L2 German Learners' Perceptions and Use of an Online Semantic Frame-based Dictionary

ABSTRACT

To know a word receptively and productively, second language (L2) learners must have knowledge of a word's *form*, *meaning*, and *use*, including grammatical functions and collocational patterns (Nation, 2001). Frame semantics (Fillmore, 1982) provides a useful model to help L2 learners deepen their lexical knowledge. A functional and construction grammar developed to explain form-function pairings, the model views "frame" as a meaningful linguistic structuring device evoked by sets of related lexical items. These diverse lexical units exist along a continuum, theorized in Construction Grammar, from individual to multi-word to abstract schematic constructions. Building on recent studies that explore frame semantics' potential for L2 vocabulary acquisition (e.g., Atzler, 2011; Boas, 2013; Boas, 2016), this study investigates how beginning and intermediate L2 learners of German (n=65) perceive and report interacting with a frame-based dictionary, the German Frame-Semantic Online Lexicon (G-FOL; www.coerll.utexas.edu/frames/). Discussion centers on the affordances G-FOL offers in learning mulit-faceted aspects of vocabulary knowledge, which textbooks often fail to address (Neary-Sundquist, 2015). The study provides teachers, program directors, and designers of frame-based dictionaries with valuable information about the perceived usefulness of frame semantics for L2 learners across instructional levels.

Keywords: Frame semantics, vocabulary learning, G-FOL, teaching & learning tool

L2 German Learners' Perceptions and Use of an Online Semantic Frame-based Dictionary

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Few educators would dispute that the development of the lexicon plays an essential role in learning a second language (L2). Consequently, discussion focuses on how best to teach vocabulary (e.g., Ecke & Rott, 2019; Laufer, 2009, 2017; Schmitt, 2008, 2019; Uchihara, Webb, & Yanagisawa, 2019), and what role instructional materials play in the learning process (e.g., Brown, 2010; Lawley, 2010; López-Jiménez, 2010; Rankin, 2019; Sánchez-Gutiérrez, Miguel, & Olsen, 2019; Vyatkina, 2018). Despite their dominance in many L2 classrooms, textbooks are not the only resources for developing lexical knowledge. With technological advances and an expanded view of what constitutes instructional materials (see, e.g., Blyth, 2014), foreign language (FL) programs increasingly look to materials beyond the traditional textbook to support students' L2 development.

Recent approaches to instructional materials as part of a larger 'classroom ecology' (see Guerrettaz & Johnston, 2013, with further discussion in the *Modern Language Journal*'s "Perspectives" column, especially Tarone, 2014) have emphasized the need to consider their usefulness in terms of an interconnected system of "participants, processes, structures, and artefacts" (Guerrettaz & Johnston, 2013, p. 782). Central to materials development is the consideration of the materials' intended users, a point echoed by Larsen-Freeman (2014), who notes that affordances for learning through materials are ultimately determined by the L2 learners themselves. Inspired by a classroom ecological approach to materials development, this study investigates L2 learners' reported experiences with a vocabulary learning resource so as to

discover the "relations of possibility" (Guerrettaz & Johnston, 2013) between learners and materials, including unintended learning affordances that learners themselves may discover in them.

Situated within an ongoing materials development project, the present study focuses on how beginning and intermediate collegiate L2 learners of German engage with, understand, and learn from a digital pedagogical dictionary, the German Frame-Semantic Online Lexicon (G-FOL; www.coerll.utexas.edu/frames/). Though this tool was originally developed to align with the home department's beginning German textbook in 2011, its use and usefulness for and by collegiate L2 learners were not investigated until recently. Thus, by considering learners' experiences with the tool, this study serves as a first step in understanding how G-FOL works within the ecology of a collegiate FL program.

To contextualize the analysis, this study begins with a short review of the literature on L2 vocabulary development and its relationship to instructional materials, followed by an introduction to the origins of G-FOL in frame semantics, the site's development, and its organization. Analyses of the students' reported experiences and understandings of the online lexicon then provide important feedback for further development of the tool and its future use in collegiate FL programs, points that are taken up again in the discussion.

Perceptions of Vocabulary Learning and Instructional Materials

Because textbooks often exert powerful authority over instructional design and practice, it is perhaps not surprising that research on L2 vocabulary learning has taken a keen interest in how textbooks present vocabulary and allow learners to practice it. Reflecting advances in corpus-based linguistics, recent studies have critically examined commonly used L2 textbooks in terms of the distribution of high vs. low frequency vocabulary (Godev, 2009; Lipinski, 2010; Miller, 2011; Sánchez-Gutiérrez et al., 2019), frequency of lexical input and recycling of vocabulary (Lopez-Jimenez, 2014), and different types of vocabulary learning activities (Brown, 2011; Lopez-Jimenez, 2009, 2014; Neary-Sundquist, 2015). Much of this work has pointed to inconsistencies between the way vocabulary is treated in textbooks and recommendations informed by the research. With growing interest in studying the needs of individual learners, it stands to reason that any study that aims to identify the effects of a particular language learning tool on the L2 learner must include an analysis of student perceptions (Ehrman, Leaver, & Oxford, 2003), especially as L2 learners' understanding of language learning have been found to influence their achievement in the language classroom (Williams & Burden, 1997).

Nation's (2001) taxonomy of lexical knowledge has been widely influential not only in designing materials, but also for their evaluation, with two recent studies, Brown (2011) and Neary-Sundquist (2015), applying the framework to critical analyses of L2 textbooks as the main instructional materials used in FL instruction. Nation's typology includes nine aspects of vocabulary knowledge across three main categories: (1) *form*: spoken, written, word parts; (2) *meaning*: form and meaning, concepts and referents, associations; and (3) *use*: grammatical functions, collocations, and constraints on use. Brown's (2011) analysis of nine beginning and intermediate English L2 textbooks showed a general preference for vocabulary activities focused

on form-meaning connections, followed by grammatical functions and spoken form. Similarly, Neary-Sundquist (2015), whose study is modeled after Brown (2011), found that vocabulary activities in five beginning collegiate German textbooks most often addressed grammatical functions and form-meaning connections. Both researchers observed minimal attention to other dimensions of word knowledge, i.e., word parts, concepts and referents, collocations, constraints on use, and associations. Although not all aspects of lexical knowledge may need equal attention in L2 instruction (Neary-Sundquist, 2015), the limited incidental exposure that instructed L2 learners have to language forms outside the classroom has led some language educators (e.g., Brown, 2011) to recommend explicit attention to all nine aspects of Nation's taxonomy.

These studies suggest not only that instructional materials beyond the textbook are needed to meet students' L2 vocabulary learning needs effectively, but also that vocabulary learning tools should consider the comprehensive nature of what it means to know a word.

Frame Semantics and FrameNet

Based on Fillmore's (1982) theory of frame semantics, whose central idea is that "a word's meaning can be understood only with reference to a structured background of experience, beliefs, or practices" (Fillmore & Atkins, 1992, pp. 76–77), the German Frame-based Online Lexicon (G-FOL) offers a language resource for English-speaking L2 learners of German that aims at overcoming the general disconnect between vocabulary and grammar present in most instructional materials. In the model, word meanings are understood in terms of semantic background frames that motivate the concept encoded by a word. For example, the words *buy*, *sell*, *payment*, and *expensive* all evoke a Commercial Transaction frame, which reflects particular knowledge speakers of a language have about particular situational contexts, and whose Frame

Elements of Seller, Goods, Buyer, and Money can be thought of as situation-specific semantic roles. According to frame semantics theory, the relevant frame knowledge is evoked in the mind of a language user any time a speaker uses a word belonging to the frame (Fillmore & Baker, 2010). Since 1997, Frame Semantics has been applied to the construction of a corpus-based lexical database of English, FrameNet (http://framenet.icsi.berkeley.edu). In FrameNet, semantic frames are taken as structuring devices to model the types of knowledge necessary for interpreting utterances (see Boas, 2005; Petruck, 1996; Ruppenhofer et al., 2010). The FrameNet database consists of lexical entries for several thousand words taken from a variety of semantic domains. As of September 1, 2019, the FrameNet database contained a total of 13,640 entries for English lexical units (a lexical unit is a word in one of its senses or collocations). G-FOL contained a total of 419 entries for German lexical units. Based on corpus data, FrameNet identifies and describes semantic frames, analyzes the meanings of words according to the frames that underlie their meanings (for details, see Boas, 2017; Fillmore & Baker, 2010), and documents the syntactic properties of words by examining how their semantic properties are given grammatical form (Fillmore, Johnson, & Petruck, 2003).

Over the past decade, several research teams have taken the semantic frames from English FrameNet to construct comparable FrameNets for other languages such as French, Chinese, Japanese, Portuguese, Spanish, Swedish, Korean, and German (for an overview, see the contributions in Boas 2009). However, as these large lexical databases may be too detailed and thus impractical for FL learners, the idea arose to develop a prototype frame-based online lexical resource for beginning English-speaking L2 learners of German that would more explicitly correspond to the lexicon targeted in learners' L2 instructional contexts. In 2009, the German Frame-based Online Lexicon (Boas & Dux, 2013; Boas, Dux, & Ziem, 2016) was developed at

The University of Texas at Austin (www.coerll.utexas.edu/frames/). The first step in building G-FOL involved mapping the original frames for English from the FrameNet database onto the vocabulary in the program's first-year online textbook *Deutsch im Blick*. 97% of the 2,000 words in *Deutsch im Blick* were covered by existing English frames. Subsequently, Boas & Dux (2013) study on how second-year L2 learners of German use lexical entries in G-FOL to learn new words within the Personal_Relationship frame found that a G-FOL experimental group outperformed a control group on tasks that asked students to describe semantic and pragmatic differences of words. The learners who engaged with G-FOL demonstrated a better understanding of the range of meanings pertaining to personal relationship expressions in German.

The German Frame-Semantic Online Lexicon

The G-FOL website provides information about semantic frames and the words that evoke them, together with detailed information about the word's usage, sentence templates, and grammar and cultural notes. By learning vocabulary through a frame-semantic view, L2 learners can develop their metalinguistic awareness about the lexico-grammar as a system of meaning-driven patterns. To illustrate the types of information accessible in G-FOL, consider the Grooming frame (see Figure 1), which includes a frame description, a picture depicting the frame's meaning, and a list of core Frame Elements (FEs) for the frame, whose definitions can be viewed by dragging the mouse over the FE name.

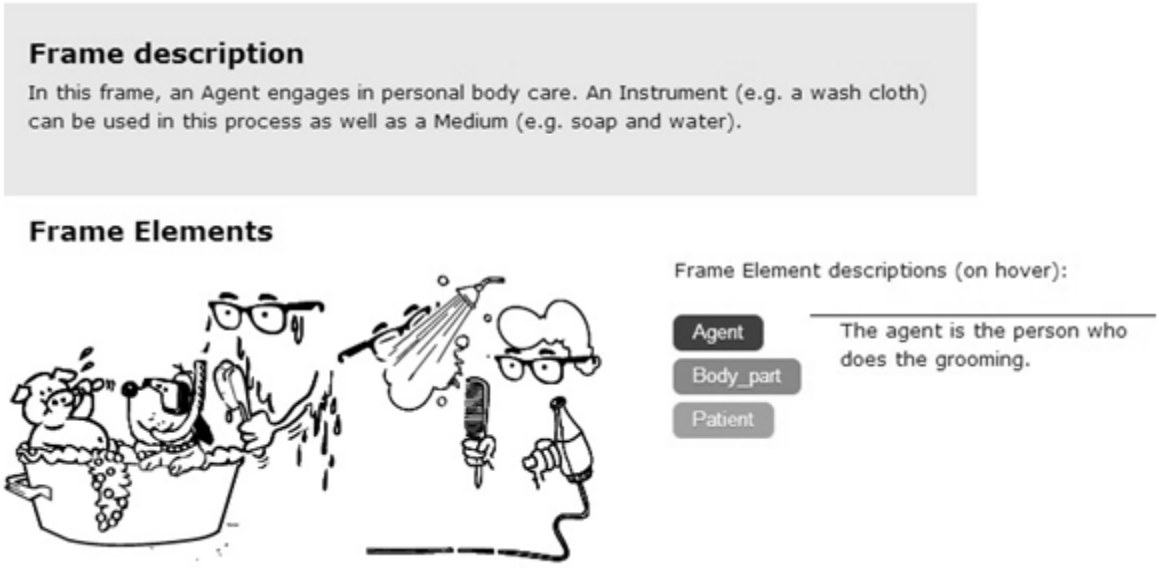


Figure 1

Frame description for Grooming frame in G-FOL

G-FOL users can find a list of all relevant lexical units (LUs; an LU is a specific sense of a word) at the bottom of the frame description, while more detailed information about individual LUs can be accessed by clicking on the appropriate circle next to each LU. Figure 2 shows a portion of the LU list for the Grooming frame, as well as the "Details" for the LU *bürsten* ('to brush').

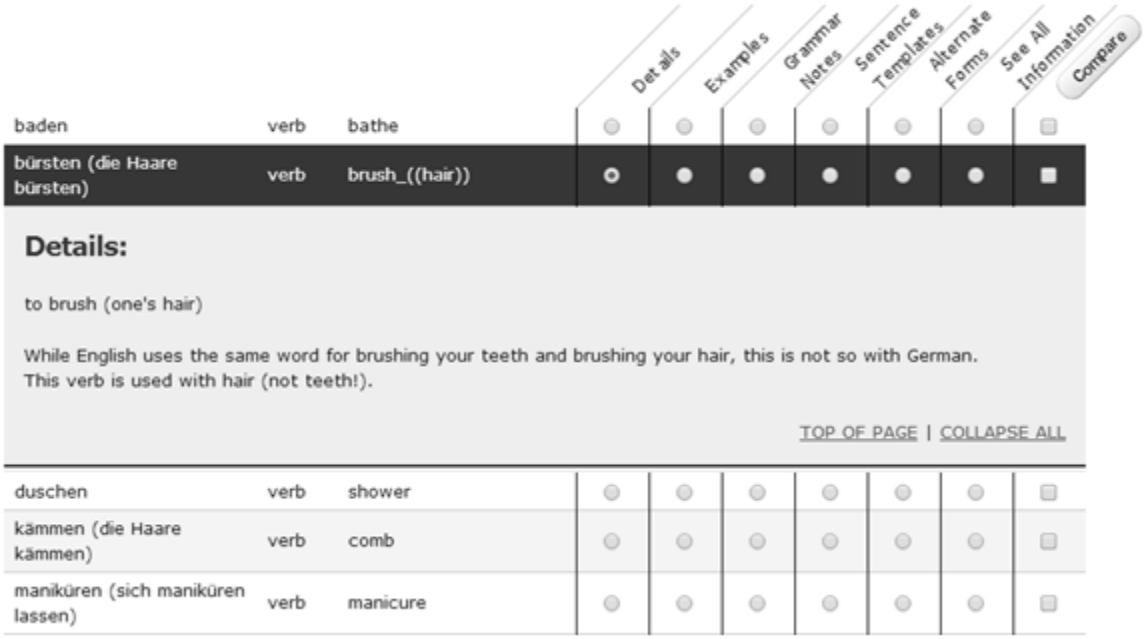


Figure 2

Partial LU list for Grooming frame with focus on details for the LU *bürsten* (‘to brush’)

“Grammar Notes” provide additional useful information about LUs by describing differences between individual or sets of LUs and their English counterparts in the grammatical expression of Frame Elements. Figure 3 shows a section of the “Grammar Notes” relevant for the verb *sich duschen* (‘to take a shower’). Here, G-FOL users learn that the German construction (a pairing of a specific form with a specific meaning) *sich duschen* is used as a transitive verb (with the direct object frequently appearing as a reflexive pronoun when one bathes oneself), whereas the English noun *shower* is often used in combination with a light verb, *take*, as in *to take a shower*.

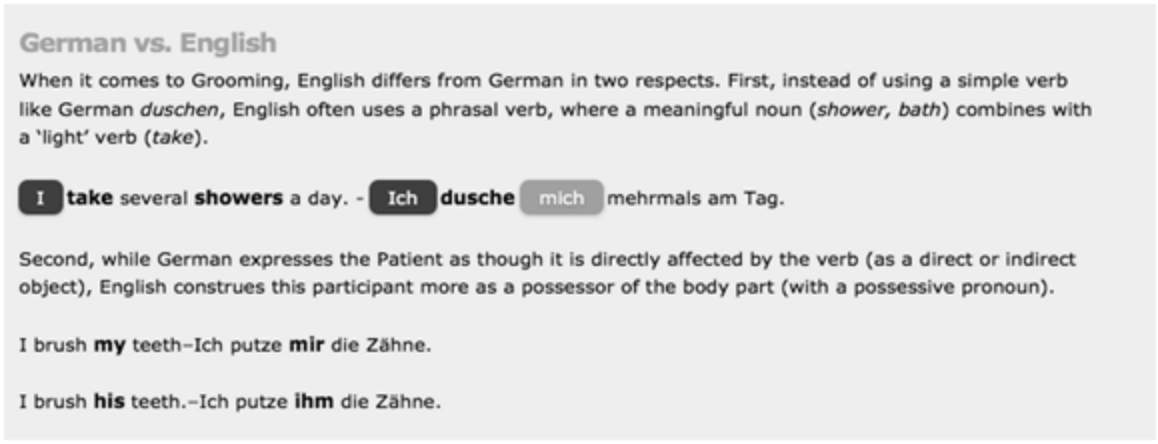


Figure 3

Example of "Grammar Notes" for *sich duschen* ('to take a shower')

G-FOL also provides a list of three to six example sentences for each LU showing how the construction is used in context. The example sentences and their English translations, also at the sentence level thus promote meaning verification and retention (see Grace, 1998), are annotated for FEs using color-coding to inform users how individual participants (the frame elements of the semantic frame) are realized grammatically, thereby illuminating differences between the two languages. Figure 4 shows the example sentences for the verb *baden* ('to bathe') in the Grooming frame. The 'Agent' FE is colored purple (here, dark gray), the 'Patient' FE is pink (here, light gray), and the 'Body Part' FE is green (here, normal gray).

Figure 4

Example sentences for *baden* (‘to bathe’)

In addition to the “Details,” “Grammar Notes,” and “Example Sentences,” G-FOL also provides a list of “Alternate Forms” for each LU, which lists various verb forms for verbs (preterite, participle, etc.) or plural forms for nouns. Finally, G-FOL offers “Sentence Templates,” i.e., simple sentence “skeletons” that show how a verb combines with various configurations of its FEs. For example, the templates for *baden* (‘to bathe’) include “AGENT badet,” “AGENT badet PATIENT,” and “AGENT badet BODYPART.” The German sentence templates also appear together with English translation equivalents. Note that the simplified sentences in Figure 4 do not resemble natural communication in context; the primary goal of G-FOL, similar to most learner dictionaries, is to provide concise information about a word’s multiple syntactic and semantic combinatorial possibilities in order to provide clear sentences that are lexicographically relevant and easily understood by a beginning learner of German.

Because G-FOL is anchored in the highly-contextualized model of frame semantics that adopts an integrated semantic, pragmatic, and syntactic approach to meaning-making, it introduces users to both breadth and depth of a word's meaning and use. Indeed, a view of G-FOL through the lens of Nation's (2001) typology of vocabulary knowledge reveals a preference for presenting lexical information in terms of *meaning* and *use* (spoken and morphological dimensions of *form*, however, are not represented). Five of the six dimensions of *meaning* and *use* (i.e., *form and meaning, concept and referents, grammatical functions, collocations,* and *constraints of use*) are introduced to varying degrees across lexical entries of the different frames in German on the site, especially prevalent in the "Details," "Examples" and "Sentence Templates" sections.

Table 1

G-FOL mapped on to aspects of vocabulary knowledge (Nation, 2001)

		Frame Description	**Details**	**Examples**	**Grammar Notes**	**Sentence Templates**	**Alternate Forms**
Form	Spoken						
	Written	X	X	X		X	X
	Word parts						
Meaning	Form & meaning		X			X	
	Concept & referents	X	X	X		X	
	Associations						
Use	Grammatical functions			X	X	X	X
	Collocations		X	X			
	Constraints on use		X	X	X	X	

The comprehensive nature of this pedagogical dictionary is encouraging, particularly when compared to Brown's (2011) and Neary-Sundquist's (2015) findings that revealed much less attention devoted to conceptual and collocational knowledge, as well as constraints on use in

English and German FL textbooks. As described above, these different types of word knowledge are presented to learners in the online dictionary through a variety of ways, i.e., by providing definitions and multiple example sentences that highlight the semantic roles of words along with their English translations, explaining constraints of use including disambiguating commonly confused forms for English -speaking L2 learners of German, and representing the targeted words' semantic roles visually. In this way, G-FOL allows L2 learners to engage with lexical units representing varying levels of congruency between the L1 and L2, a key aspect of vocabulary learning that textbooks often do not address yet prove to be especially challenging for L2 learners (Ecke & Rott, 2019).

How do L2 learners engage with G-FOL's breadth of semantic information? Studies on online and multilingual dictionaries provide evidence that the use of reference tools can positively affect L2 learner's vocabulary retention (Laufer & Hill, 2000; Laufer & Levitzky-Aviad, 2006) and be managed by instructors through manipulating accompanying tasks (Peters, 2007). As such, the present study seeks to bridge the gap between intended and actual use by asking learners directly about their behavior.

To understand thus how G-FOL's main intended users engage with and understand this multifaceted vocabulary learning tool, we asked the following research questions: (1) How do beginning and intermediate instructed L2 learners of German perceive the G-FOL tool in learning vocabulary? (2) What aspects of the site do they find most useful for learning vocabulary, and how well do they find information presented and made accessible to its users? Answers to these questions, discussed below, should inform further materials development work by providing important information as to specific needs across instructional levels.

Method

Students' experiences with and perceptions of the G-FOL tool were elicited through online surveys with the L2 learners of German. This section describes the participants, instructional context, and quantitative and qualitative methods employed.

Participants and Instructional Context

Study participants (n = 65) were L2 learners enrolled in beginning and intermediate German courses at a large R1 institution in the American South in spring 2017. The lower-division German sequence, which fulfills the university's FL graduation requirement, runs for three semesters across two levels: The first year is a beginner-level, two-semester track with two courses (referred to here as German 101 and German 102 respectively), each meeting five hours per week. The second-year intermediate level (German 201) represents an intensive, one-semester course that meets for six hours per week in three two-hour sessions. Each of the three courses consists of several sections, many of which the researchers regularly taught.

Participants were recruited from three sections of each lower-division course for a total of nine sections: six in first year (German 101 and 102) and three in second (German 201). In early spring 2017, the research team visited the nine sections to present the study and invite students to participate. As shown in Table 2, 65 L2 learners completed the online questionnaire: 32 from the first-year courses (14 from German 101 and 18 from German 102) and 33 from the second-year course (German 201). This represents an overall 36% participation rate among all enrolled students. All participants were undergraduate students, ranging in age from 18 to 34 years with a mean age of 20.8 (first-year students averaged 19.8; second-year students averaged 21.8). 54% of participants were female, 44% were male, and 2% gave no answer.

Table 2

Study participants

Course *(Year)*	Participating Students (n = 65)	
	n	%
German 101 *(1st)*	14	21%
German 102 *(1st)*	18	28%
German 201 *(2nd)*	33	51%

Instruments and Data Collection

To study student perceptions of the use and usefulness of the German Frame-Semantic Online Lexicon (G-FOL) for vocabulary learning, the study draws on an online questionnaire, administered through Qualtrics (https://www.qualtrics.com/), that gathered information on learners' perceptions and reported use of G-FOL immediately following initial exposure to the site (see Appendix A for a truncated version of this survey).

During weeks 2–4 of the 2017 spring semester, all students enrolled in German 101, 102, and 201 were asked to visit the G-FOL site as part of a homework assignment (see Appendix B), complete the corresponding online survey, and prepare for a discussion in English about the learning tool in the next class period. The precise timeline differed for each course, as different frames were assigned according to when each G-FOL topic occurred in the course syllabi: German 101 used the Education frame in Week 2, German 102 the Buying and Selling frame in

Week 3, and German 201 the Grooming frame in Week 4. These frames were selected for their close correspondence to targeted vocabulary covered in *Sag Mal* (Anton, Barske, & McKinstry, 2016), the textbook used across all three courses. By aligning the G-FOL tool to the existing curriculum, we hoped to maximize student motivation for using the frame-based dictionary and thereby increase potential learning affordances.

For homework (see Appendix B), students were to access the assigned frame (Education, Buying and Selling, or Grooming) and study the specific vocabulary items/ LUs in the designated frame for as long as desired. (The education frame contains 26 LUs, the Buying and Selling frame has 20, and the Grooming frame 11.) We asked students to explore these different vocabulary items on the site and gave no further explicit instructions as our goal was to better understand how learners would navigate the site on their own.

Data Analysis

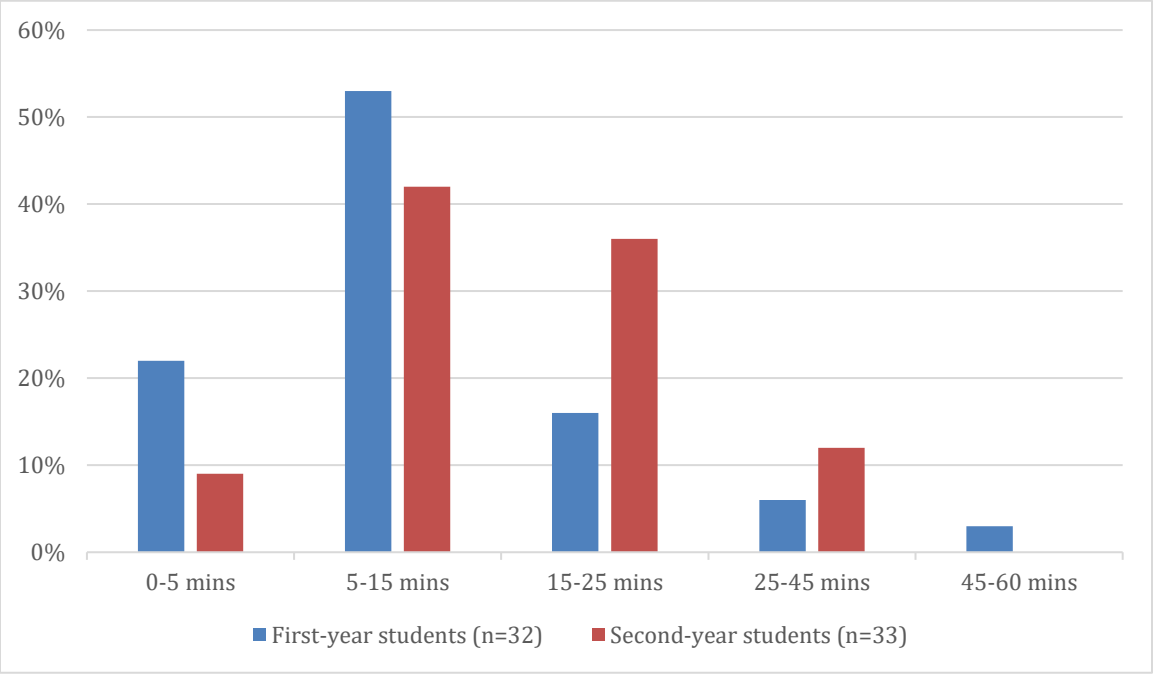
The student surveys serve as the main source for quantitatively and qualitatively analyzing students' reported experiences with and perceptions of the G-FOL tool. Numerical data offer information about students' reported time spent on the G-FOL site, information students accessed most often, students' perceived usefulness of the site, and their confidence levels in learning vocabulary through the tool (see questions in Appendix A). Additional qualitative analysis of the open-ended survey questions provides more detailed information about students' experiences, including issues related to design and user interface, a final topic addressed in the Results section. When reporting the results, means in percentages, standard deviations as well as total numbers of participants from either three- or five-point Likert-scale

questions are provided where appropriate. Where applicable, quantitative data findings are supplemented with student quotes that emerged in the qualitative analysis.

Results

Site Navigation

A first step in understanding the L2 learners' experiences with G-FOL involves consideration of time spent navigating the site, as well as content accessed most often. Reporting on these aspects, this section provides a baseline of learners' experiences exploring the site on their own without specific prompts to guide their reflection.



Note: No student spent more than 60 minutes on the G-FOL assignment.

Figure 5

The average student reported spending approximately 15 minutes on the site. As Figure 5 above shows, most first-year students (53%) spent 5–15 minutes, while an almost equal percentage of beginning students spent less than 5 minutes (22%) and more than 15 minutes (25%) navigating the site. The second-year students, in contrast, reported spending more time on the site, with 48% indicating lingering 15 minutes or more and 42% 5–15 minutes.

To examine student experiences with G-FOL, Q29 asked students to indicate which pieces of information they accessed the most frequently during the assignment. As Table 3 illustrates, *Examples* and *Details*, two sections that communicate diverse aspects of lexical knowledge from conceptual word knowledge to use-related information includings collocations and constraints on use (see Table 1), appear to have held students' attention the most. First-year students reported visiting *Examples* (56%) and *Details* (53%) most frequently, followed by *Sentence Templates* (19%) and *Grammar Notes* (16%). Second-year students responded similarly, with 61% accessing *Examples* most frequently, followed by *Details* (48%) and *Grammar Notes* (36%). The less frequently visited sections for both groups included: *Frame Descriptions* (14%), *Pictures* (9%), *Alternate Forms* (8%), and *Sentence Templates* (18%); low numbers for these categories are not surprising given the shorter amount of text that these sections offer their readers compared to the more frequently accessed pages. Second-year students accessed *Grammar Notes* more often than their first-year counterparts while the first-year group seemed to spend more time with *Details*. These results give reason to believe that both first- and second-year students seem to appreciate lexico-grammatical information about the meaning and use of vocabulary items as outlined by previous work on vocabulary learning and further discussed below.

Table 3

Information accessed most frequently (reported)

	First-year (n = 32)		Second-year (n = 33)		Total (n=65)	
	n	%	n	%	n	%
Examples	18	56%	20	61%	38	58%
Details	17	53%	16	48%	33	51%
Grammar Notes	5	16%	12	36%	17	26%
Sentence Templates	6	19%	6	18%	12	18%
Frame Descriptions	5	16%	4	12%	9	14%
Pictures	2	7%	4	12%	6	9%
Alternate Forms	1	3%	4	12%	5	8%

Note: Students were allowed to select multiple options for this question.

Overall, students reported using the G-FOL site for a fairly short amount of time (approximately 15 minutes) with second-year learners noting slightly longer time spent on the site than first-year students. While these data speak to time spent, they do not reflect the amount of content explored or what and how well the participants learned the LUs. The data on pages accessed most frequently also indicate that many students value more detailed information about different LUs, including how LUs are used in example sentences.

Students' Perceived Value of the G-FOL Vocabulary Learning Tool

Responding to a three-point Likert scale on the question of reported usefulness of G-FOL for vocabulary learning (Q31), all beginning and intermediate learners reported G-FOL as a useful tool (see Table 4 below), with a similar distribution between those students who found it "very useful" (53% of first-year students and 44% of second-year students) and those who found it "somewhat useful" (47% of first-year students and 56% of second-year students). A higher mean of 1.56 (.50) for first-year students indicates that this learner group found G-FOL slightly more useful as a resource for their vocabulary learning than second-year students (*M* =1.47 (.50)).

Table 4

Reported usefulness of G-FOL for vocabulary learning

	First-year (n = 32)		Second-year (n = 32)		Total (n = 64)	
	n	%	n	%	n	%
Very useful	17	53%	14	44%	31	48%
Somewhat useful	15	47%	18	56%	33	52%
Not useful	0	0%	0	0%	0	0%
	(*M* = 1.56, *SD* = .50)		(*M* = 1.47, *SD* = .50)			

Note: One second-year student did not respond to this question.

Students were also asked to reflect on the usefulness of the different information presented on the G-FOL website for their learning of German vocabulary (Q27 from the survey). Of the six sections for each semantic frame (see Table 5 below), 84% of all first-year students found *Details* and *Examples* to be most useful followed by *Sentence Templates* (75%), while 91% of second-year students ranked *Examples* as most useful for their learning followed by *Details* and *Grammar Notes* (both 88%).

Table 5

Reported usefulness of information presented in G-FOL

	First-year (n = 32)		Second-year (n = 33)		Total (n=65)	
	n	%	n	%	n	%
Examples	27	84%	30	91%	57	88%
Details	27	84%	29	88%	56	86%
Grammar Notes	23	72%	29	88%	52	80%
Sentence Templates	24	75%	25	75%	49	75%
Alternate Forms	23	72%	22	41%	45	69%
Frame Descriptions	21	65%	19	57%	40	62%
Pictures	16	50%	15	45%	31	48%

Note: Students were allowed to select multiple options for this question.

Qualitative analysis of the open-ended questions from the surveys revealed that many students found the organization and categorization of vocabulary items as well as the depth of information provided on the site helpful for their understanding of targeted vocabulary. A common theme voiced by both beginning and intermediate learners was the site's comprehensiveness, allowing its users to access multi-faceted information about individual lexical items in one place without having to refer to other reference works. One intermediate student, for example, described G-FOL as a "one stop shop for vocabulary learning." The student explained: "Instead of looking up words in a dictionary and then googling examples I can access all of the information at once." Indeed, a number of students found the GFOL explanations to be overall more comprehensive than standard dictionary entries given the additional contextual information offered such as sample sentences and usage rules associated with key vocabulary words. The *Example Sentences*, which were valued by 88% of the student respondents (see Table 5 above), were cited as especially helpful in being able to see words in context, as one German 102 student noted: "Most dictionaries don't provide enough examples in a variety of contexts, and I appreciate the G-FOL's example sentences." Other students mentioned the color coding of the FEs used across the site as helpful in understanding how words were used in sentences: "the color-coding made it much easier to see where everything fits in both the original German and the English translation" (intermediate learner). Overall, students seemed to appreciate the organizational layout of the site and the frames as a way to categorize and remember vocabulary, as in the following comment from an intermediate student: "I definitely think grouping related vocabulary words together into 'frames' helped me organize words in my brain."

The site's extensive amount of information seemed, however, to overwhelm certain students, especially beginning learners. One beginning student mentioned that having "all the

information available at once makes it difficult to decided [sic.] where to start." Two intermediate students offered differing viewpoints on the site's comprehensiveness: while one learner liked the possibilities for individualized help with G-FOL's "many different tools and options that users can select based on their own strengths, weaknesses, and preferences when learning vocabulary," another suggested that G-FOL might be more appropriate for highly curious students:

> Honestly, I think it's a really great resource for the type of student that comes to class always asking, "But WHY?" Personally, I think it's a lot of information. I think that the comparisons between English and German are useful for a lot of students, but when I'm learning a new language, my goal is to translate as little as possible. […] However, I know many students love to compare and would find that information useful.

These student comments highlight a recognition that G-FOL's extensive, elaborated information about word knowledge can help (certain) L2 learners process and think critically about different lexical forms, their relationships to other collocating words, and across languages, a point revisited in the Discussion section.

Students' Confidence Levels

Though the main source of students' feelings of confidence in using the new vocabulary items is difficult to identify, Q24 asked students to report on these feelings after using the G-FOL site. Students' confidence levels differed slightly between the two instructional levels. Responding to a five-point Likert scale from "very confident" to "not confident," second-year students reported feeling more confident in using the new vocabulary compared to their first-year counterparts, with 70% of second-year students feeling "confident" or "very confident" and 34%

of first-year students expressing confidence (see Table 6). Notably, 9% of the beginning learners reported not feeling confident at all; no intermediate learners marked this option. These higher confidence levels were corroborated by a few students (both beginning and intermediate) who noted in the open-ended questions that working with the G-FOL site was preferable to using dictionaries in helping them to feel more secure in using the word. As one intermediate student remarked: "… they provided a lot of information that you normally do not get from a normal dictionary. I like this because I can be more confident that I am using the vocabulary correctly."

Table 6

Reported confidence levels after using G-FOL

	First-year (n=32)		Second-year (n=33)		Total (n=65)	
	n	%	n	%	n	%
Very confident	1	3%	0	0%	1	2%
Confident	11	34%	23	70%	34	52%
Neutral	17	53%	10	30%	27	42%
Not confident	3	9%	0	0%	3	4%
	(M = 2.70, SD = .67)		(M = 3.29, SD = .46)			

Site Design and User Interface

A final theme emerging from the students' feedback on the survey centered not on the content of the site, but rather on learners' interactions with its design and user interface. Student

opinions about the organization of information on the G-FOL site differed greatly. While some students found the site to be "well-organized" and "intuitive," others described it as "disorganized" and "minimal." As mentioned earlier, some students appreciated the color coding to indicate the different FEs, though a few pointed out that the colors themselves were not consistently used across the different site sections. Students also provided concrete suggestions for improvement of the site's functions, including a more dictionary-like search function, better drop-down menus, and a streamlined "compare" function used to compare similar LUs. Additionally, aesthetic and interface improvements were recommended to make the site more user-friendly and interactive. One beginning learner described their experience with the G-FOL site as if they had "wandered into an underdeveloped page but as [they] started to hover over the different options, [they] realized how much information was available." Indeed, a common observation made by the students was that it took some initial time to make sense of the site before its information became meaningful to them. On the learners' wish list were: audio samples of featured vocabulary and activities (e.g., quizzes, flashcards, exercises, games) to practice and receive immediate feedback on their understanding of frame semantic concepts and their ability to use targeted language forms.

Discussion

This exploratory study set out to examine the reported experiences of beginning and intermediate L2 learners of German engaging with a frame-based dictionary. As noted at the outset of this article, the German Frame-Semantic Online Lexicon provides its users with comprehensive lexical information regarding semantic, pragmatic, and syntactic patterns for key thematic categories typically found in beginning and intermediate German language courses. Many of G-FOL's features (especially the site's sections *Details, Examples,* and *Sentence*

Templates) cover multi-faceted aspects of L2 vocabulary knowledge as outlined by Nation (2001), and attend to the shortcomings in German language textbooks described by Neary-Sundquist (2015), where two areas in particular, *meaning* and *use*, have received minimal attention. For language learners of German, G-FOL can therefore fill an important gap in understanding how to use foundational vocabulary words accurately and appropriately.

A look at L2 learners' initial perceptions of working with the online lexicon shows that many novice learners indeed value G-FOL's highly-contextualized information. Although students reported using the site for a short amount of time, both beginning and intermediate learners found overall the resource to be useful for developing vocabulary. The learners' high marks given to the *Examples* and *Details* sections, in particular, both of which present use-related information such as collocations and constraints on use through illustrated examples, suggest that both novice learner groups appreciate learning about a word's particular contexts of use. (The only feature from Nation's taxonomy, however, that students lamented was missing in G-FOL was *spoken form*, e.g., audio samples that allow users to hear how a word is pronounced.) Additionally, the analysis points to both beginning and intermediate learners feeling confident in using the new vocabulary items studied in the online dictionary and appreciating the organization and categorization of the G-FOL site. The following discussion expounds on differences observed between the two learner groups.

Given the small number of student participants in this study, caution is needed in generalizing the findings reported here beyond this localized instructional setting (indeed, the numbers were too small to conduct meaningful statistical analyses). This exploratory study, however, does offer thoughts on how the G-FOL resource might be used productively in a collegiate German program, and while few distinctions were found between instructional levels,

certain preferences among the two groups can inform further materials and lesson development, especially in considering which aspects of the site to have students visit and how best to scaffold this work.

Although the G-FOL website was originally developed for beginning L2 learners of German, the analysis indicates that the tool is equally if not more appealing to intermediate learners, who reported spending more time on the site (almost 50% spent 15-45 minutes perusing the site) compared to the beginning learners (only 25% spent more than 15 minutes). While slightly more beginning students rated G-FOL overall as useful, more intermediate learners found G-FOL's different sections (i.e., *Examples, Details, Grammar Notes*) valuable for their vocabulary learning. Additionally, more intermediate learners compared to beginning learners expressed confidence in using the new vocabulary items learned on the site. Following this, one might ask whether G-FOL is just as or even more suitable for more advanced L2 learners.

Another difference between the two groups pertains to the *Grammar Notes* feature, which the intermediate learners tended to access more often and found more useful than the beginning learners. Here, it is important to note that these grammar explanations do not reliably provide LU-specific information but rather tend to focus on particular parts of speech that the LU represents. It may be that the *Grammar Notes* provide these intermediate learners with a "refresher" for foundational grammar structures that can be expected to be covered in first-year classes but whose descriptions are expanded on from an explicit frame semantic perspective on the G-FOL site (e.g., the grammar section that corresponds to LUs that are verbs reviews the case system by framing discussion in terms of the construct of transitivity and semantic roles). From this, it is possible that the intermediate learners may be more developmentally ready to process G-FOL's in-depth information in developing their vocabulary knowledge. In support of

this are comments from some beginning learners who felt overwhelmed by the extensive information on the site.

This exploratory study sought to understand beginning and intermediate L2 learners' initial impressions of working with G-FOL without instructional guidance in order to develop a sense of the tool's potential learning affordances seen from the learners' perspective. Since initial data collection for this study, numerous class activities and instructor manuals have been developed by the G-FOL design team (Gemmel, 2016-2018) in an open-resource shared google drive (https://drive.google.com/drive/folders/0Byg7PyauMJRScWtuSGh4ajZ4d1U) that includes PowerPoint presentations, text-based comprehension activities, and explicit vocabulary exercises. Indeed, two of the three frames profiled in this study (Buying and Selling and Grooming) are didacticized, and LUs from the Education frame are additionally included in example sentences in the how-to materials folder.

Given that repeated exposure to words in context promotes L2 vocabulary acquisition (Nation, 2001; Schuetze, 2019; Uchihara, Webb, & Yanagisawa, 2019), lessons developed around G-FOL frames can capitalize on the site's numerous recycled LUs that appear in different sentence configurations across the frames. Semantic field ('Wortfelder') activities, for example, could be paired with the G-FOL site to encourage students to make form-meaning connections and organize lexical knowledge conceptually within a given frame. In constructing their own frame-based lexical fields, learners can not only increase repeated exposure of key words and their collocations, but also practice selecting and combining words in their own visual networked patterns. In this way, G-FOL can serve as a 'priming' tool for L2 learners to understand how to develop semantic fields within natural communication, an activity that can prove to be hard even for advanced L2 learners when asked to "mine" a text for thematically-related words.

As some students expressed feeling overwhelmed with the amount of information available to them or uncertain as to how navigate the G-FOL site, careful guidance by the instructor is necessary before having learners engage with the tool. Inductive approaches to vocabulary teaching that encourage learners to "guess from context" (Hunt & Beglar, 1998; Schmitt, 2019) as they formulate and test out hypotheses has been found to improve L2 learners' collocational knowledge (Tsai, 2019). Since G-FOL's example sentences proved to be one of the most valued and most frequently accessed part of the site by the L2 learners in this study, a productive initial activity with the online dictionary could start by having students discover patterns (especially key semantic roles) in the example sentences before engaging with the more elaborate explanations about meaning and usage rules provided on the site.

To promote L2 vocabulary retention, L2 learners can also be asked to consult the G-FOL site when composing or revising texts related to particular thematic foci. Linking vocabulary learning to writing supports Laufer & Hulstijn's (2001) Involvement Hypothesis that proposes that form-focused activities with high *need*, *search*, and *evaluation* components create effective vocabulary learning tasks (see Laufer, 2009, for further discussion). By working through the site's example sentences, in particular, learners can process the lexical information more deeply and refine their word knowledge.

A further implication for the future of the G-FOL site arises from the qualitative analysis of students' feedback on visual design. As noted above, most students' first impressions of the site focused on issues of design (Q23), especially the salience of various elements, a point that underscores the importance of the visual for students' engagement with instructional materials. As one example, students reported the color-coding of frame elements throughout the site as helpful. A second example concerns the way students access different information via drop-

down menus, which some students found unintuitive and overwhelming. When designing visual materials of any kind, it is important to consider design to maximize their relevance and efficacy for students. Further development of this and similar materials, thus, will benefit from consulting literature on multimodality (e.g., Kress & Van Leeuwen, 1996/2006) and the construct of the 'multimodal ensemble' (Serafini, 2014). By considering how specific modes of meaning are selected to realize certain aspects of a larger message, as well as how they function in concert, materials developers can address how content can best be presented and the various ways it may be received in the learning process.

Limitations and Future Directions

To support further development of G-FOL and understand its potential affordances for classroom use, it is necessary to address this study's limitations. In addition to the small number of participating students in this study, which cautions one in generalizing the findings to other contexts, one methodological concern pertains to the three different semantic frames the three L2 learner groups engaged with on the G-FOL site. While we hoped to retain ecological validity by selecting frame topics for each class that fit targeted vocabulary already used in the students' classes, it is difficult to make comparisons of student feedback when each learner group interacted with a different frame on the site.

Another limitation concerns the nature of the data collected. Students' reported experiences with the site provide just one aspect, though an important one, of a larger picture of how materials are used and valued. While an average of 15 minutes per learner spent interacting with G-FOL is an admittedly small amount of time, we wanted to gather data on first impressions and perceptions without disrupting the existing curriculum. Importantly, these

results have yielded meaningful data that can guide the development of further research. A true ecological approach to materials development, for example, would also look to the actual use of the materials by key users and consider their relationship to other artefacts in the curriculum.

Future directions should also include data on student learning such as comparisons of vocabulary learned through word lists. Data on site usage and exploring how useful students find the tool in terms of learning specific aspects of vocabulary such as collocations and different word meanings would strengthen future studies. Given the extensive, multi-faceted information provided in G-FOL, future research on frame semantics in L2 vocabulary acquisition could also investigate the use of frame-based dictionaries for advanced L2 learners in developing vocabulary knowledge, as well as track L2 learners' experiences longitudinally across a curriculum in order to see how conceptual knowledge of semantic frames and frame-based lexical knowledge develops and how this knowledge may impact learners' vocabulary acquisition.

Future Directions: Materials Development and Classroom Ecology

Returning to our earlier discussion concerning materials development approached from an ecological classroom perspective, our study informs both on-going development of the G-FOL site in terms of content and form, as well as continued reflection on how best to use and integrate the tool into regular classroom practice. Following this initial step of asking our students to share their impressions and experiences with using the G-FOL site, we see the need to involve teachers again in the process, particularly in co-developing local pedagogies surrounding the use of the lexicon for L2 learners across different curricular levels and observing how the materials are actually used in instruction (see Guerretaz & Johnston, 2013). Soliciting

teacher feedback of G-FOL, sharing the current study results with the instructors, and encouraging teachers to continue exploring the tool with their learners serve as natural next steps in understanding how the G-FOL site optimally works with different users (teachers, program coordinators, and students) and with other instructional materials across the curriculum. Through such an approach, we hope to gain a better understanding of the learning affordances and constraints for working with this and other vocabulary learning tools.

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Appendices

Appendix A: Online Survey (Selected Questions)

Q23. What were your first impressions of the G-FOL site?

Q24. On a scale from 1-5, how confident do you feel using the new vocabulary now?

Very confident (1) – Not confident at all (5)

Q25. Which pieces of information did you access first? (Choose one or more)

[Frame description / Pictures/ Details / Examples / Grammar Notes / Sentence Templates / Alternate Forms]

Q27. The G-FOL site presents different information through tabs users can access. Please rate how useful you found the different pieces of information for your learning of German.

Very useful (1) – Not useful at all (5)

a. Frame description

b. Pictures

c. Details

d. Examples

e. Grammar Notes

f. Sentence Templates

g. Alternate Forms

Q28. How were these pieces of information helpful/not helpful?

Q29. Which pieces of information did you access the most? (Choose one or more)

[Frame description / Pictures/ Details / Examples / Grammar Notes / Sentence Templates / Alternate Forms]

Q31. Do you think the G-FOL is a useful resource for learning vocabulary?

Q32. Why? Please elaborate.

Q33. How can the G-FOL be improved? What other pieces of information would help you learn with the G-FOL better?

Q36. How much did you enjoy learning with G-FOL?

Q37. Why? Please elaborate.

Q38. Is there anything else you would like to share about your experience working with the G-FOL?

Appendix B: G-FOL Vocabulary Learning Guide

The Assignment. A key part of learning a foreign language involves learning vocabulary. The German Frame-Semantic Online Lexicon (G-FOL), created right here at the University of Texas at Austin provides detailed information about how specific words in specific word families (labeled “frames”) are used in German. Because this is a relatively new site, the department is eager to hear your experiences as a student of German in working with the site and how it can best be used.

For your homework assignment, please visit the G-FOL site and explore as much information from the “frame” as you would like. You are free to print out the materials or take any notes, though not required. Once you are finished looking at the site, please go to [URL for Qualtrics]

to fill out a survey on your experiences using the G-FOL site. Feel free to go back to the site for reference as you take the survey.

For our next class, we will spend some time in class talking about the G-FOL website (in English). So, please come prepared ready to share any feedback you have on the learning tool!

Here is a guide to help you navigate the website:

1. Visit the website https://www.coerll.utexas.edu/frames/ and view the short video that introduces the website
2. Choose the Frame [insert frame] from the drop down menu.
3. Below, you will find different categories related to [insert frame]. By clicking on the arrows, you will find all lexical units (LU)s related to that frame. Each LU contains different information about the frame (including grammar notes and examples). Explore all of the LUs.

Things to remember. For the frame, there is a Frame Description provided by G-FOL. Next to the picture you can also hover over the different frame elements and read the detailed descriptions. Make sure you familiarize yourself with all elements of the frame. Click around and explore! Get to know the website, as it may be helpful for you in the future!