 500NOK gift card as compensation.



### 5.4 Annotation

The screen and audio recordings were annotated using ELAN software (Wittenburg et al. 2006). All recordings were annotated by the author using Laporte/Gilquin’s (2018) annotation protocol developed for research on the use of online resources with minor adjustments. The analysis in this study is based on the tiers (annotation layers) shown on the left-hand side in the screenshot below.

	5.000	00:29:30.000	00:29:35.000	00:29:40.000
<b>CONSULTATION_U</b>	single			
TOOL [28]	Nynorskordboka			
INFORMATION_TY	inflection			
QUERY [31]	hendar	hender	hende	
EMPTY_QUERY [31]	empty	empty, noun		
INDIRECT_QUERY				
INDIRECT_ACCES				
EFFECT_UNIT [20]	positive_change			
RESULT [20]	hendar > hender, el. går føre seg			
COMMENT [20]				

**Screenshot 8:** Example of coded data on a participant’s search (Ask),<sup>3</sup> prompted by *hendar* (= happen, TF,<sup>4</sup> erroneous present tense suffix)

This search (**CONSULTATION\_UNIT**) is annotated as single; that is, it describes continuous use of one tool only. The participant looked up the word *hendar* (= happen, present tense),<sup>5</sup> as annotated in **QUERY**. The dictionary, Nynorskordboka (annotated in **TOOL**), did not return any results; cf. **EMPTY\_QUERY**. The participant tried to search for the verb using another present tense suffix. The result of this look-up was also marked as empty, as the dictionary returned the homograph noun hands. On the final try, the participant used one of the infinitive suffixes instead (*hende*), and the dictionary returned the desired verb and its inflection pattern. The participant corrected the erroneous form in the student text (*hendar*) to the form found in the dictionary (*hender*), as annotated in **RESULT**. Additionally, they proposed a synonym “går føre seg”. The kind of information sought or the query intent in this case was inflection, as annotated in **INFORMATION\_TYPE**. The effect of the whole search was positive, and the participant made a change in the text (positive\_change on **EFFECT\_UNIT**, as opposed to positive\_confirmation when a search validates a form used in the student text). The total resource consultation time for this particular language problem was 16 seconds. See Laporte/Gilquin (2018) for an in-depth description of the annotation protocol. The data were then exported and analyzed in Microsoft Excel.

<sup>3</sup> The participants’ names were replaced with other names.  
<sup>4</sup> TF stands for text form.  
<sup>5</sup> In Nynorsk, there are three (-er/-r, -ar, -Ø) present tense suffixes.

## 6. Findings and discussion

A total of 148 consultation units (i. e., searches) were identified. A search may consist of one or several look-ups (and therefore also several queries) addressing one specific language problem.

### 6.1 What online resources are used by the students?

The participants almost exclusively resorted to the official Nynorsk dictionary, Nynorskordboka, and they expressed, while thinking aloud, that they consider the dictionary a reliable aid that they use often. When looking up a verb with three inflection patterns, one of the participants, Due, stated: “This is why we have the dictionary. It is completely unhuman to have all of it in your head.”

Other resources were accessed only three times in total by three participants. Two of these searches can be classified as using other resources, and the latter ended up in Nynorskordboka via a roundabout manner through the Norwegian Language Council’s website. Not surprisingly, all three searches concerned two language problems for which the dictionary is not the most suitable resource, passive voice and the use of the determinatives *nokon* and *nokre* (often compared with some and any in English).

Regarding norm optionality and consistency of choice, the find function is especially useful for a time-saving check for norm inconsistency. Only Due and Eir used or expressed that they normally would have used this function, still displaying limited awareness of consistency requirements. None of the participants turned on the built-in spell and grammar checker.

### 6.2 What characterizes the use?

Single-tool, continuous searches dominated overwhelmingly, as shown in Figure 1. In 125 out of 148 searches, the participants consulted Nynorskordboka and returned to the text to make corrections or moved on. In 115 searches, only one query was carried out. The average time registered on a continuous single-tool search was 22 seconds.<sup>6</sup> As hypothesized, the number of searches made by each participant varied. Due carried out more than double as many searches as Ask, as shown in Figure 1.

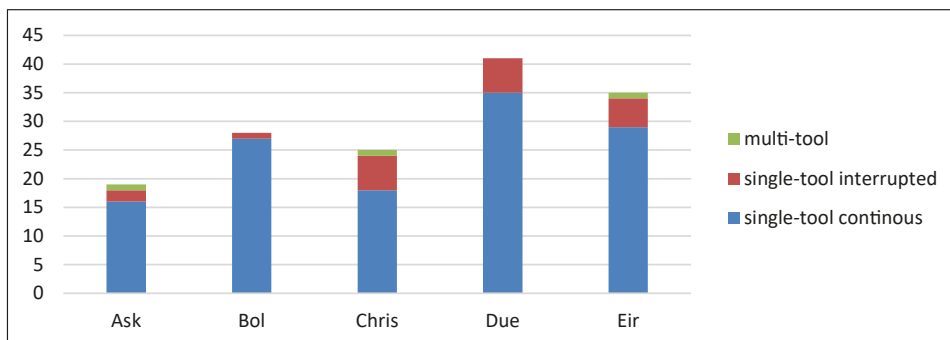


Fig. 1: Number and type of searches per participant

<sup>6</sup> Thinking aloud while performing the task makes the searches somewhat longer.

The screen recordings also revealed that the participants demonstrated different levels of dictionary skills, for example if and how fast they could locate and extract the information sought. Moreover, the participants showed significant differences in basic information and communication technology (ICT) skills that affected their workflow and therefore also the amount of time they spent on a search. Ask and Due were the most efficient in their consultations, respectively spending 9 and 12 seconds on average for single-tool searches. This seems to cohere with good ICT skills, that is, the fact that they both use keyboard shortcuts to switch between windows and that they are very familiar with the dictionary architecture. Unskillful querying is time-consuming; Eir tended to use word forms other than the base in queries more often than the other participants, which prolonged the searches.

Bol stands out, as this participant spent a longer time on their dictionary consultation than other participants (43 seconds on average for single-tool searches; this number includes the time it took to access the dictionary after a search in Google for each search). This seems to be the result of insufficient dictionary skills, as the participant never opened the needed inflection patterns. Instead, they searched through the example section. The problem with this approach is that the example section in dictionary articles does not present the full range of norm optionality. Following only those word-form choices results in a much narrower norm, that is a norm with fewer optional forms.

The participants seemed to be unaware of other resources that could have helped them resolve language problems other than those concerning spelling and inflection. Ask and Chris were looking for assistance with passive voice (prompted by *gifte*, passive voice of *gifte*, = marry, erroneous in Nynorsk) in Nynorskordboka. Ask mentioned that googling is useful to see whether others use a given word or expression. Ask skimmed through the snippets in Google and found a website (*Hardanger historielag*) that used “giftast bort” and then returned to the dictionary and got frustrated that it did not help in this case, only showing “a forbidden sign” next to the sought word form.

Oppslagsord Ordbokartikkel	
gift (giftast)	II <b>gift a2</b> (eigenleg perfektum partisipp av III <i>gifte</i> ) som har gått inn i, lever i ekteskap; ektevigd <i>bli, vere gift (med nokon) / dei to er gifte</i>  gift med jobben heilt oppslukt av arbeidet sitt
gifte (giftast)	III <b>gifte verb, v1, v3</b> (norrønt <i>gipta</i> , opphavleg 'gje bort')  1 gje til ektemake <i>gifte bort dotter si</i>  2 refleksivt <b>gifte seg</b> gå inn i ekteskap <i>ho, han, dei gifta seg i går / gifte seg opp att</i>  gifte seg med ta (nokon) til ekte  3 ta til ekte <i>han gifta jenta</i>

**Screenshot 9:** *Giftast* (passive voice of *gifte* = marry and the forbidden sign. When hovering the cursor over it, a text box with this message appears: *Tilslagsord unormert* = word form not standardized. The sign is only present next to the adjective article and not the verb article.

Chris did not get the forbidden sign, as this participant queried the base form (*gifte*). However, Chris was also looking in vain for passive voice in the inflection pattern. Eir did not look for help with *nokon* and *nokre* in Nynorskordboka but instead queried “nokon eller nokre” in Google. Although this participant found The Norwegian Language Council’s mini-grammar websites (The Norwegian Language Council, no date-b) that include a section on this topic, they chose to rely on a random Google snippet and based on that corrected *nokon* to the optional, in this case *nokre*, which was an unnecessary correction in the student text. Due also did this, although this participant relied on Nynorskordboka, which only shows both determiners as optional in plural without providing any information on this rather peculiar issue.

### Information type

A total of 199 language-related queries were carried out by the participants within the 148 searches. Inflection and spelling constitute the types of information most often sought. Queries regarding grammar and meaning constitute a negligible number,<sup>7</sup> as shown in Figure 2.

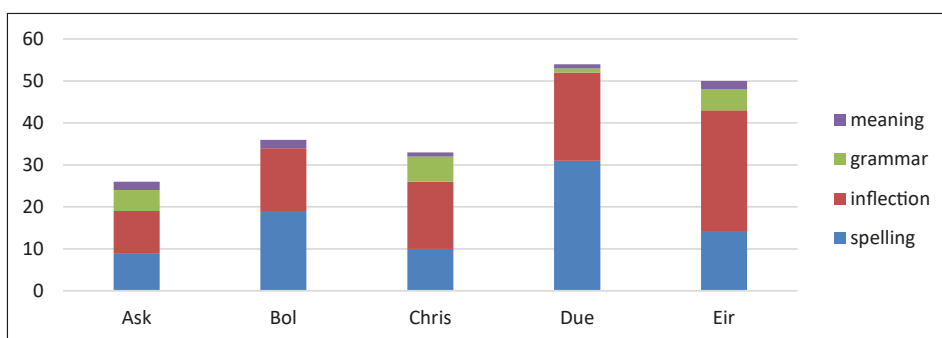


Fig. 2: Information type in queries; query intention

### Queries

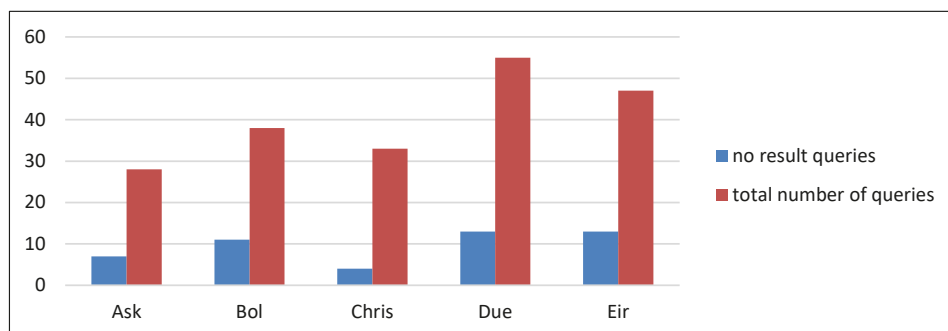
Almost all queries consisted of only one word. All participants other than Eir looked up *bilde* (= picture) and *skriva/e* (= write) in the dictionary; otherwise, there was little overlap. Verbs and nouns represent most of the language problems (31% and 32%, respectively) the participants consulted aids for. A closer look at the forms the participants used shows that Ask, Bol, and Eir frequently used inflected forms – present tense, infinitive with “to” (*å bruke* = to use), nouns with an indefinite article (*ein person* = a person), and plural form (*virkemidlar* = means). It looks like these participants use the dictionary as if it was a search engine. Due queried other word forms than base only twice (*openbart* = obvious(ly) TF, *inneheld* = contain, CF<sup>8</sup>).

For 48 queries, none or no relevant results were returned. Chris had substantially fewer such queries, as shown in Figure 3, probably because this participant never used forms other than base forms and had only one typo. Typos and using a different form than the base form

<sup>7</sup> The nature of the task presented to the participants – to correct language errors – sets some prerequisites for their focus.

<sup>8</sup> CF stands for correct form.

constituted 26 occurrences. In their study on search logs, Nygaard/Fjeld (2008) found that spelling mistakes in queries were the reason for 46% of searches where Bokmålsordboka did not return any results. As the authors point out, dictionaries nowadays should propose related words when a query does not return any results.



**Fig. 3:** Number of queries returning none or no relevant results compared to all queries carried out by the participants

The label “deviant lexical item” denotes forms that exist in Bokmål but that are not allowed in Nynorsk, for example *giftermål* (= marriage), *foran* (= in front), *hun* (= she), and *fortsatt* (= still). In these cases, users must know their Nynorsk equivalents are to be spelled *giftarmål*, *framfor/føre*, *ho*, and *framleis*, as the dictionary does not provide any hints. As Nygaard/Fjeld point out, “[t]he paradox when using a spelling dictionary is that one has to know how to spell a given word to find the actual spelling” (2008, p. 59, author’s translation). Using a wildcard might have helped in such cases, but the participants never did that. Instead, they typed in different spelling(s) or proposed a synonym. Bol looked up *giftmål* (TF) in Nynorskordboka with no luck and then tried *giftermål*, which did not return any results either. Bol ended up proposing *ekteskap* (= marriage) instead. The participant did not look it up this time, probably because they did it earlier in the experiment. Typing, for example, “gift\*mål” would have returned *giftarmål*. Ask, however, did not waste time querying the deviant lexical item. Instead, this participant carried out one look-up on *giftarmål* and corrected the item. When Due searched for the erroneous *openbart* (= obvious(ly), TF), the dictionary returned no results, mainly because it is not the base form of the adjective. Typing in *openbar*, although still erroneous, would have led to the sought dictionary article on *openberr*. Instead, the participant proposed the synonym *tydeleg*. Due could have used the following incremental search; typing in “openb” in the search box would prompt the dictionary to propose “openberr” at the top of the list. It seems like Due typed too fast, and the incremental search list disappeared before it was noticed. Chris paid close attention to that list when typing a query. When this participant failed to extract relevant information on “virke”, they proposed the synonym “synest” (= seem). When querying this synonym, Chris noticed that the incremental search proposed the infinitive “synast” and queried that form.

One lacune was uncovered by Due – *oppsummere* = sum up. Although there is no dictionary article on this compound in Nynorskordboka, there is one in its twin dictionary Bokmålsordboka. Such cases might lead dictionary users to the conclusion that a given word is not allowed in the Nynorsk norm (Rauset 2019). This was indeed Due’s conclusion. The participant then proposed the synonym *samanfatte* and carried out a look-up on it, although the only correction that really was needed regarded the spelling from *oppsumere* to *oppsummere*.

### 6.3 Are online resources helpful?

By and large, consulting Nynorskordboka proved to be helpful. Of the 148 searches, 125 were categorized as having a positive effect on the issue in question. This means that 84% of all consultations either improved a language error or validated a correct form in the student text. In fact, 64 searches did not result in any changes. Many searches were carried out “just in case”. In fact, Chris looked up three items (*bruke* = use, *gje/gi* = give, *vise* = show) two times each. This evidence might point to fundamental norm insecurity, as suggested by Jansson (2007), that would not be possible to detect when only scrutinizing the finished product of the corrections.

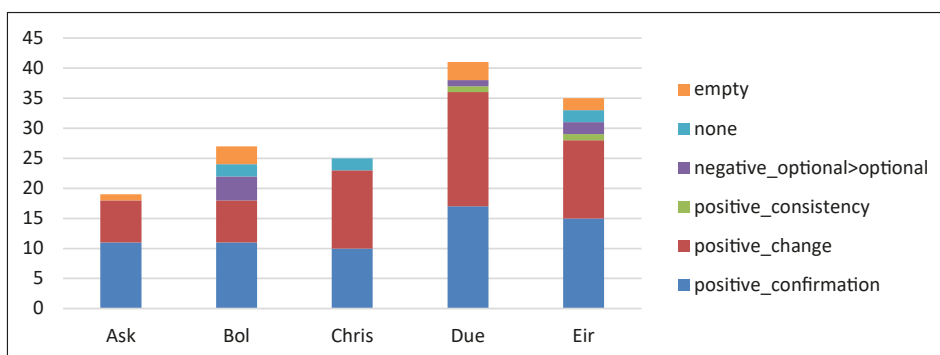


Fig. 4: Effect of consultation

Sometimes, the information in the dictionary was ignored even though it would help correct the error (annotated as “none” in Fig. 4.). Eir conducted a search on *svekka* (= weaken) to find the past participle, and even though the dictionary returned *svekt*, the participant typed in *svekka* as the correct form without commenting on their choice. While the other participants “obeyed” the dictionary, even though they stated they would have made different choices when writing themselves, Bol seemed to put personal linguistic instinct above the online resource. Bol made a change from one optional form to another twice (*brukar* to *nyttar* = use and *bilde* to *bilete* = picture). The reason Bol made these unnecessary changes was because *nyttar* and *bilete* were used in the example section. This phenomenon is not prominent in the data for the present study, but previous research has concluded that it is common for teachers to make this type of correction and thus promote a “narrower” norm with fewer allowed forms (Djupedokken 1983; Byberg 1995; Omdal 1999). This study provides evidence that this might also happen due to the word-form choices in the example section, in addition to users’ inadequate dictionary skills and insufficient norm competence.

## 7. Closing remarks

The analysis of the students’ consultation behavior shows that they almost exclusively relied on Nynorskordboka, carrying out quick searches the majority of which had a positive effect on the student text. Moreover, they tended to depend on their own linguistic instinct and knowledge rather than turning to other resources. Although not always appropriate and successful, this was a useful strategy when looking for a spelling equivalent in the dictionary because then the participants were trying to resolve the paradox of having to know a spelling of a given word to find the needed spelling. A great majority of the consulted

spelling and inflection problems were either improved or validated. For the other language problems (i. e., passive voice and *nokon/nokre*), resources other than Nynorskordboka should have been used.

Although this article is mainly concerned with consultation behavior and the effect of the consultations and not norm competency per se, several clues indicate that a higher level of metalinguistic knowledge and norm knowledge is needed. Approximately half of the words that were looked up were correct. Several errors were overlooked. The participants also showed very limited awareness of consistency requirements. The findings give evidence of norm insecurity, as suggested by Jansson (2007). Teaching dictionary skills, especially skillful querying, will speed up consultations but not improve Nynorsk writing and editing competence. Spelling and inflection are relatively easy to look up and to correct once they have been spotted. Language problems regarding consistency and syntax require a higher level of grammatical competence and prompt the use of a resource other than a dictionary.

The predominant use of Nynorskordboka stresses the importance of it meeting users' needs. One lacune was uncovered in the study (*oppsummere* = sum up). Although it is not possible to provide dictionary articles on every compound word, cases where one of the twin dictionaries has an entry and the other has not can be interpreted as the word being not within the norm. The dictionary should also be more proactive by enhancing the "Did you mean ...?" function with suggestions covering deviant lexical items when no results are returned (for example *fortsatt* = still and *foran* = in front). The issue of users not being able to locate the inflection pattern is solved in the newest version of the dictionary, as it is not hidden behind a code anymore but is indicated by the label *Sjå bøying* (= show inflection). Furthermore, optional form choices in dictionary articles, although it is probably not possible to avoid, might be more normative than intended. Having in mind the authority the twin dictionaries carry among users, implementing sufficient information on norm optionality and other commonly queried issues (e. g., on passive voice) within the architecture of the dictionary should be considered.

Previous studies have stressed the importance of providing users with adequate dictionary skills. The findings of this study first and foremost indicate the necessity of improving norm knowledge and metalinguistic knowledge to make better use of aids. Teaching dictionary skills should be an integrated part of this process, but alone it may not be enough.

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