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# Sustainable vocabulary acquisition in Japanese classroom with the help of Memrise

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## Abstract

This paper presents the methodology and results of creating Croatian language materials for e-learning and m-learning of Japanese language vocabulary through Memrise platform. Firstly, we have assessed previous research on the subject of vocabulary acquisition and e-learning, as well as the existing free platforms for language content creation. According to both the literature review and assessment of e-learning tools, Memrise was chosen as most fitting platform. Secondly, materials were created using language textbooks Genki 1 and 2 as a reference, since they are main Japanese textbooks used in Croatia. Upon the completion of the e-courses, they were distributed to the students and their results recorded. After two semester usage with the group of 27 university students, those who have regularly used Memrise for learning have had 40% better grades at the end of both semesters. Although vocabulary is only a part of the cumulative language acquisition process, sustainable learning e-system can help students to improve all their language skills. We have found that students mostly enjoy using Memrise to study, and that it is beneficial to their results.

**Keywords:** vocabulary acquisition, Japanese, e-learning, spaced repetition, Memrise

## 1. ON THE VOCABULARY ACQUISITION AND ITS ISSUES

### 1.1. Japanese study and vocabulary acquisition in Croatian learners

This paper deals with specific issue in language learning – the acquisition of vocabulary, and the development of innovative e-learning and m-learning methods in order to overcome the issue in question. We will deal with Japanese language, and Croatian learners in this paper. Japanese, as a non-Indo-European language, presents a challenge in the vocabulary acquisition area, since a Croatian learner cannot memorize words with the aid of similarity (as is the case with the Indo-European languages), or in most cases, is not exposed to native speakers to such extent that he or she can acquire the language naturally. Since vocabulary and grammar are building blocks on which other language skills – listening, reading, speaking and writing – can grow, it is important to ensure that learners develop their vocabulary well: both in volume and with consistent speed.

In Croatia, most learners of Japanese use traditional methods of studying vocabulary. According to the survey across Croatian cities where Japanese course is available (Janjić, Librenjak and Kocijan, 2016), only 25% of students have had a chance to encounter e-learning and m-learning in their language classrooms, while they rate the relevance of such study methods 4.5 out of 5, and the average interest of a student in using e-learning or mobile learning is 4.1 out of 5. These figures state that digitalization of Japanese materials in Croatia is well wanted and necessary.

Students of Japanese in Croatia do not generally rate vocabulary acquisition as one of the biggest issues in learning Japanese, but are stating the script (ideographic *kanji* characters, with around 2000 characters they need to memorize) and speaking as the most difficult in their learning process, with 38% of students stating the script and 22% of students stating speaking as most difficult, according to Janjić, Librenjak and Kocijan (2016). Still, one can argue that vocabulary is one of the hidden areas that hinder one's ability to be more expressive in their speech, and enable to memorize more *kanji* if the word behind it is known, as it is less of a difficulty for Japanese children who only need to connect the shape of a character with the sound. We do recognize the importance of developing proper methods for teaching *kanji*, and we have dealt with the issue in Librenjak, Kocijan and Dovedan Han (2012).

### 1.2. A case for Memrise as supported by research in learning strategies

Memrise is a vocabulary learning website which exists in the form of web application as well as an Android and iPhone application free of charge. It provides the option of creating courses with desired vocabulary in almost any language, or using any of the existing for individual learning. Its main qualities are ease of accessibility, option of mobile learning at any place and time, employment of spaced repetition algorithms for better recall, providing knowledge testing methods, and usage of gamification elements such as scoreboards. This section seeks to connect the findings in learning strategies research with the functionalities of Memrise, thus proving it to be a feasible choice to use in classroom setting, and not just individual and goal-less learning.

Learners sometimes lack the discipline to study outside of the classroom and rely too much on the teacher, but according to Macaro (2001), the strategies for vocabulary acquisition are largely individual and learners need to rely on themselves and their own practices more than completely relying on a teaching process. Digital methods that adapt to the learner, i.e. spaced repetition methods which store individual memorized data and assess the knowledge according to this data, would be beneficial in this context. Memrise uses spaced repetition in order to facilitate memorization and recall, but does so on an individual level.

Still, self-regulated learning can be difficult to manually regulate at times. A learner would need to self-assess the review intervals, which is not only difficult to predict, but also an unnecessary task which takes time that could be better invested. Pyc, Agarwal and Roediger (2014) argue that it is important to review items at spaced intervals, but it is much easier to do so using a computer regulated algorithm such as the one used in Memrise.

Lastly, testing is a method of vocabulary acquisition which, according to Brown, Roediger and McDaniel (2014) is more efficient than studying without having to generate response, and especially if an effort is put into responding to a question. Brown et al. state that students retain more information when they have to work harder to answer a question, and when they just go over vocabulary lists, they tend to overstate their knowledge if they are not explicitly tested on it. Along with this research, Huesler and Metcalfe (2012) have found that learners often avoid making the mistakes in language learning, but are wrong in this belief, as error making is greatly correlated with better recall of word pairs. Kornell, Hays and Bjork (2009) also state that feedback which comes after unsuccessful attempt leads to more learning, than spending time to simply memorize the word pair. Since Memrise constantly uses testing methods, as opposed to simply presenting the data, it should serve better in the task of helping students with vocabulary recall.

## 2. VOCABULARY E-LEARNING USING MEMRISE AND SIMILAR TOOLS

### 2.1. Comparison of Memrise and similar tools

Along with Memrise, there are few other online tools that provide similar functions. Since our goal was language learning, with the vocabulary acquisition in the focus, not every flashcard and e-learning site was adequate. Table 1 presents similar tools and their characteristics.

Table 1. E-learning and m-learning websites and tools

Name of the service	Website	Tool type	Creation of own materials	Mobile apps	Pricing	Spaced repetition algorithm	Testing types
Anki	ankisrs.net	downloadable app, simple flashcards with powerful algorithm	yes	yes	free, 24.99\$ for iOS	yes	self-checking

Cerego	cerego.com	elaborate memorization site with many courses and nice design	yes	yes	free, 10\$/m pro	yes	multiple choice w/ none of the above option, spelling, audio questions
CoboCards	cobocards.com/en	flashcards web service with slightly outdated design, mainly for German market	limited	yes	free, 5.57\$/m pro	yes	flashcards viewing, no test
Cram	www.cram.com	simple flashcards with nice and usable design	yes	yes	free	no	self-checking, generated non-dynamic test, games
Duolingo	www.duolingo.com	non-customizable language courses	no	yes	free	no	multiple choice, spelling, audio
Memrise	www.memrise.com	elaborate memorization site with many courses and nice design	yes	yes	free, 9\$/m pro	yes	multiple choice w/ none of the above option, spelling, audio questions
Mnemosyne	mnemosyne-proj.org	flashcards downloadable app, not web-based	yes	yes	free	yes	self-checking
Learn that Word	www.learnthat.org	English vocabulary and spelling training site	no	no	free, 9.50\$/m pro	no	quizzes, tests, concentrated on English voc and spelling
OpenCards	opencards.info	flashcard app which can use PowerPoint files	yes	no	free	yes	self-checking
Quizlet	quizlet.com	simple flashcards with nice and usable design	yes	yes	free, 34,99\$/y pro	no	self-checking, generated non-dynamic test, games
Skritter	www.skritter.com	Japanese and Chinese characters flashcards	no	yes	14,99\$/month	yes	writing, reading
SuperMemo	supermemo.com	flashcards downloadable app, not web-based, a bit outdated	yes	yes	66\$ for program	yes	self-checking
Synap	synap.ac	web based flashcard quizzes (MCQ)	yes	no	free	yes	multiple choice quizzes with lots of feedback

Memrise was chosen as one of the best e-learning tools, providing users – both teachers and learners – with most functionalities, great application for mobile learning, and easily accessible and fun interface. Gamification element in the form of the leaderboard was also expected to be an important advantage. Other tools also showed some advantages, but were more applicable for some other area in language study, such as Anki for ideographic *kanji* characters, or Quizlet or Cram for fast studying, using games or quality TTS (text to speech synthesis) of whole sentences for pronunciation learning.

There is already some academic research on the usefulness of Memrise in classroom. Walker (2015), who did a case study in using Memrise to teach Latin vocabulary, states that “the quantitative data strongly support the superiority of Memrise as a way of learning Latin vocabulary, over the methods that students would otherwise self-select”. Her students found using Memrise enjoyable and convenient, and she concludes that Memrise would be a useful tool for Latin teachers to employ in teaching vocabulary.

## 2.2. Japanese courses already present on Memrise

As Memrise was chosen as the platform on which we would develop Croatian-Japanese materials for study, some preliminary survey of already created materials was necessary. At the moment of creation of our courses, there was no Croatian-Japanese materials online, so we reviewed English-Japanese materials, as English is used partially as a language of instruction in Japanese language course at the University of Zagreb, and all used textbooks are in English.

There is already a significant number of Japanese language courses present at Memrise, most popular being the one issued by Memrise itself (Japanese 1) with 164.000 users, and the one issued by user jlptbootcamp

(Introduction to Japanese), also a website dedicated to studying Japanese with the accent on passing the standardized test in Japanese called JLPT (Japanese Language Proficiency Test). The latter is by far the most popular course, counting as much as 585.000 users. Other popular courses are following prominent Japanese textbooks, such as Minna no Nihongo or Genki, or an online course and book called Tae Kim's Guide to Japanese. There are some courses specifically designed for various levels of JLPT test, N5 being the lowest and N1 being the highest level of the test. Lastly, there are some courses specialized for the acquisition of some of the Japanese scripts (syllabic *hiragana* and *katakana*, or ideographic *kanji*), and some very specialized vocabulary areas. Unfortunately, it may be difficult for users to be persistent in using any of the courses without the proper context – a course or an opportunity to use what they have learned. According to the survey conducted by Janjić, Librenjak and Kocijan (2016), only 20% of Japanese language students have previously had used Memrise in their studies, but they have used it more than any other e-learning or m-learning tool.

### 3. CREATION OF CROATIAN MATERIALS FOR MEMRISE

In our research so far, we have recognized two main problems for Croatian students when it comes to using e-tools and m-learning tools for the purpose of vocabulary acquisition. Firstly, there was no systematic course which follows curriculum, so the students can make most use of its content. Secondly, there was no course in Croatian as the language pair with Japanese, so even the learners with weaker command of English can make use of it. We believe that such course is needed also for the purpose of strengthening the Croatian identity in the Japanese learning community, as opposed to using English as a bridge between Japanese and Croatian learners. This is supported by the survey conducted by Janjić, Librenjak and Kocijan (2016), where we found that 63% of learners would prefer the native language materials, even though there is a disparity between young learners (high school students and young adults) and older learners (past university age) in this area. Younger learners find English materials satisfactory in their pursuits, while older learners would strongly prefer Croatian materials.

The survey also showed us that most prevalent textbooks in Croatia are Genki 1 and Genki 2 by Japan Times, and thus they were chosen for the basis of our courses. We have used Common European Framework of Reference for Languages (CEFR) to divide the courses into levels from A1 to B2. Textbooks Genki 1 and 2 were used as a reference in constructing the A1 and A2 courses, respectively, with 768 words in A1 and 751 word in A2 level. For higher levels, we referred to a number of textbooks, but have used Integrated Course of Intermediate Japanese and Tobira: Gateway to Advanced Japanese as base textbooks for reference for B1 and B2, respectively. Each level counts about 700 new words, and after A2 level they are represented both with syllabic *kana* script and ideographic *kanji*, so that a student can review both ways. Words were paired with their pronunciations recorded by native speakers available in public domain at Forvo website, and publicly created mnemonics were also provided. Bakken and Simpson (2011) argue that young learners benefit from using mnemonics in their acquisition of knowledge, and as we are aware that young adults are most prominent population amongst learners of Japanese in Croatia, we believed they would benefit from this approach. Figure 1 shows Japanese courses word list and a demonstration of a study process.

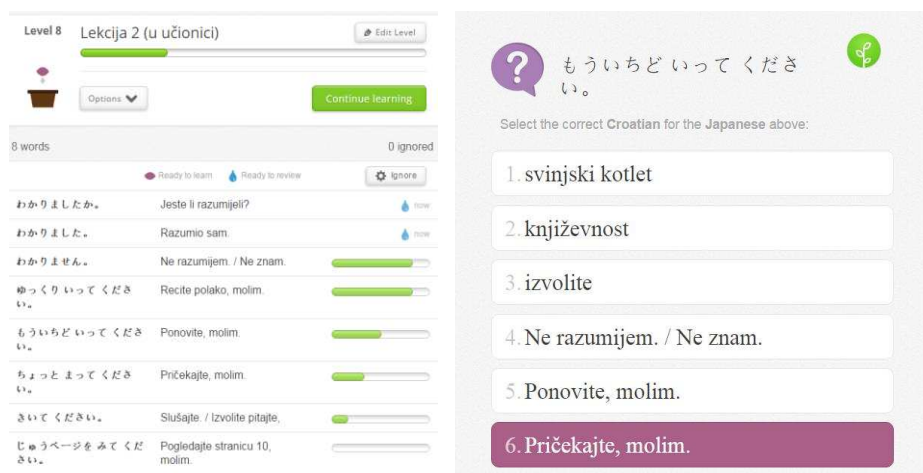


Fig. 1. (a) Memrise word list; (b) An example of test while studying

However, mere vocabulary lists may not be sufficient for some students. The grammar of Japanese is significantly different from Croatian, and some learners find it difficult to form a sentence even if they have mastered the necessary vocabulary. In fact, grammar was listed as third most difficult feature of Japanese language by Croatian students in survey by Janjić, Librenjak and Kocijan (2016). Having this in mind, we have also created accompanying levels (A1 – B1, with B2 in making for upcoming higher level students) with grammar in context, i.e. Japanese sentences with their Croatian equivalents. Each sentence contains only the vocabulary that was learned on the corresponding level of vocabulary course, and has a new grammar expression in focus. Grammar courses also contain Croatian language explanations for the forms that would appear in sentences on the next level. Sentences are also paired with their pronunciation, so learners can naturally acquire the sound of the language as well. Figure 2 shows grammar courses on Memrise: the explanation, sentence display and testing. Testing of the sentences is performed in three main manners: multiple choice, typing the sentence, and arranging the scrambled pieces of a sentence. All modes of testing can be conducted in Japanese, Croatian, or audio mode.



Fig. 2. (a) Grammar explanation in Croatian; (b, c) Examples of using the course

All Memrise courses constructed in this project were manually checked for errors, and updated frequently when an error is reported. As they are tested in the classrooms, it is believed that they are reliable and correct for the large part, so we can ensure that students do not learn an incorrect word or form. Higher levels are yet to be added audio, as they were not yet tested on a larger scale, since there is not enough learners of that level. Table 2 summarizes Japanese courses created on Memrise, as well as their main sources and number of users.

Table 2. A list of courses on Memrise created in this project

	Number of units	Main source	Users	Audio
Vocabulary A1	768 words	Genki 1	85	yes
Grammar and sentences A1	134 sentences	Genki 1	63	yes
Vocabulary A2	751 word	Genki 2	28	yes
Grammar and sentences A2	180 sentences	Genki 2	23	partially
Vocabulary B1	772 words	Integrated approach to intermediate Japanese	11	not yet
Grammar and sentences B1	266 sentences	Integrated approach to intermediate Japanese	10	not yet
Vocabulary B2	85 words (currently in making)	Tobira: A gateway to advanced Japanese	not published	not yet

One can see that there are not so many learners of Japanese compared to those worldwide, but considering the fact that there are only between one and two hundred active learners in Croatia all together (approximated according to the results of the 2016 survey by Janjić, Librenjak and Kocijan), we can be satisfied with the current number of users after an incomplete year of the courses' existence.

## 4. IMPLEMENTATION IN THE JAPANESE CLASSROOM

### 4.1. A method of implementation in the beginners Japanese course

In the academic year 2015/2016, these courses were implemented in Japanese language course at the University of Zagreb. Japanese language 1 (in the winter semester) had 27 students, while Japanese 2 (in the summer semester) had 17 students who have passed Japanese 1. It was an elective course for students of various majors, and not a course for Japanese majors. At these course, Memrise course Japanese A1 was used as an important part of the curriculum. The textbook used in the course was Genki 1, which was completed over two semesters with 3 school hours a week. With each of the 12 units in Genki 1, students were instructed to use Memrise consistently, as a preparation for the each unit.

Research supports implementation of computer based flashcards into curriculum (Altiner, 2011), but it is important to present it as an option and not a necessity, since not all students have the faculties to use e-learning and m-learning in the same amount. Thus, usage of Memrise was optional, and students were given a list of words to study in a traditional manner in case they did not chose e-learning or m-learning, but a large number of students gladly tried using Memrise course. Before starting the new unit, they were given a vocabulary test, and were required to correctly answer 70% words in order to pass it. Students who did not pass, had to retake the test at the next class. In addition to vocabulary quizzes, teacher ensured that students use new vocabulary in speaking and writing exercises. Each week, leaderboard at the Memrise site was inspected, and most avid users were noted.

### 4.2. Results

Out of the 27 students in Japanese 1 class, 15 were regulars users of Memrise course, and out of 17 students in Japanese 2 course, 10 used Memrise regularly. This data was later compared to final grades of the course, as shown in Table 2. Croatian grades range from 1 to 5, 5 being the highest possible grade, 2 lowest passing grade, and 1 meaning the failure of the class.

Table 3. Results of implementation of Memrise A1 Japanese-Croatian course in the class

	Japanese 1	Japanese 2	Cumulative
Regular Memrise users	55%	58%	56.5%
Average passing rate	85%	70%	77.5%
Average grade (if passed)	3.68 / 5	4 / 5	3,84 / 5
Average grade of Memrise users	4.63 / 5	4.5 / 5	4,56 / 5
Average grade of non-users	2.37 / 5	3 / 5	2.68 / 5
Difference between two groups	+ 48%	+ 33%	+ 40,5%

In both semesters, a bit over half of the students used Memrise on a regular basis, but almost all have tried it. Regular users are considered those who have had score on a leaderboard each week in the given course. Generally, their average score is significantly larger than non-users. Of course, they were more motivated in other areas of the course as well, but the contribution of regular vocabulary learning cannot be ignored. We can conclude that using Memrise benefited new students of Japanese, since they completed the course with better grades, even though quizzes and participation formed only 1/3<sup>rd</sup> of the whole grade in the course. Grade is considered an apt measure of their knowledge, because they were comprehensively tested in speaking, listening, writing, reading and participation. Students who have used Memrise throughout the course have had 40% better grades in the course - and the knowledge behind it.

## 5. CONCLUSION

This article dealt with vocabulary acquisition of Japanese language for Croatian students, and usage of e-learning and m-learning tools. Firstly, we presented the current state of Japanese learners in Croatia, and their issues in learning. Even though they do not always recognize the importance of vocabulary acquisition, it is connected with every language skill, such as speaking and writing which Croatian learners find most difficult in their study. Literature review pointed us to seek a learning and teaching tool which enhances the recall by enabling students to make mistakes, and test them often. Memrise, a web based application which also exists in the form of mobile application for m-learning, was chosen as a platform which would be most usable in the classroom. Studies suggest that it was already successfully employed in teaching vocabulary in the language classroom.

However, there was no Croatian language course with materials which follow Japanese language class curriculum, so no sustainable learning was possible with the language pair Japanese-Croatian. We have thus created Japanese course from levels A1 to B1, to be used in Croatian classrooms as an additional tool for teachers and learners. We have chosen vocabulary items and sentences from most used Japanese textbook in Croatia, and added audio and visual mnemonics for most of the content.

These courses were presented to students throughout Croatia, but one class of beginners using Memrise A1 course was thoroughly monitored in their usage for two semesters. More than half of the students in the class opted to use Memrise regularly every week. Even though that did not affect their grade directly, they did perform better on almost every part of the class. Cumulatively, Memrise users group have had 40% better grades at the end of the class than the group of non-regular users.

We can conclude that creating a systematic, sustainable courses which follow curriculum in the classroom benefit students' vocabulary acquisition as well as their overall progress. It is important that teachers and instructors include that course in their class through quizzes and exercises which would provide the students the opportunity to use and show their knowledge. Memrise also provides the function of keeping score each week and month, and displays it in leaderboard. This gamification element cannot be ignored in the education of young adults, since it served beneficially in their motivation. Overall, after two semesters of use, we would recommend similar courses for vocabulary acquisition of foreign language, both on individual level and in the classroom.

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