

Evaluation Report

The Danish Simulator – Exec Summary

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By **UNI-C**

*The Danish Center for Education & Research -
in cooperation with VIFIN*

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DANMARKS IT-CENTER FOR UDDANNELSE OG FORSKNING

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1. Project Summary

The Danish Simulator (DS) project was funded by the Foundation For Welfare Technology (www.ffvt.dk) in Denmark, under the Ministry of Finance. The foundation has as its main objective to fund projects that can *cut costs and increase efficiency within the public sector, without lowering the quality of the provided service.*

The DS project has been evaluated by UNI-C, The Danish IT-center for Education and Research, an agency under the Ministry of Children and Education. The original report is in Danish and will be provided upon request. Please contact thkha@vejle.dk

The current summary in English was done by VIFIN.

The purpose of the DS project has been to test whether the DS platform could substitute a given percentage of the traditional teacher based Danish classes at the language centers in Denmark, while maintaining an unchanged number of confrontation hours and passing rate, without lowering the quality of the experience or service provided by an actual teacher.

The DS is an online language- and culture learning platform (www.dansksimulatoren.dk) developed by the Resource Center for Integration in Vejle, Denmark (www.vifin.dk), in cooperation with private engineer Troels Myram (troels.myram.dk), Odense and Alelo Inc, Los Angeles (www.alelo.com), based primarily on Alelo technology and previous work on the Digital Pronunciation Trainer (DPT).

The DS platform contains three main elements 1) The Pronunciation Trainer, where the main purpose is to build vocabulary, teach the pronunciation of single words and detect and correct mispronunciations at the segmental level, 2) the Skill Builder section, which teaches conversation and cultural awareness and 3) the mission environment where the learner applies the obtained skills while navigating the city of Vejle and talking to the local residents while searching for Denmark's birth place, the Jelling Mounds, and the final encounter with King Harald Bluetooth, who erected the largest of the Mounds around the year 965 A.D.

There are 60-70 language teaching institutions in Denmark, receiving public funding, teaching Danish to an average of 45.000 learners every year, costing the Danish government approximately 150 million dollars annually. The number of learners has increased by appr. 13.000 over the past 5 years, while the number of teachers has remained the same and the number of available teaching hours decreased.¹

Language classes are free for a period of 3 years and handled by the local municipality. Either the municipality handles the teaching themselves or outsource it to private entrepreneurs.

Learners are divided in to 3 groups depending on their educational background:

¹ The latest report from 2010 states that 49600 learners took Danish classes. All reports are in Danish but can also be provided upon request. They are published annually, but with a two year delay, hence the newest one is from 2010.

Track 1 (T1): Learners who have no, or very little, education, are illiterate or have no knowledge of the Latin alphabet. This group constitutes approximately 7% of the entire group, on an annual basis.

Track 2 (T2): Learners with who have some schooling or a shorter educational background from their home country. This group constitutes approximately 40% of the annual learners.

Track 3 (T3): Learners with an intermediate- or higher educational background, PhD students for instance. This group constitutes the largest of the three with its appr. 53%.

Each of the 3 tracks is divided into 6 modules, where passing a test is required to advance from one module to the next.

Which track a learner is placed on, depends on a preceding “visitation” interview with a representative from the language center, where the purpose is to gauge a learner’s background and capabilities.

The premise for testing the DS platform was to have it take over 10 percent of in-class lesson on T2, modules 1+2 and T3, modules 1+2.

The DS platform was tested at three different language centers in Denmark simultaneously, over a 6 month period, divided into two periods of three months. The first period spanned October, November and December 2011. The second period was January, February and March 2012. Both a quantitative and a qualitative evaluation was done.

The quantitative results were obtained via module test scores and student records provided by the language centers and annual reports issued by the Ministry.

The qualitative results were obtained via written feedback in emails and through questionnaires provided to both teachers and learners, as well as through oral interviews with 1 teacher and 4 learners and on-site observation of 2 actual classes. Both experimental groups and control groups were part of the test.

10 experimental classes with, on average, 13 learners were involved in the trials. All in all appr. 200+ students had access to the DS platform.

2. Conclusion

The main purpose of the quantitative evaluation was to confirm or reject the initial hypothesis that 10 and 20 per cent of the normal teacher based classes at the T2 and T3 tracks, modules 1 and 2, could be replaced by the DS platform. Replacement had to take place without a decrease in the passing rate on the module tests that the learners are subjected to.

The main purpose of the qualitative evaluation was to identify whether learners or teachers felt a decrease in the quality of the provided service, by replacing the teacher with the DS platform, as compared to the traditional teacher based instruction.

The conclusion is divided in to two parts, summarizing the quantitative and qualitative results, respectively.

Quantitative evaluation

With the stated reservations regarding an analysis of language learning in general and differing teaching methodologies, the results of the trial show that:

Not only was the DS platform able to fulfill the success criteria and the pre-trial calculations, but exceeded expectations.²

Pre- and post trial calculations are shown in table below:

Table 1:

	Use of the DS platform	Current number of annual full-time equivalents at the 3 language institutions	Savings potential in annual full-time equivalents at the participating institutions.	Percentage of annual full-time equivalent	Potential savings in annual full-time equivalents on a national basis.
Pre-test calculations	in 10 og 20%	56,98	5,26	9%	42,92
Post-test calculations	in 10 og 20%	56,98	7,97	14%	65,03

Table 1 shows that given a best-case scenario, where exactly 10 and 20 percent of T2 and T3 classes could be replaced by the DS at the participating institutions, we would expect to be able to save the time equivalent of 5,26 teachers annually. On a national level this would amount to 42,92 teaching hours. The post-test calculations show savings using the actual percentages used in the trial.

² In some cases the DS platform was used in a higher percentage (up to 25%) than the indicated 10 or 20, still without a change in passing rate or other involved success criteria.

Calculating the savings potential for the three participating language institutions as well as on a national basis, is done by multiplying the annual full-time savings potential with the average teacher salary.³

The potential savings at the participating institutions: 556.136,- USD

The potential national savings 4.537.874,- USD

Note: the potential savings are calculated in the report based on a full-time equivalent of 1680 hours/year, which may vary depending on organization and union. 680 hours constitute the direct confrontation hours, while the remainder constitute preparation, meetings and administration.

Savings per teacher per module are illustrated in Table 6, in the main body of the report.*

Individual questionnaires were developed for both teachers and learners, where both parties were asked to evaluate different aspects of the DS platform on a scale from 1 (worst) to 5 (best)

With the teachers the average score was 4.2. When evaluating the DS exclusively on its ability to teach pronunciation and conversation, it receives a score of 4.0

The learner scores were completely identical to those of the teachers', both in terms of overall assessment and pronunciation and conversation.

Qualitatively

The qualitative evaluations are based on individual questionnaires distributed to teachers and learners, as well as interviews and, on-site observations and feedback via email and phone conversations.

Overall it is very clear that both teachers and learners were very enthusiastic about the DS platform working so specifically with pronunciation and conversation. Especially the Pronunciation Trainer part of the DS is mentioned in this connection.

Both groups could easily identify the potential of the *anytime/anywhere* concept where it is possible to work from home or elsewhere, at convenient moments. Unlimited practice time and tutor patience, as well as the possibility for weaker students to work in a 'safe' environment were also mentioned as advantages.

However, both groups also mention that there were and still are technical and user friendly barriers that at times makes it difficult to work with the DS.

Especially at the beginning of the initial trial phase there were many technical problems associated with running the DS platform on the IT-systems of the language institutions. The problems ranged from loading the platform to enabling the sound recording functionality.

³ The average annual salary used in the report is based on union figures and corresponds to 401.940 Danish crowns. At the time of writing the exchange rate lists 576,69 Dkr for 100 US dollars. The salary in US dollars would therefore be 69782 USD.

It was found that the majority of the problems were due to restrictive IT-systems, which were “locked” to prevent students from installing software. The problems were solved as they appeared, but some systems did a daily reset, which brought some of the problems back.

Mistakes and malfunctions were also discovered in the DS platform itself, which were also corrected as they were discovered, but obviously were a nuisance.

Concerning the technical implementation of the platform, it can therefore be concluded that close cooperation between the provider and the IT-department at the participating institutions is paramount, to ensure as seamless as possible an integration of the DS platform into regular usage.

In the majority of the cases, the Pronunciation Trainer is mentioned in a particularly positive fashion. The focus on actual spoken language skills and the opportunity for practice receives a lot of praise in general.

Interestingly, the skill builder area is not mentioned separately. The 3D environment is not high-lighted either, although one teacher describes it as “not really catchy,” and another states that “the platform is hard to use as the regular teaching focuses a lot on interaction and practical usage.” Especially the latter statement is noteworthy as interaction and practical usage are key words for the DS platform. The idea being that the learner acquires certain skills in the skill builder section and applies them practically in the 3D environment. These observations coupled with requests about the functionality and content of the platform, which was actually already present, prompts the question of whether teachers had been trained enough or had been given enough information about the structure or training in the functionality of the DS platform, to be properly prepared to use it.

It should be reiterated that the content of the platform is based on the existing curriculum and converted to platform usage by language teachers.

It should also be noted that the platform contains a large content and it is possible that the teachers never had the time to cover the entire platform during the relatively short trial period.

It is therefore concluded that thorough introductory courses for relevant teachers should be conducted before attempting to integrate the DS platform in the teaching environment. This is both to familiarize the users with the platform functionality, but also to introduce the structure of the platform and how the various modules are connected. Some teachers are immediately able to see how they can integrate a platform of this type in the classroom, while others will be much more insecure. Therefore a “How-To” for teachers was created with suggestions, by another teacher.

It is noteworthy in the questionnaires that particularly T2 learners are having trouble using the platform on their own and in its entirety, as many of them do not speak English. Therefore, they primarily make reference to the Pronunciation Trainer part, describing it as simple and easy to use, even without knowledge of the language.

The teachers point out that the T2 learners constitute almost as large a group as T3, but might be far more motivated to learn, as T2 learners often have plans to settle down in Denmark, as opposed to T3 learners, who are fairly often Phd. students or employed on short- or mid-term contracts. T2 learners are described

as very often having a quite well-developed vocabulary and knowledge of Danish, but are simply not very good at pronunciation.

It is therefore concluded that further instructional languages should be implemented, for instance Danish, in order to better reach a wider audience. Having, as a minimum, Danish and English as instructional languages, should enable the DS to reach almost 90 percent of the learners on both T2 and T3.

In general, both teachers and learners express great enthusiasm with the fact that the DS targets pronunciation and conversation. But both sides also express some reservations as the technology is not flawless, leading to some instances where it fails, leading to false corrections or correct pronunciations which are not accepted. This can at times lead to a lack of confidence or trust in the platform's feedback mechanism.

The teachers further state that they are having trouble seeing the DS specifically replacing direct confrontation hours, but do believe that it will work well as a supplement. One teacher expresses the belief that the DS platform would better be able to create savings by becoming an integral part of normal teaching.

Also for the learners it is difficult to see the DS as a direct substitute for in-class teaching, but they all agree that it is a good supplement. Most learners express their skepticism toward fewer hours with a teacher in general.

It can be concluded that both teachers and learners are skeptical toward the idea of receiving less teacher based hours and having these replaced by a learning platform.

It is therefore recommended that this skepticism should be looked into further, to determine how, at the time of implementation, the more traditional point of view of teaching can be accommodated. At the same time it should be noted that much worry ensues when a platform of this type is launched, particularly when the main objective of it, is to determine whether savings can be gained from using it. Furthermore, it is important to continue developing the robustness of the speech recognition engine in order to increase learner confidence in the platform.

It should be noted that many teachers express desires in terms of added functionality and content in the DS platform.

The development team points out that even though the platform is currently considered done, there are a variety of expansion possibilities, and it should be remembered that only 12 months were initially available for development.

More instructional languages are an often cited wish as well as additional material and functionality that will encompass an even larger portion of the learners, also directed at T1 learners. Reading and writing capabilities are also mentioned.

It is also possible to port the whole, or parts of, the platform to handheld devices, tablets and phones.

In conclusion, it must be said that, based on the target of “increasing efficiency and creating savings without compromising the quality of the delivered service,” the project has been a success.