# Say no to Reinventing the Wheel: How other Countries can Build on the Norwegian Model of State-Financed OER to Create More Inclusive Upper Secondary Schools

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## ABSTRACT

The article shows in which areas other countries can benefit from the work of the Norwegian platform NDLA (ndla.no). This assessment is based on interviews with 13 representatives of the platform, three cooperation partners and one representative of Norwegian textbook publishers. The experiences described refer to a large-scale Open Educational Resources (OER) platform for upper secondary education, which was founded in 2006. The contents and experiences of the interviews were categorised into four areas: creation process, consumption, context based decisions and peer-production. The openness of the colleagues through the interviews conducted allows –for the first time– insights into the structures, strategies and considerations of NDLA. In conclusion, the special potential of such a state funded OER platform for inclusive education and which aspects might be relevant for higher education is shown.

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# INTRODUCTION

All the worlds countries are united in their efforts to provide the next generation with the widest possible access to education and are equally faced with the challenges and opportunities that digitalisation brings to the education sector. Even though the implementation of SDG 4 to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" has been set back by the pandemic (United Nations, 2020, p. 32), Open Educational Resources (OER) can make a contribution towards achieving the goal.

This article is based on an understanding of inclusion as described by Susan Peters in reference to the Salamanca Declaration:

> "1. All students come to school with diverse needs and abilities, so no students are fundamentally different.
>
> 2. It is the responsibility of the general education system to be responsive to all students.
>
> 3. A responsive general education system provides high expectations and standards, quality academic curriculum and instruction that are flexible and relevant, an accessible environment, and teachers who are well prepared to address the educational needs of all students.
>
> 4. Progress in general education is a process evidenced by schools and communities working together to create citizens for an inclusive society who are educated to enjoy the full benefits, rights, and experiences of societal life." (Peters, 2007, p. 99)

A broader concept of inclusion that includes other dimensions of heterogeneity in addition to disability is also advocated by (Hinz, 2002) or in the South African white paper (Department of Education, 2001).

Inclusive education is therefore understood as a pedagogical approach that aims to go beyond the dimension of dis/ability to support all learners to develop their full potentials in social interaction and cooperation addressing structural disadvantages based on gender, sexual orientation, dis/ability, class, economic, social & cultural background (incl. indigenous people), race, languages, health, age, pregnancy and maternity, belief, religion (or lack thereof).

In line with UNESCO (2019, p. 5), Open Educational Resources are understood as:

> "1. Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others.
>
> 2. Open license refers to a license that respects the intellectual property rights of the copyright owner and provides permissions granting the public the rights to access, re-use, re-purpose, adapt and redistribute educational materials.
>
> 3. Information and communications technology (ICT) provide great potential for effective, equitable and inclusive access to OER and their use, adaptation and redistribution. They can open possibilities for OER to be accessible anytime and anywhere for everyone, including individuals with disabilities and individuals coming from marginalized or disadvantaged groups. They can help meet the needs of individual learners and effectively promote gender equality and incentivize innovative pedagogical, didactical and methodological approaches."

Through OER, this effort can now, for the first time be made transnational on the basis of free licences without having to draw up complex cooperation agreements. In combination with digital availability and the possibility of free reproduction etc. (Wiley, 2014), new opportunities arise to build on the ideas of others legally, quickly, easily and at lower cost.

A large topic of the discussion about OER is related to the university sector, in part due to the cost of textbooks (Wiley, Green, et al., 2012).

Some country-specific OER platforms for schools have been developed, such as Wikiwijs in the Netherlands (Schuwer et al., 2014) or KlasCement in Belgium with an approach relying heavily on sharing materials (Pynoo & Van Braak, 2014, p. 321). The Nasjonal digital læringsarena

(English title: Norwegian Digital Learning Arena, NDLA) is standing out for its long-term experience (since 2006), its extensive funding (20% of the textbook budget) and maximum openness. In countries like Germany, where research funding has led to numerous short-lived OER projects at all levels of the education system (Otto, 2019) in recent years, it is of particular interest what experiences institutionally based, long-lived projects have gained.

Norway is thus one of the few countries that have dealt with OER systematically and on a large scale in upper secondary education. This is particularly interesting as they can look back on a long period of experience and have gone through a process of systematic professionalization. Based on contributions from Norwegian colleagues at OER conferences about NDLA, my interest was sparked, so I wanted to get to the bottom of the what the NDLA model is and how it works.

The number of English-language publications on the ndla.no model as well as on the experiences made with it is very manageable and most of them contain rather brief mentions (Abbas, 2016; Johnson et al., 2015; Pawlowski et al., 2013). This was the reason for a series of qualitative interviews with supporters and opponents of NDLA. First results of the interview study were published by Müller (2019). The following publication now focuses on the specific question: "How can other countries build on the Norwegian model of OER in upper secondary education?"

Why is Norway a suitable model for other countries in this area? Since 2006, NDLA has succeeded in establishing a comprehensive large-scale platform for the development and distribution of OER, despite large obstacles (textbook publishers with monopoly position, small number of pupils, little need to save money due to oil industry, teacher unions opposing OER).

The upper-secondary level in Norway is following 10 years of joint schooling. The Videregående skole is an advanced three-year educational program that focuses on either college preparation or vocational training. NDLA addresses both groups of students with its offer. The materials are aimed at high-school students, but are also used by students at the university level (e.g. *Fundamentals of Mathematics*).

NDLA offers teaching and learning materials for 80 subjects (**Figure 1**). It distinguishes between topic articles (2537),[1] subject material (10356), tasks and activities (7469), assessment
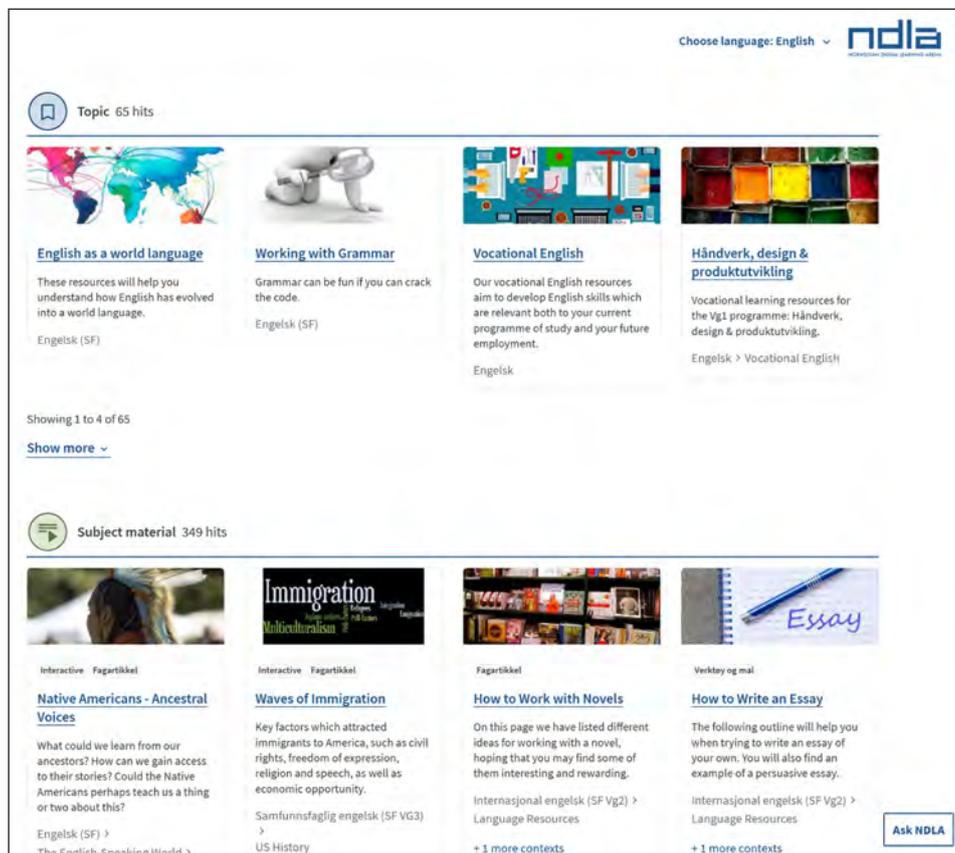


**Figure 1** Screenshot NDLA Topic articles for English as a subject.

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[1] Current (March 2021) absolute number of resources, due to the change from the old platform to the new platform, these numbers may fluctuate.

resources (303) and learning paths (670). The materials are designed for use in schools, but are also used extensively by students as a self-learning resource.

NDLA team members see OER as a contribution to development cooperation in the sense of global free access to education. The open licences used for software and content enable other countries to build directly on the developments in Norway. The willingness of the Norwegian colleagues to provide comprehensive insight into their work processes and findings is a treasure trove for initiatives in other countries.

For the analysis, reference is made to the theoretical framework of Smith and Seward (2017). They distinguish (see *Figure 2*) between open practice, the legal and technical characteristics that structure this process, the context that influences design, and consumption.
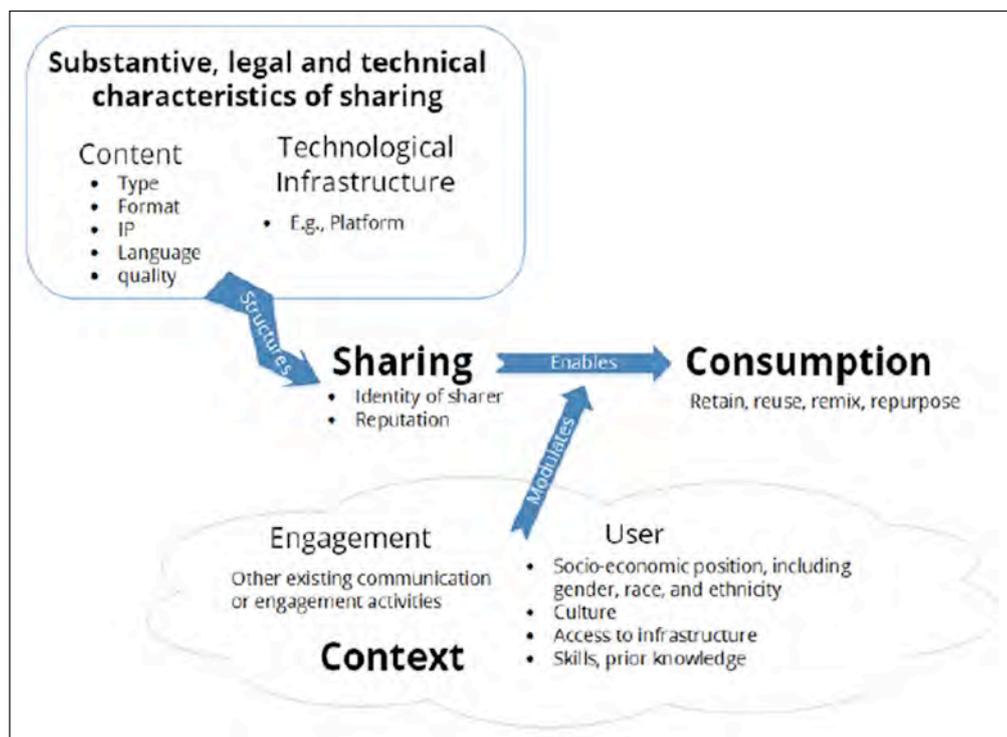
Smith and Seward also included the aspect of peer production of OER to their model. In the Smith and Seward model, the levels of openness are represented in terms of consumption following the 5Rs (Wiley, 2014). In addition, for this analysis, the ALMS analysis framework (Hilton et al., 2010) is integrated in regard to the technical aspects.

## METHODS

Based on the question "What experiences have NDLA's employees, cooperation partners and opponents been able to gather over the past ten years with the government-financed large-scale-OER platform?" 13 expert interviews were conducted in person throughout Norway[2] in March 2017. Interview partners were team leaders of NDLA, a political representative, employees of cooperating companies (one publisher and two ed tech companies) and a representative of the Association of Textbook Publishers. Since the expertise of the interviewees was spread over different areas, an overarching guideline was drawn up. The interview guide addressed a wide range of topics: historical development, challenges, obstacles, licensing, law-suits, future perspectives and innovation, financing, technical aspects, development of materials, pedagogical approaches, cooperation with publishers, usage, subject specific issues, accessibility, marketing and distribution, international cooperation and dealing with diversity. The related questions were selected from this document according to the specific field of activity of the interview partners. The interviews were conducted in English and then transcribed. A

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2    One interview could not be included in the publications due to a lack of approval by the board of directors of a company.

qualitative content analysis was carried out using MaxQDA 2018, following Mayring's approach of developing inductive sub-categories (Mayring, 2000) for the deductively created main-categories based on Smith and Seward (2017), and presenting the results focusing on how other countries can build on the experience in this paper. The interviews were numbered, so that when quoting, reference was made to the respective number.[3]

## RESULTS

The interviewees' experiences in these three areas are presented below. These four main categories are based on Smith and Seward (2017), while the subcategories were inductively generated from the material (*Figure 3*).
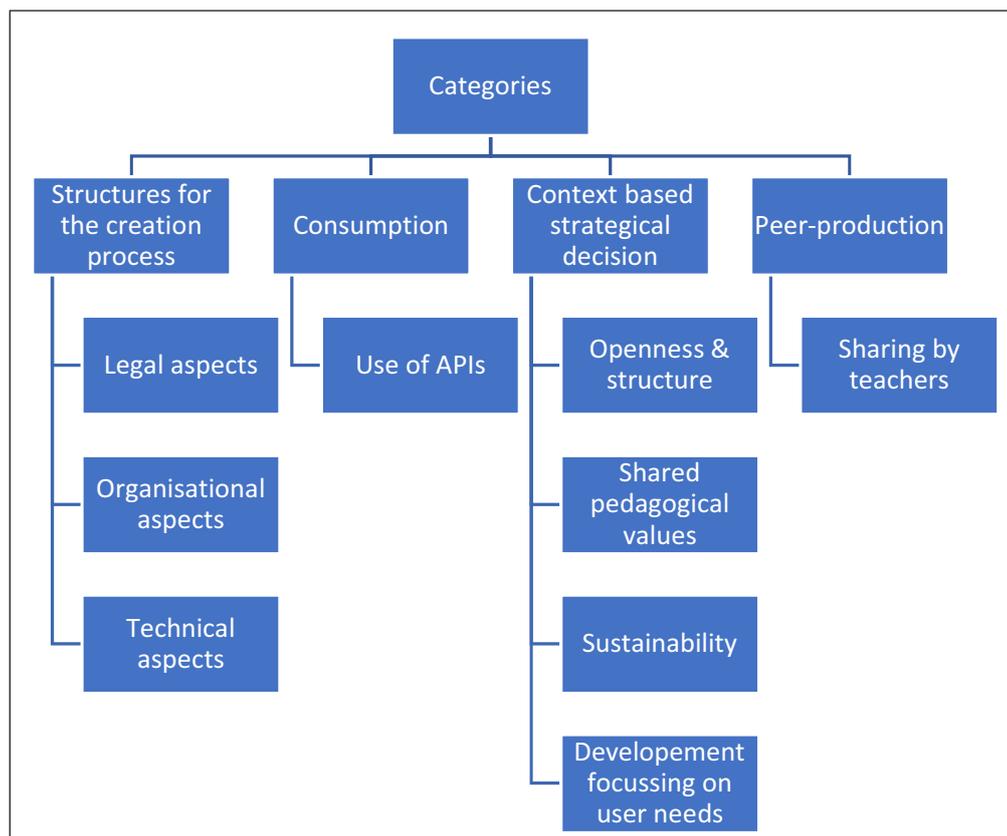


**Figure 3** Deductive and inductive categories.

### STRUCTURES FOR THE CREATION PROCESS

Following Smith and Seward (2017), the structures for the creation process are divided into legal aspects, organizational aspects and technical aspects.

### Legal aspects

The main legal aspects relate to the legal basis of NDLA funding and the legal disputes around it. By law, Norwegian counties, in their capacity as school authorities for upper secondary education, are obliged to provide pupils with high-quality digital and analogue materials. This law (*https://lovdata.no/dokument/NL/lov/1998-07-17-61#KAPITTEL_3*) is regarded as the basis for the existence of NDLA [I1 10–10, 31–33].

To fulfil the obligation of providing high quality learning materials, NDLA receives 20% of the schoolbook budget from the counties involved [I1 9–9]. NDLA is aware that a high-quality standard and the openness of the materials have their price. Simultaneously, they are willing to pay this price [I1 21–21]. However, the intended cooperation with textbook publishers has not materialized [I8 52–58, I9 12–12].

Most of the money from NDLA (70%) is returned to the market via public tenders [I1 20–20]. This means that 94% of the money for schoolbooks remains available to the market.

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3    For example [I8, 7–9] means interview 8 and paragraphs 7 to 9.

The schoolbook publishers have been unsuccessful with their complaints before the EFTA court: the funding and preparation of OER cannot be considered as inadmissible state funding [I1 31–33, I8 32–33] (EFTA Surveillance Authority, 2011). As the case law of the EU Court of Justice and the EFTA Court are based on each other, this decision has great significance for similar projects in other EU countries. With a comparable legal basis, expensive legal actions may be avoided.

In Norway, NDLA was producing materials only for upper secondary education at the time of the survey (2017). The potential of primary and lower secondary schools (grades 1–10) using OER in Norway (and other countries) is even greater based on the fact that the number of students is higher. Due to the relatively small number of inhabitants in Norway, other countries could achieve comparable results with a comparatively smaller amount of money per student [I1 24–24]. With one euro per subject and student, Germany (and other countries) would have a good foundation for establishing a sustainable landscape of free educational materials (Müller, 2019, p. 68).

## Organizational aspects

Of particular importance for content creation and of great value for other countries are the insights into the organizational aspects of the Norwegian OER platform. The colleagues addressed the use of funds, the structure and functioning of the organization from the beginning in 2006 to the professionalization in recent years.

### *Allocation of funds*

At an advanced age of a platform, those in power have to decide if they want to invest the available funds in platform development, the development of new content or in the revision of old content. NDLA currently answers this collectivly with: all of these [I5 93–100, I11 43–45, I13 120–124].

### *Organization*

Responsibility for upper secondary education in Norway is at county level. NDLA is run as a virtual organization by a consortium of 18 of the 19 counties (all except for Oslo)[4] [I9 4–4]. NDLA's staff is spread across Norway, working digitally. This cooperation is characterized by a team structure with weekly online meetings and a management structure that links these teams together [I3 5–5]. It was noted that a gender-equitable composition of the management team is a challenge that has not yet been overcome [I13 71–72].

Fundamental decisions regarding the NDLA are made by the Board of Directors on the basis of proposals from the management level [I5 175–180]. Once the interviews were conducted, the structure of the Board was fundamentally changed. Today the board consists of two members who are principals in upper secondary school and one member who was a director of education for one of the member counties. There is also one member from a member county that works as a specialist in the area of digitalization and one member representing the employees in NDLA. The members are appointed by the general assembly, which has representatives from all counties. The board meets on a regular basis (every sixth week). The idea behind this model is to have a board that can contribute more actively to the governance of the organization.

### *How to begin?*

Based on their own experience, the Norwegian colleagues recommend an editorial board of motivated, seconded teachers who work as a team on materials for a subject in order to start building a national OER platform [I12 119–121].

> You know, if you have a group of teachers who really want to do this, so let them do, let them follow their dreams in a way, give them credits for what they want to do and give them sort of loose chain, they can go quite far. I think it's important that you base the identity through a set of core values that has to do with sharing, openness, respect, tolerance, variety if you like, always keeping the students in your mind when you do things. So, developing some sort of core identity that does not inflict too much damage on each individual, sort of dreams of creativity. You have to sort of let them bloom. And accept 'okay, oh you're so good with using

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4     Fun fact: much of NDLA's traffic is generated by schools and students in Oslo [I1 52–55].

films and teaching, develop it, use it, use you're great at it, you know? So, I think that's very important when you build an organization of those who come in here, they come in and then they can use themselves and they use what they are good at and get acknowledgement for that. And then gradually, I have to build sort of professionalism into it and more discipline. We start out with sort of letting the enthusiasts bloom. I think that is important. [I12 121–121]

This phase of blooming and trying out different approaches when creating a state-funded OER platform offers tremendous opportunities: it is, however, very resource consuming.

Different approaches have been proposed with regard to the subjects for which materials will be produced first. NDLA itself started with Norwegian, Natural Sciences and Healthcare and added English and Social Sciences the following year [I13 11–12]. Here it is important to what extent considerations are given to textbook publishers and possible political distortions. Another approach is to focus on subjects for which there is less demand (violin tuner, minority languages) and to convince with quality and create thereby a demand for main subjects [I12 123–127].

*Professionalize*
In the context of a professionalization process, the development of a multi-professional team is an important step from the point of view of the respondents [I11 85–86]. This includes an early professionalisation in the preparation of public tenders by appropriately qualified personnel, whereby the task of ensuring teaching materials is more complex than the tendering of furniture or the like. In addition, it requires the cooperation of pedagogically and legally versed experts [I2 49–53].

The cooperation with a team of web designers, photographers, etc. enables further development for those involved and a professional design of the OER [I4 6–6].

There was also a evolution in subject development compared to the initial small editorial group.

> Earlier there has been a more traditional project or method which we call it 'Dreiebook' in Norwegian it's like a concept gets to start when several quality criteria of how should our new subject be build and a project manager etc. similar to commercial companies. Our success the 3–4 last years has been to invite all parties with interest in communicating knowledge within a subject to the society to workshops and to collaborate on building this. We did this on the history subject (history one and two), we started that with religion now and a sociology-similar subject. We will probably follow that origin that means network production, conceptually quite similar to what Alexander Osterwalder did when he built the business model generation book. He was the moderator of 450 editors. [I3 49–49]

*A grown organization – make it smooth and keep it running*
After building a larger team, it is important to take a closer look at how the developed process flows. Considering the large number of employees involved in an OER platform, it is particularly worthwhile to think about the efficient design of input screens [I12 75–82]. This also means separating the subject-didactic contents from technical and licencing-related aspects. Teachers should not have to deal with search engine optimization themselves [I 12 156–159].

*Quality control*
NDLA also has experience on which to build for quality assurance. A comprehensive quality control for OER is important to avoid mistakes with licencing or while creating materials. Quality within NDLA covers five areas (*Figure 4*): subject quality, technical, educational, quality seen from the user's perspective and production quality [I1 141–143] and for each area there are responsible persons at NDLA.

For example: ensuring a common language of the material is a task for the quality assurance department at NDLA. The feedback on language correction is a great help for the editors [I4 153–156].

## Technical aspects

Technical aspects are not limited to platform-related issues, but also include, for example, global challenges such as the discontinuation of Adobe Flash as a popular format for elearning

**Figure 4** Dimensions of quality control at NDLA.

content. Due to the very open approach of NDLA, other countries can also build on the Norwegian developments in this area.

*Build on the software of ndla.no*
NDLA has extensive experience in adapting a CMS (Drupal) to the needs of learners. In summary, this has been a painful journey (Müller, 2019, p. 48), but it is the basis for the development of a new specific platform for OER in the school context.

*New technological platform*
Modeling a large-scale OER platform using a traditional content management system and adding custom features via plug-ins will only work moderately well in the long run. A specific platform for OER is more expensive than a commercial content management system, but inevitable. It would therefore make all the more sense for other countries to build on the existing software from NDLA [I12 172–172].

The newly built platform of ndla.no is available as open source on github (*https://github.com/ NDLANO*) and is already geared towards multilingualism (including English), as there are two official written languages in Norway. This new platform also adapts to users' devices and internet-bandwidth [I4 187–192].

Technical aspects are closely linked to content aspects. For example: One of NDLA's strategies for updating content is separating texts into permanent parts and less permanent parts (e.g. introductory paragraphs with up-to-date references) which makes it easier to revise [I12 15–16]. The new platform enables best-before dates for individual learning materials, so that editors are notified when content needs to be checked for necessary updates [I4 159–168].

*H5P – a new internationally used interactive multimedia format financed by NDLA*
The development of the open h5p format goes back to the discontinuation of Adobe Flash and NDLA's response to this development. When Steve Jobs explained that the iPad would not support Adobe Flash, NDLA (and many other providers of elearning materials) realized that they had a huge problem because the data could not be easily transferred to a new format. To avoid this happening again, the Norwegian company Joubel was commissioned to develop an open container format [I1 137–137]. By financing the development of h5p, NDLA has laid the foundation for an open educational multimedia format that now benefits many other educational institutions (including those outside Norway). Meanwhile some other educational institutions (e.g. Victoria University in Australia) funded the development of additional h5p content types, expanding the potential of the open format [I7 110–113].

## CONSUMPTION

NDLA relies on creative-commons licenses (cc-by/cc-by-sa/cc-by-sa-nc). In some cases, the restrictions (non-commercial, no derivatives) are based on the specifications of external providers such as image agencies (e.g. scanpix). By waiving logins and downloads, the content is available on the web as openly as possible. This means that most of the content meets Wiley's 5r requirements for OER.

With regard to the ALMS analysis, full access to the editors is not yet provided, but this will change in the future. Regarding the required "level of expertise", it can be said that with the Learning Path a tool has been created that makes it easy for teachers to remix and adapt content. This makes the content meaningfully editable. Source file access is available for most of the content. Only for older content, where Flash animations and the like are still used, is a source file accessible. There are no source files available. For h5p, on the other hand, the files are in an open container format and can be meaningfully edited with some expertise.

Other countries can build on the content of NDLA because the content is available under a cc-license. In order to make further use as easy as possible, the information about the license and options of reuse are offered transparently together with the material [I1 15–15].

NDLA has also had positive experiences with local cooperation, e.g. with museums or universities. These offer opportunities for content with special relevance for the students [I10 181–181].

Members of NDLA also see international exchange as a means to support the human right to education worldwide [I3 86–86]. This exchange and mutual inspiration contributes to the reflection of the own teaching-learning processes. It is not a matter of using NDLAs materials unconditionally, but of adapting materials to the needs and interests of one's own students and local context.

### Use of APIs

NDLA's main priority is to provide good learning opportunities. Whether this is done via the own platform or via a commercial LMS is irrelevant. This is possible through APIs which can be used by the market and facilitate a worldwide content distribution [I3 53–53]. NDLA provides these APIs at *https://api.ndla.no/* for articles, audio, images, and concepts that map a content link to these materials.

The use of metadata and interfaces forms the basis for the findability of already existing materials and the embedding in own LMS. This is done through APIs from NDLA directly, but in the future also through the h5p content hub, which contributes to the distribution of material.

## CONTEXT BASED STRATEGICAL DECISIONS FOR OPENNESS

Other countries can also build on the pedagogical considerations that NDLA has developed over the last decade. Apart from the decision for maximum openness, there are other aspects that result in a common pedagogical manifesto that provides orientation for the team members.

### Openness & structure

Openness is the central aspect of the platform for NDLA employees. As a consequence NDLA is as open as possible: no login, no download and print [I 12 144–146]. For NDLA team members OER is a means of democratizing education because of its universal access. All students (parents, etc.) have access to all materials, regardless of status, economic background or chosen subjects. This allows unlimited access to learning materials even after finishing school [I13 78–81]. This is not the case with Norwegian digital textbooks (and reusable paper textbooks in other countries):

> **I:** So, if it's epub3 you got one copy for yourself as you keep it for the rest of your life or is that also with the…
>
> **A:** No, this is license and these are different kinds of models here but mostly you have them for three years as a student. Here we have lots of (playing a video/song). You have songs, you can write, you can mark and all that kinds of thing you can keep of course. But that's a license-based product. [I8 27–28]

Interestingly they also promote openness for different pedagogical approaches:

> **I:** So, do you try to influence the teachers in a certain way of teaching?
>
> **A:** That's a hard question. Because we would very much like to do that, I think. Anyway, because I think if you read that paper you will see that we are telling the teachers that if you're going to use a computer in your lessons, you have to let the pupils be active. You have to let them work, you have to let them cooperate and so on. If you let them hide behind a screen and do the teaching from above, then they will soon be on Facebook. And I don't mind pupils being on Facebook. I think when Facebook is an issue let's use Facebook to create good teaching or good learning. But the question was 'do we influence the teachers'. I think we can't do this as much as we would like to because there is a standing word or something in Norway that the teachers should be free to use their own methods for learning and I don't think that is right to the total end or something. I think we have to admit there is some methods that are better than others in learning, but we can't officially go out and say 'do that!' No, we can't do that. [I5 81–82].

However, despite of the openness of the learning environment, it also provides structural elements to provide orientation for students. Using individual learning paths, teachers can put together suitable offers for students. The freedom of learners requires opportunities to deviate from learning paths or to leave them altogether [I13 91–95].

## Shared pedagogical values

The shared values of NDLA's educational platform provide guidance for the design of materials for (new) team members:

> "The NDLA's basic pedagogical view is to help and motivate so that pupils:
>
> • participate actively in, and understand, their own and others' learning processes
> • participate in communication and collaboration
> • have opportunities to develop in-depth understanding and are helped to understand contexts and connections
> • gain new knowledge that is adapted to each pupil's level of pre-existing knowledge and experience
> • receive challenges and emotional engagement that motivates them and provides a sense of mastery that encourages them to stretch themselves
> • are oriented towards goals and progression in learning
> • learn material that is linked to the core elements of each subject
> • benefit from a high-quality, safe learning environment." (NDLA, 2019)

Linking academic and professional content to each other as well as with the lifeworld of adolescents is of particular importance to NDLA. [I4 91–93].

Last but not least, an important statement can be highlighted: The best for learning is not necessarily the best for business.

## Sustainability

The openness of the system (and all its content) makes it more independent of the NDLA brand. If someone pulls the plug tomorrow, it is possible to start a new platform the day after tomorrow [I1 65–65]. This sustainability beyond a possible end of project financing is only possible due to the open licences used. It forms a massive difference to previous 2–3 year projects, which were also common in Norway [I13 4–4].

## Development focusing on User needs

A central starting point is to focus on the needs of the users. In this respect, NDLA has undergone a change, as the needs of the students are now the focus of attention, whereas in the early years, the ideas of the teachers were given more consideration. NDLA as an organisation is

oriented towards the LEAN model and uses the methods of Design Thinking (Brown, 2009) [I3 5–5]. The described change in the focus of the development was interesting:

> The biggest change we done is... I think it was healthy for NDLA the first years to be focused on the teachers until it became all of a movement. But it's not possible for us anymore to speak about the pupils, we had to speak to the pupils and with the pupils. And not only them but to, kind of conceptionally, we need to be focused on learning. So NDLA's business is learning. And is not one pupil, it's the three pupils working together, getting advice from the teacher, gathering some information from other parents, which have special competences within one area and so on. [I3,7–7]

Thus, the fictitious descriptions of students and teachers (personas) help to adopt perspectives during the development of new content and structures [I11,25–33]. The personas, as well as much of the information used to create material, are publicly available and understandable to non-Norwegian speakers via Google Translate (*https://brukskvalitetsplattform.ndla.no/personas.html*). The cooperation with pilot schools makes it possible to test new approaches intensively before they are used for a larger number of materials [I4,169–173; I11, 5–5].

## PEER-PRODUCTION

Internally at NDLA, a distinction is made between two levels at which teachers are involved. Firstly, the level of systematic material production and dissemination and, secondly, the level of voluntary revision and sharing of own materials under free license. While NDLA is very successful at the level of systemic production, the second level of peer-production is still expandable.

### Sharing by teachers

The effective use of resources is also a central idea in the discussion about user involvement in updating and creating new content. Expanding and updating large-scale OER platforms require capacities that in the long term cannot be met by editorial teams alone. For updating minor bugs in OER platforms, low-threshold user engagement would be useful [I4 166–168].

Teachers in Norway are to busy to create Wikipedia-style materials outside their working hours. Therefore motivating teachers to share content and check and document licenses before publishing is not an easy task. User-friendly structures and systematic recognition (e.g. over flexible days off or in assessments) could help. Secondments or additionally paid project parts are a good basis to involve more teachers in the preparation of certain parts of a subject [I13 55–58]. Workshops with groups of teachers to create OER together are a mutual inspiration for all participants, especially those from rural contexts [I11 4–4].

In parallel, ways are being sought to involve teachers and learners more in content enhancement:

> Now it comes to the time aspect. We have to create some solutions. Today, you have to sort of log on to websites and fill in lots of forms. It has to be a lot simpler, in terms of the contributors being... they read something and they say, okay, that's a darn question, it's not good at all. Then, if a teacher reads one of our resources and finds they a bad question, you should be able to click directly on the website and write a new version of it and press share. That should

> then go to our desk or one of the editorial staffs, as a suggestion. So, I think you could have..., we could at least try out, to let everyone do it without even logging in. And it just goes as an anonymous suggestion. If that creates too much spam, we have to have some kind of log-in and teachers can use their professional log-in. Everyone has a log-in through their employer. [I 12, 72–73]

NDLA's current effort aims to develop the structures for peer production of content in closed structures to slowly introduce teachers to sharing materials in larger peer groups.

## DISCUSSION

Having shown in advance in which areas other countries can build on Norway's experience in upper secondary education, the question of *why* is now to be taken up again. To what extent

does it make sense to further develop the Norwegian approach against the background of inclusive education? UNESCO's stated goal that OER can open up "possibilities for OER to be accessible anytime and anywhere for everyone, including individuals with disabilities and individuals coming from marginalized or disadvantaged groups" (UNESCO, 2019, p. 5), is not self-fulfilling. It is much more a matter of focusing on the needs of diverse learners at all levels of development.

## DIVERSITY IN MIND

The needs of the learners are already taken into account when developing the material. Here, an attempt is made to depict the diversity of the students via fictitious personas. The design of the learning platform also makes it possible to depict several levels of complexity for one learning object. Via the learning paths, teachers can make specific offers available to students [I5 39–43]. The team members also emphasize the need for openness, to be able to deviate from these learning paths and to learn without full-time supervision by the teachers.

The materials can also better connect to the diverse realities of the pupils' lives due to the possible multi-perspectivity. Digital space is less limited here than a textbook. This makes it possible to incorporate local characteristics as well as to take into account different perspectives (e.g. on historical events).

## ADAPTING THE MATERIALS

Especially for inclusive education, the adaptation of pedagogical material to the learning requirements of the pupils is of particular importance. If the diversity of pupils is taken into account when designing the OER, the need for further adaptation may be reduced. Simultaneously, from a realistic point of view it is clear that even the best material will not be suitable for all pupils. This is where a decisive advantage of OER comes into play. Teachers have the right to adapt, develop and share the material with other teachers. This improves the fit between teaching material and students.

## CONCLUSION

The present paper is focused on the experiences of the Norwegian colleagues with a multi-year development of a state-financed OER platform. The data basis of this study is limited to the views of staff, cooperation partners and opponents of NDLA collected through interviews. Unfortunately, financial and time limitations in the research process meant that teachers and students as well as representatives of the Ministry of Education could not be interviewed about their experiences with NDLA. Nevertheless, by involving staff from different departments, cooperation partners and adversaries, it was finally possible to gain a comprehensive insight into the Norwegian approach. This first-hand information is supplemented by detailed accessible documentation pages such as the usability platform (*https://brukskvalitetsplattform.ndla.no*) and the Design Manual (*https://designmanual.ndla.no*), which are also publicly accessible. A more in-depth analysis of those policy documents would be one way to shed further light on the work of NDLA, especially with regard to accessibility.

In addition to these limitations, the discussed data were collected in the time before the Corona pandemic and can therefore not include more recent developments.

Due to the very different framework conditions from country to country (e.g. with regard to responsibilities at federal, state or municipal levels) the Norwegian experience can (and should) not be adopted 1:1. Nonetheless, it is possible to build on the experiences, strategies, software, content, structures and pedagogical considerations described above. Steiner-Khamsi (2016) describes the problems of policy borrowing, in particular the projection of national interests onto "empty vessels" of policies, but also the spread of transnational corporations in the education market. Accordingly, it is not about the simple worldwide adoption of current strategies such as cc-licenses, but rather about the reflection on how relevant content can be made available for the respective target groups. This may also include alternative models such as Traditional Knowledge licenses, that communicates fair usage options of traditional knowledge of Indigenous communities (Anderson & Christen, 2013).

The risk of unreflected policy borrowing makes it all the more necessary to gain a detailed insight into other systems (such as NDLA) in order to be able to make justified further developments to one's own system in the interest of the learners.

The openness of the Norwegian colleagues makes such an insight possible and can form the basis for own reflections. In contrast to other global developments there are no commercial interests and no standardization efforts behind it. On the contrary, state-funded OER offer the chance to address the interests and needs of the students and ignore market logic.

So, when countries, like Norway, decide to allocate parts of their budget to OER and build a large-scale platform, they contribute to a better quality of teaching for all students and reduce the workload of teachers, as they no longer have to reinvent the wheel every day.

The strategies, ideas and experiences presented can form a basis for developing own platforms and building on the ideas of the Norwegian colleagues. The example of Norway, including its obstructive conditions, shows what is possible on the basis of a simple legal foundation and a shared vision. However, the development of a state OER platform is particularly attractive for countries with economic constraints (Wiley, Hilton III, et al., 2012) and large student populations. In any case, it is a chance to support teachers and advance inclusive education for all pupils.

Also, for the higher education context there are some possibilities to build on the presented experiences and approaches of the Norwegian colleagues.

These include, for example, using personas to focus on and address the diverse needs of students. This is not limited to accessibility for students with disabilities, but also includes issues of multi-perspectivity and differentiation by interests.

A modular structure, as with NDLA, also allows for flexible content composition by educators in higher education.

Low-level remixing offerings, such as via the customizable Learning Path, are particularly interesting in this regard, as they make it possible to create differentiated offerings for students from different degree programs or based on interest.

The complete openness of offerings (without login or download) as with NDLA is also appealing for university teaching, especially since academic content is often hidden behind walls of learning management systems (LMS). At the same time, it should be kept in mind that even for tertiary teaching, contextualization of materials by competent faculty is usually necessary (Knox, 2013, p. 825).

A systematic exchange of OER between universities via a common OER platform based on APIs/standards offers numerous opportunities, especially for countries with state-funded universities. The Norwegian open source OER platform software, for example, could also be used in this area, as it can be used as a common basis to deliver content via APIs to the various LMSs of the higher education institutions.

Universities are already using NDLA-funded h5p and, like the University of Victoria (Wilkie et al., 2018), have contributed to the further development of the format.

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## COMPETING INTERESTS

The author has no competing interests to declare.

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# REFERENCES

**Abbas, N.** (2016). *From paper to digital, and back. A qualitative study of the publishing of Open Educational Resource based textbooks in a knowledge society.* University of Oslo. *http://urn.nb.no/URN:NBN:no-55488*

**Anderson, J.,** & **Christen, K.** (2013). "Chuck a Copyright on It": Dilemmas of Digital Return and the Possibilities for Traditional Knowledge Licenses and Labels. *Museum Anthropology Review*, *7*(1–2), 105–126. *https://scholarworks.iu.edu/journals/index.php/mar/article/view/2169/4251*

**Brown, T.** (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation.* HarperBusiness.

**Department of Education.** (2001). *EDUCATION WHITE PAPER 6: Special Needs Education Building an inclusive education and training system.* *http://www.info.gov.za/whitepapers/2001/educ6.pdf*

**EFTA Surveillance Authority.** (2011). *State Aid: Norwegian support to provider of learning material cleared.* *http://www.eftasurv.int/press--publications/press-releases/state-aid/nr/1535*

**Hilton, J., Wiley, D., Stein, J.,** & **Johnson, A.** (2010). The four R's of openness and ALMS analysis: Frameworks for open educational resources. *Open Learning*, *25*(1), 37–44. DOI: *https://doi.org/10.1080/02680510903482132*

**Hinz, A.** (2002). Von der Integration zur Inklusion–terminologisches Spiel oder konzeptionelle Weiterentwicklung. *Zeitschrift Für Heilpädagogik*, *53*(9), 354–361.

**Johnson, L., Becker, S. A.,** & **Hall, C.** (2015). *2015 NMC Technology Outlook for Scandinavian Schools.* *https://www.learntechlib.org/p/182056*

**Knox, J.** (2013). Teaching in Higher Education Five critiques of the open educational resources movement Five critiques of the open educational resources movement. *Teaching in Higher Education*, *18*(8), 821–832. DOI: *https://doi.org/10.1080/13562517.2013.774354*

**Mayring, P.** (2000). Qualitative Content Analysis. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, *1*(2). DOI: *https://doi.org/10.17169/fqs-1.2.1089*

**Müller, F. J.** (2019). *Opportunities and Challenges of State-financed Open Educational Resources: The Norwegian model – a way to more inclusion?* Verlag ZLL21 e.V. *https://osf.io/preprints/socarxiv/7325g/.* DOI: *https://doi.org/10.31235/osf.io/7325g*

**NDLA.** (2019). *Better learning for all through active participation and reflection – The NDLA's pedagogical platform.*

**Otto, D.** (2019). Adoption and Diffusion of Open Educational Resources (OER) in Education: A Meta-Analysis of 25 OER-Projects. *The International Review of Research in Open and Distributed Learning*, *20*(5), 122–140. DOI: *https://doi.org/10.19173/irrodl.v20i5.4472*

**Pawlowski, J. M., Ossiannilsson, E., Creelman, A., Pirkkalainen, H., Hoel, T., Varis, T., Lounaskorpi, P., Johannessen, Ø., Titlestad, G., Hylen, J., Lund, C. H.,** & **Ellefsen, O.** (2013). The Nordic Alliance for Open Education – State of the Art, Challenges and Opportunities. *The Joy of Learning: Enhancing Learning Experience – Improving Learning Quality. Proceedings of the European Distance and E-Learning Network 2013 Annual Conference.* Oslo, 12–15 June, 2013. 505–514. *http://lup.lub.lu.se/record/3917567/file/3917577.pdf*

**Peters, S. J.** (2007). "Education for all?" A historical analysis of international inclusive education policy and individuals with disabilities. *Journal of Disability Policy Studies*, *18*(2), 98–108. DOI: *https://doi.org/10.1177/10442073070180020601*

**Pynoo, B.,** & **Van Braak, J.** (2014). Predicting teachers' generative and receptive use of an educational portal by intention, attitude and self-reported use. *Computers in Human Behavior*, *34*, 315–322. DOI: *https://doi.org/10.1016/j.chb.2013.12.024*

**Schuwer, R., Kreijns, K.,** & **Vermeulen, M.** (2014). Wikiwijs: An unexpected journey and the lessons learned towards OER. *Open Praxis*, *6*(2), 91–102. DOI: *https://doi.org/10.5944/openpraxis.6.2.116*

**Smith, M. L.,** & **Seward, R.** (2017). Openness as social praxis. *First Monday*, *22*(4 SE-Articles). DOI: *https://doi.org/10.5210/fm.v22i4.7073*

**Steiner-Khamsi, G.** (2016). New directions in policy borrowing research. *Asia Pacific Education Review*, *17*(3), 381–390. DOI: *https://doi.org/10.1007/s12564-016-9442-9*

**UNESCO.** (2019). *Recommendation on Open Educational Resources (OER).* *33*, 59. *https://unesdoc.unesco.org/ark:/48223/pf0000373755/PDF/373755eng.pdf.multi.page=3*

**United Nations.** (2020). The sustainable development goals report 2020. In *The sustainable development goals report 2020.* *https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf*

**Wiley, D.** (2014). *The Access Compromise and the 5th R.* *http://opencontent.org/blog/archives/3221*

**Wiley, D., Green, C.,** & **Soares, L.** (2012). Dramatically Bringing down the Cost of Education with OER: How Open Education Resources Unlock the Door to Free Learning. *Center for American Progress*, 1–5. *https://www.americanprogress.org/wp-content/uploads/issues/2012/02/pdf/open_education_resources.pdf*

Wiley, D., Hilton III, J. L., Ellington, S., & Hall, T. (2012). A preliminary examination of the cost savings and learning impacts of using open textbooks in middle and high school science classes. *The International Review of Research in Open and Distributed Learning*, *13*(3 SE-Research Articles), 262–276. DOI: *https://doi.org/10.19173/irrodl.v13i3.1153*

Wilkie, S., Zakaria, G., McDonald, T., & Borland, R. (2018). Considerations for designing H5P online interactive activities. *Open Oceans: Learning without Borders. Proceedings ASCILITE*, 543–549.