The use of platforms in Nordic creative works of Electronic Literature

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Introduction

This project aims to investigate Nordic creative works in the Elmcip knowledge base and see which platforms the Nordic works have been created for. Elmcip (Electronic Literature as a Model of Creativity and Innovation in Practice) is a collaborative research project which involved "seven European academic research partners and one non-academic partner who investigated how creative communities of practitioners form within a transnational and transcultural context in a globalized and distributed communication environment" (Rettberg, Scott and Baldwin 2014, 1). The result of the Elmcip project is a database of creative works, critical writings and authors relating to electronic literature known as the knowledge base. It also contains publication details, and information about platforms.

A platform is defined by Bogost and Montfort as "…computer systems that support creative work" (Bogost and Montfort 2009). Typical examples of platforms in the Elmcip knowledge base are programming languages like JAVA or Javascript, social media platforms like Twitter or Wordpress, and video platforms like Vimeo or YouTube. The concept of platforms in electronic literature is interesting because it is related to the technical aspects of creative works. New platforms are created over time, and old ones become obsolete. Platforms then, represent a point in time, as creative works will often be created for a platform that is easily accessible at any given time. They also give a creative work an expiration date (although one that will not be known at the time of creation), as platforms become obsolete and any creative work built on them became less accessible. At this point a creative work enters the realm of preservation and recovery in the digital humanities, where data must be recovered from legacy media to be made accessible again (Krishenbaum 2016, 188).

The usage of different platforms within geographical and demographical areas might also give an indication about different schools of programming and creativity within different cultures. Bogast and Montfort (2009) describe platform studies as being about the connection between technical specifics and culture, and writes:

> In one direction, it allows investigation of how particular aspects of a platform's design influenced the work done on that platform-for instance, how the presence of a particular graphics mode enabled games of a certain sort to be made and made these games appealing to developers. In the other direction, it looks at how social, economic, cultural and other factors led platform designers to put together systems in particular ways.

Platforms are not developed in a vacuum, but fits into a time period and a culture, and studying platforms is to study a part of that period and culture. And the e-literature itself must

be seen not only as what appears on screen, as Lori Emerson suggests. More attention should be given to the "material context of the writing – whether its hardware or software" (Emerson 2011). If platforms are a crucial part of the understanding of E-literature, and if they are a product of a time and culture, then their study is important.

This project explores the question of culture, as it will look at the usage of platforms across different geographical areas. The Elmcip knowledge base does not contain information about which country a given work is made in. But it does specify which language is used. With this information it is possible to find works that were created by users of a specific language, which would be a strong indication of geographical and cultural belonging. This project is restricted to explore the official Nordic languages in order to compare languages used in easily comparable cultures, reducing the number of potential cultural variables that might influence the results. The research question for this project is: Which platforms do Nordic creative works take advantage of, and is there any differences between the Nordic languages in which platform they are created for?

Methodology

Using the filtering options of Elmcip, data about all creative works in the following languages were collected: Norwegian (Bokmål), Norwegian (Nynorsk), Swedish, Danish, Finnish and Icelandic. Originally this study meant to include Sami as one of the Nordic languages. There were, however, no creative works in Sami in the Elmcip knowledge base.

Network analysis, rooted in sociological methodology, is a mathematical methodology for understanding different kinds of networks (Rettberg, Jill W. 2014). To be able to visualize the connections between languages and platforms, the collected data was formatted to be used in Gephi, an open-source network analysis and visualization tool. Using the Force Atlas function, several visuals were created to display the network relationship between creative works, languages and platforms. Force Atlas was chosen because it resulted in a better visualization then the alternatives, giving a good overview of the relationship between works, languages and platforms. Alternative functions did not provide the same quality of information.

In addition to using Gephi, all data was imported into tables (Table 1), showing the number of works for each platform and language. In this table, creative works from the Electronic Literature Collection were added as well. The Electronic Literature Collection is a collection of creative works in many different languages (although, most of them are in English), which have been added to the Elmcip knowledge base. This different dataset functions as a comparison.

For a statistically more accurate view of the distribution of works across languages a second table was created (Table 2). This table includes the total number of works for each language, and how many works are represented in each language when adjusted for population. It is worth noting that when calculating the number of works per 100 000 inhabitants, Norwegian (Bokmål) and Norwegian (Nynorsk) were calculated using the number of estimated users of the two languages, not the total population of Norway.

Results

	Norwegian (Bokmål)	Norwegian (Nynorsk)	Swedish	Danish	Finnish	Icelandic	Average	ELC
Adobe After Effects	6	0	0	0	0	0	1	0
Android	1	0	4	0	0	0	0,8	1
Cascading Style Sheets (CSS)	2	0	7	16	2	1	4,6	10
DHTML	0	0	0	0	1	0	0,2	11
Final Cut Pro	5	0	0	0	0	0	0,8	1
Flash	26	0	6	13	2	0	7,8	0
Google API	0	0	0	0	1	1	0,3	0
HTML	12	0	9	22	4	1	8	63
HyperCard	0	0	3	0	1	0	0,7	0
iOS	0	0	4	7	0	0	1,8	3
iPad	2	2	4	2	0	0	1,7	3
iPhone	0	0	0	2	0	0	0,3	1
JavaScript	2	0	6	7	3	1	3,1	52
Quicktime	7	0	0	4	0	0	1,8	5
Shockwave	0	0	0	6	0	0	1	15
Twitter	1	1	0	0	0	0	0,3	30
Unity	0	0	0	3	0	0	0,5	2
Vimeo	23	0	0	0	0	0	3,8	0
WordPress	1	0	0	0	0	0	0,2	1
YouTube	5	0	4	0	0	0	1,5	0

Table 1: Number of creative works for each platform and country, and the total of creative woks by platform in the Electronic Literature Collection (ELC)

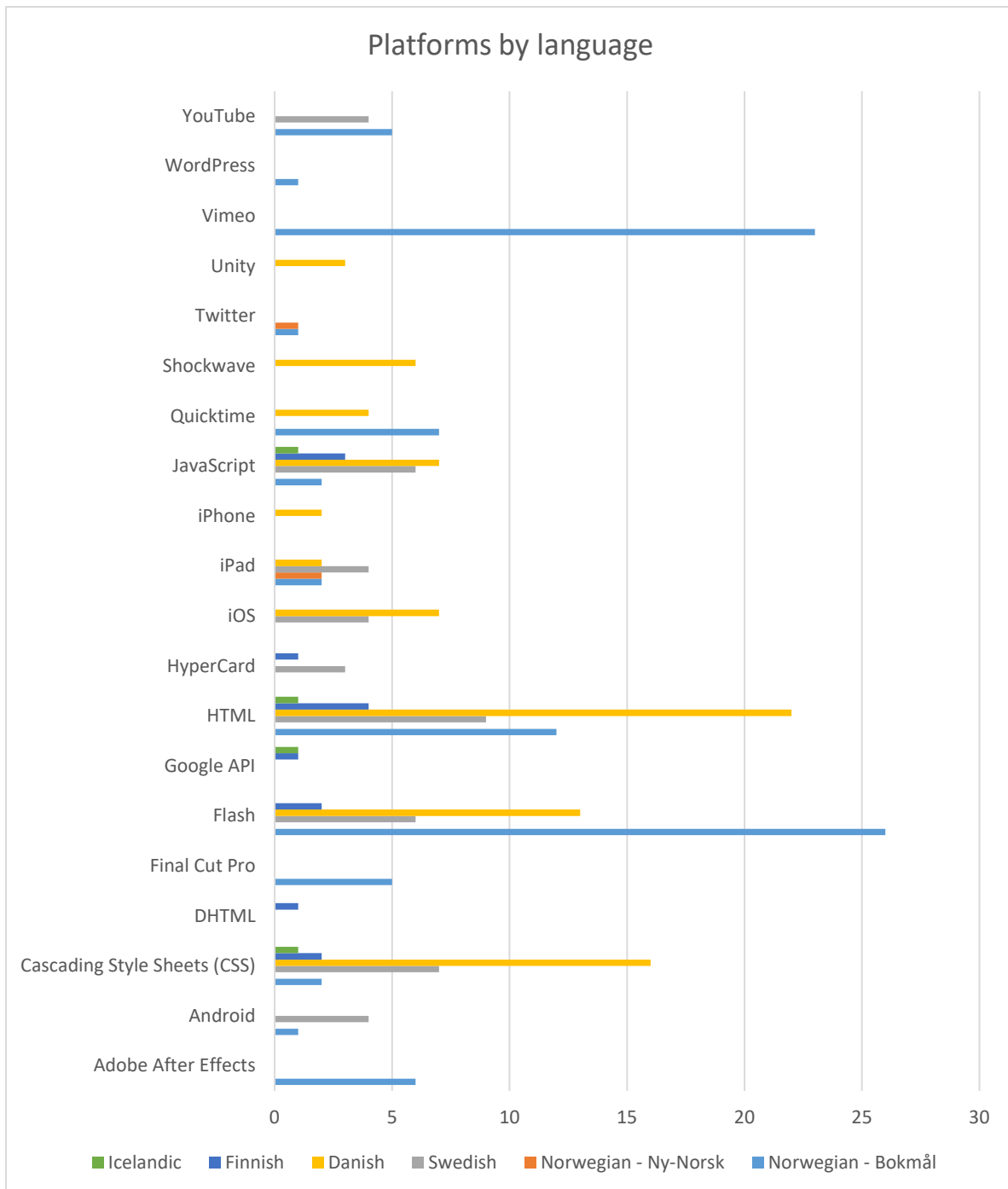|	Norwegian (Bokmål)	Norwegian - Ny-Norsk	Swedish	Danish	Finnish	Icelandic	Average
Total	38	2	12	29	7	1	15
Works per 100 000 inhabitant	0,8	0,3	0,1	0,5	0,1	0,3	0,35

Table 2: Number of creative works for each language.

Figure 1: A visualization of the distribution of Nordic languages across different platforms.

Total number of creative works by language

The first and most obvious observation when looking at the data is the high number of creative works in Norwegian (Bokmål) and in Danish. As seen in table 2, there are 38 works in Norwegian (Bokmål) and 29 in Danish, both far above the average of 15. These languages also top the list of numbers of works when adjusted for population, but with 0,8 works per 100 000 inhabitant Norwegian (Bokmål) is significantly higher than Danish. It is therefore

safe to conclude that Norwegian (Bokmål) is the most popular Nordic language used in the Elmcip knowledge base.

Norwegian (Nynorsk), Swedish and Finnish are all significantly below the average. This is also true for Sami, which, as stated earlier, is not represented in the knowledge base at all. Icelandic is a special case, as the number of creative works in Icelandic, when adjusted for population, is very close to the average (0,3 Icelandic works, 0,35 average). There is, however, only one creative work in Icelandic, Goggi. But this work is found in the Elmcip knowledge base under English and Finnish, in addition to Icelandic.

Platforms

When looking at table 1 it seems that Vimeo and Flash are particularly popular in Norwegian works[1], whereas HTML and CSS are overrepresented in Danish works. The distinction between HTML and CSS in the Elmcip knowledge base is, however, a strange one. HTML and CSS are two interdependent languages that are both necessary for creating web sites. One could argue that these two platforms should be combined into one, and if they were replaced with just one platform, Danish would be even more overrepresented.

The trends described above are clearly visible in Gephi, where works in Final Cut Pro, Adobe After Effects and Vimeo are in close proximity to Norwegian (Bokmål) (Figure 2). These are all platforms that are only used in Norwegian (Bokmål). In the center of the visual, HTML and CSS are in close proximity to Danish (Figure 3) - indicating that, while these platforms are the most popular in Danish, they are also widely used for other languages as well. Flash is in close proximity to Norwegian (Bokmål), but still leaning towards the center (Figure 4). Javascript, also in the center, is used in all languages except Norwegian (Nynorsk).
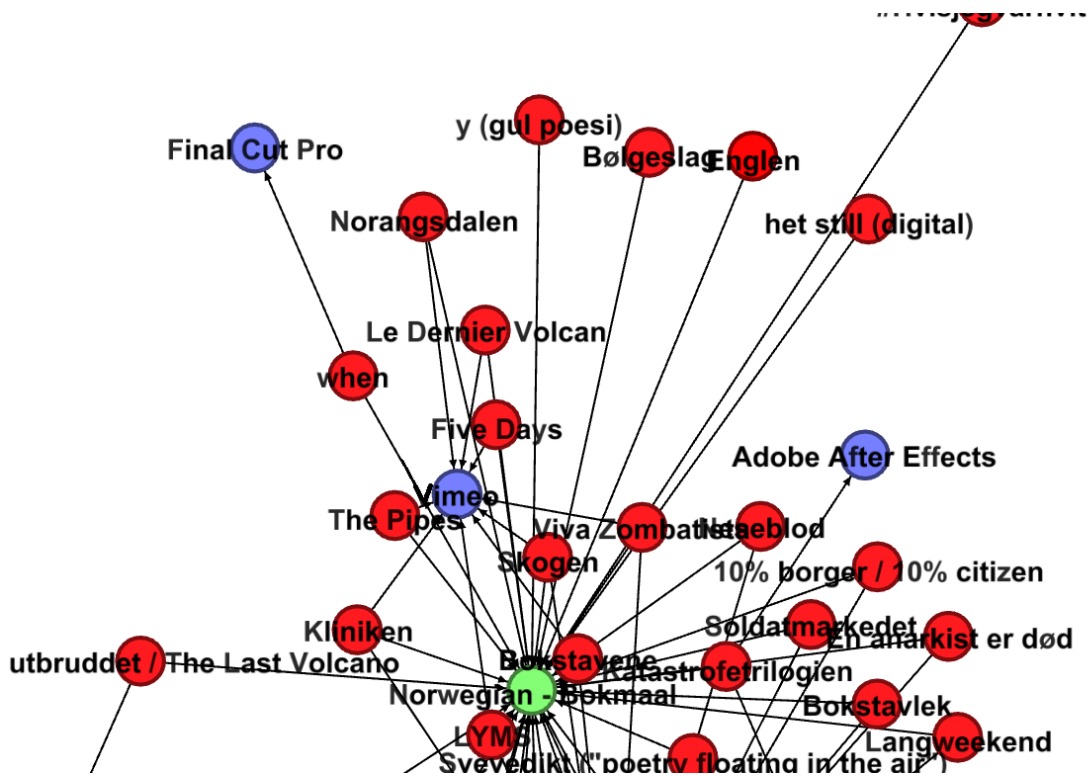
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[1] Norwegian (Bokmål)

Figure 2: Gephi visualization showing platforms (in blue) that are only used in Norwegian (Bokmål) (in green).
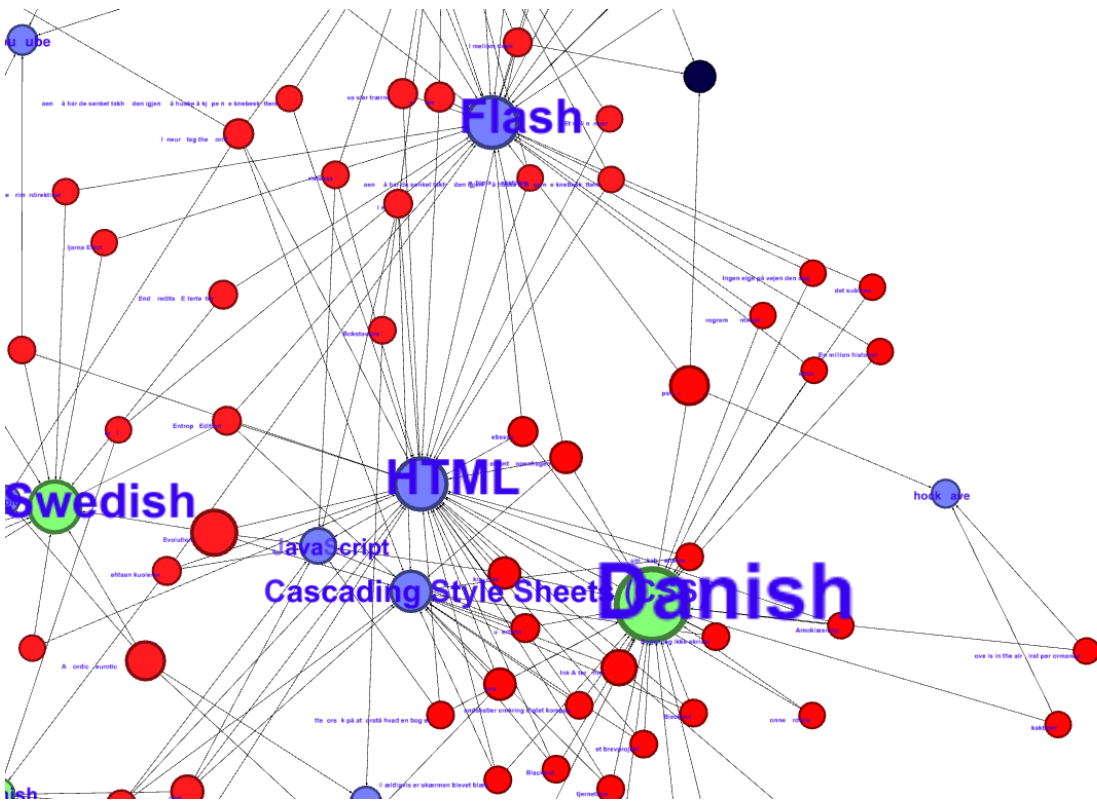

Figure 3: Gephi visualization showing the center of the network and the proximity of HTML and CSS to Danish.
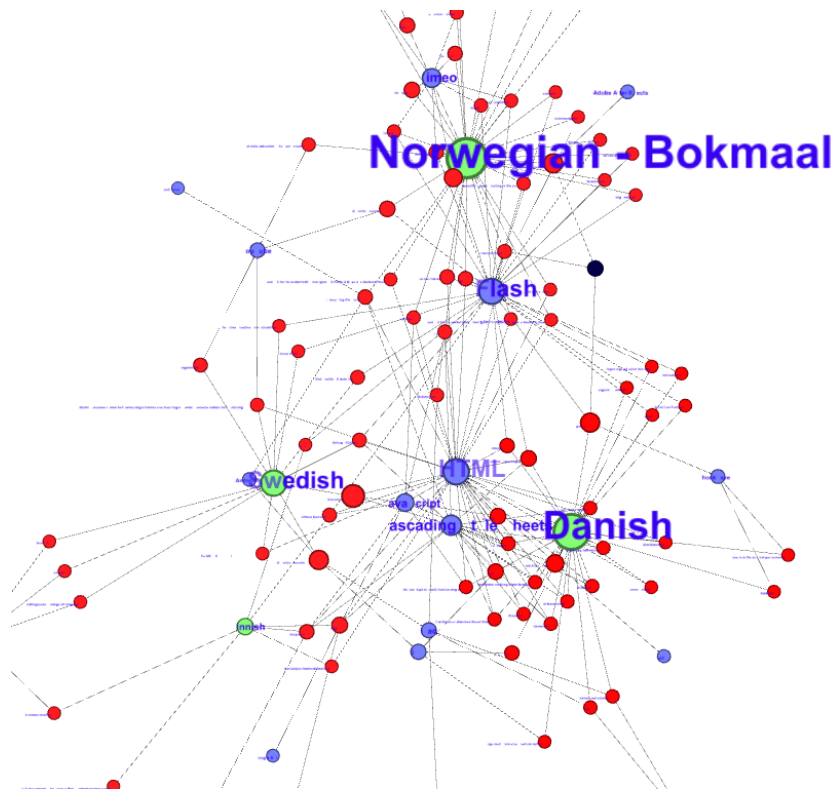
Figure 4: Zoomed out Gephi visualization of the center of the network.

Comparing Nordic languages to the Electronic Literature Collection

When comparing the Nordic platforms to the platforms in the Electronic Literature Collection (see table 1), some observations can be made. The most popular platforms in the collection are HTML and Javascript, which fits with the observations of the Nordic languages. This indicates that web design technologies are generally the most popular ones, also outside of the Nordic countries. There are however very few works in the Electronic Literature Collection in CSS – again indicating that there might be a problem with the choice of platform labels, as CSS is dependent on HTML to function.

Some platforms are more popular in the Electronic Literature Collection, like Twitter, DHTML and Shockwave. Others are more popular in Nordic create works, like Flash, iOS, Vimeo and YouTube.

<u>Discussion</u>

Problems with the quantity and quality of data

This project has been done using a total of 249 Nordic creative works[2]. Whereas some languages have a high number of works, others have very few. This creates a problem for the validity of any results, as the number of works studied may not be statistically significant. At best this project can uncover certain trends. The quality of the data may also provide an unfair representation of reality. One cannot simply assume that the Elmcip knowledge base contains every single creative work in all the studied languages, and it is impossible to say how many other works may exist. It is also possible that works have, because of human error, been labeled incorrectly.

Platforms

There is a lot of varying uses of platforms across different languages. Vimeo and Flash are very popular in Norwegian (Bokmål). In Danish, the most popular platforms are HTML, CSS and Javascript, indicating that creating websites that in one way or another display electronic literature is the preferred choice of artistic expression within the e-lit community of Denmark.

These differences can possibly be explained by looking at the communities within different countries. People with the same knowledge and interests tend to flock together and share ideas and experiences. In addition to this the potential cooperation within communities makes any similarities in interests and experiences more cemented, increasing the chances of future works being created on the same platforms as previous ones, sometimes even built upon the same idea or concept.

In both the Nordic languages and the Electronic Literature Collection, which has been used as a comparison, web design technologies like HTML and CSS are generally the most popular platforms. It seems, however, that there is generally a lot of variation in the choice of platform when creating Electronic Literature.

Creative works by language

Norwegian (Bokmål) is clearly the most popular language among the Nordic countries. With 38 creative works and 0,8 when adjusted for population, this language is far above the average (15 in total and 0,35 when adjusted for population). When looking at the total number of works, Danish comes in at a close second with 29 works, but, while still above the average, lags further behind Norwegian (Bokmål) when adjusted for population, with 0,5 works per 100 000 inhabitants. What is surprising is that Sweden, a larger country which in most areas is very comparable with both Norway and Denmark, has a much lower number of creative works. There are only 12 works in Swedish, and when adjusted for population Sweden has produced only 0,1 works per 100 000 inhabitants. Finnish is also quite low with only 7 works

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[2] 249 was the total number of creative works in the dataset before being formatted, at which point duplicate works in the dataset were deleted to provide a more accurate view of how many creative works had been created in each language.

(0,1 per 100 000 inhabitant). Icelandic and Norwegian (Nynorsk) are statistically difficult to analyze because there are relatively few people using these languages, and the data from the Elmcip knowledge base contains only a few creative works in these languages; 2 in Norwegian (Nynorsk) and 1 in Icelandic. For this reason, these two languages will be excluded from any further discussion.

The question that arises is whether Norwegian (Bokmål) is unusually high, or if Swedish and Finnish are unusually low. To answer this question, an extended study would have to be performed which includes and compares more languages. With a higher number of languages used, the average result would be more representative of the field as a whole. The problem with this is that a higher number of languages would mean that a higher number of varying cultures would be represented. This means that cultural differences, technological infrastructure, economy and many other variables would have to be taken into account during an analysis of the data.

In order to try to explain why Norwegian (Bokmål) is such a popular language for creating electronic literature, one could speculate that there is a larger community of people studying and creating electronic literature in Norway. This would affect the number of Norwegian creative works in the Elmcip knowledge base in two ways: 1) A larger community would result in more experimentation, cooperation and number of total creative works being produced within this community. 2) A larger community would mean more people writing about and adding creative works to the Elmcip knowledge base, ensuring that the number of works in the knowledge base represent more of the actual works within the community, then in a smaller community where there might be more works that are never added to the knowledge base. It is also worth noting that the majority of the work done on the Elmcip knowledge base is being done in Norway. The project is led by Scott Rettberg from the University of Bergen, Norway, and the Elmcip knowledgebase has become a benchmark project of the Bergen Electronic Literature Research Group (Seiça 2014, 94). It is reasonable to speculate that this would affect the number of Norwegian works being added to the knowledge base.

HTML and CSS

The labeling of platforms may in some cases be faulty. As mentioned earlier, it is odd that HTML and CSS are represented as two different platforms, since they are dependent on each other to produce a functional website. While it is possible to create a website using only HTML, this would result in a work with no styling, which is an unlikely choice to make for an artistic and creative work. It is also difficult to say if all works in HTML are also represented in CSS, or if there are multiple works that are only labeled as HTML or CSS. With the exception of Icelandic, all languages with works in HTML have less works with CSS. This would mean that there are several works in HTML that have no CSS, which is highly unlikely, or maybe even some works in CSS that have no HTML, which is technically impossible. Either way, it is clear that there is a problem with the dividing of HTML and CSS as platforms. One could argue that this problem extends to the use of Javascript. Javascript is a scripting language that is used in combination with HTML. A work created in Javascript is not dependent on CSS, as styling can be implemented using Javascript, but HTML is required.

The question that arises is whether these three technologies should be considered different platforms at all, as they might be grouped together into one.

Sami and aboriginal languages

The fact that Sami is not represented in the Elmcip knowledge base is unfortunate, but statistically not surprising. With only 30 000 native speakers[3] this population is not large enough to produce the 0,35 creative works per 100 000 inhabitants that is the Nordic average. That being said, the Sami population is close, and there are examples in this study of languages with fewer works then 0,35 works per 100 000 inhabitants. The low number of Sami speakers does not, however, explain why there is such a lack of other aboriginal languages in the Elmcip knowledge base. A distinction is made here between aboriginal languages and minority languages, where a minority language is a language spoken by any minority population, whereas an aboriginal language is one spoken by the original ethnic group inhabiting a country or region. While there are some minority languages represented in the knowledge base, aboriginal languages seem to be lacking entirely.

Conclusion

The expectations of this project was that there would be very little difference across languages. But the opposite seems to be the case. Norwegian (Bokmål) is highly overrepresented in Flash and Vimeo, and Danish is overrepresented in HTML and CSS. In addition to this there are several smaller variances across the different languages. If taking Javascript into account, websites (HTML, CSS and Javascript) are more popular in Danish then in other languages. But websites still seem to be the most popular form of creative works across all languages, including in the Electronic Literature Collection, which was used as a comparison.

It is also clear that some languages are far more popular than others. It is unclear if this is due to an actual difference in the number of works being produced in different languages, or if it's a problem of creative works not being added to the Elmcip knowledge base. Either way Norwegian (Bokmål) is far more popular than comparable Scandinavian languages, whereas Finnish and Swedish are underrepresented when taking into account the population of these countries. Languages with a very small number of native speakers like Norwegian (Nynorsk) and Icelandic are expectedly not very prevalent in the Elmcip knowledge base, whereas Sami and other aboriginal languages are not present at all.

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[3] Wikipedia, s.v. «Sami Languages», (accessed March 21. 2017), https://en.wikipedia.org/wiki/Sami_languages

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