One mobile app – seven art museums: A case study of *Kunstporten*

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Abstract: *As digital media change our society, museums are trying to rethink their mission and benefit from the possibilities digital tools afford. First, this article provides a historical background for the development of mobile apps as digital interpretive media in Norwegian museums between 2005 and 2020. Second, it analyses a specific case – the app Kunstporten – one of the most interesting apps to have emerged in the Norwegian cultural sector in recent years. The app was developed between 2012–2013 by seven Norwegian art museums, and the first museum app in Norway targeted explicitly at children. This small case study is based on interviews with museum educators and digital walkthroughs exploring the affordances (Gibson 1978) of Kunstporten. The article seeks to answer two questions: what have education departments learned from introducing this digital interpretive media? And why is the app more successful in some museums than others?*

Keywords: Museum apps, affordances, digital collections, digital interpretive tools.

INTRODUCTION

“You’re gonna love it. This phone is something completely else. There are hundreds of apps that you can install on it!” – exclaimed the excited salesperson, as I swiped my credit card when buying my first smartphone, the iPhone 4, in 2007. Hundreds of apps, I thought, feeling slightly overwhelmed, asking myself whether I would really need them all. Today there are 1.85 million apps in Apples App Store and 2.56 million in the Google Play Market (Clement 2020). Among these millions, hundreds of apps

are offered by museums and cultural heritage institutions.

Museum apps have been used to enhance the meeting between audience and exhibitions since the early 2000s. The shortened term “app” is a computing colloquialism, coined in the 1980s (see, e.g., Holwerda 2011), which refers to mobile application software designed to run on smartphones and other mobile devices. Many young people coming to a museum for a school trip have never been to a museum before, but all are confident using mobile

Fig. 1. Affordances of the digital app and the physical museum space are strongly intertwined. The last task invites to take part in a workshop. Retrospective exhibition of the Norwegian artist Sverre Bjertnæs, Haugar Vestfold Kunstmuseum, September 2019. Photo: Screenshot from www.kunstporten.com.

technology (Liven 2016). Museum exhibitions are complex visual environments that might be challenging to understand and benefit

from without preknowledge on the subject or guidance. Taking that into consideration, an increasing number of museums have developed digital tools directed at young visitors, which function as a portal for introducing objects and creating engagement with exhibits (Drotner *et al.* 2019, Haller Baggesen 2015, Stuedal 2015). Visitors are invited to engage with art exhibitions through their phones, downloading, sharing, re-mixing, and reusing images without restrictions in social media.

First, this article provides a historical background for the development of mobile apps as digital interpretive media in Norwegian museums between 2005 and 2020. Second, it analyses a specific case – the app *Kunstporten* – one of the most interesting apps to have emerged in the Norwegian cultural sector in recent years. Seven Norwegian art museums joined in developing the museum app, which is the first in Norway targeted specifically at children. It has also survived over a long period, so it is interesting to trace its ups and downs and investigate why it succeeded in some museums and did not become a spectacular success in others. This small case study is based on interviews with museum educators and on digital walkthroughs exploring the affordances (Gibson 1978) of *Kunstporten*. The article seeks to answer two questions: what have education departments learned from introducing this digital interpretive media? And why is the app more successful in some museums than others?

THE “APPIFICATION” OF MUSEUMS AND THE CULTURAL HERITAGE SECTOR IN NORWAY (2005–2020)

In the 2000s, before the age of smartphones, mobile museum communication was already a hot topic in the Norwegian museum sector. At a

conference of the Seksjon for formidling (SFF) under the Norwegian museum association in 2006, the Norwegian Archive, Library and Museum Authority (ABM-utvikling) presented a Nordic pilot project aiming to communicate cultural heritage via mobile technology. In the same year, the Astrup Fearnley Museet experimented with the use of mobile devices as digital interpretive media in the gallery setting. The museum offered to send text messages (SMS: Short Message Service) with information about specific artworks in the exhibition as visitors stood next to them (Buch Hansen 2006:18). The arrival of portable mp3 players and iPods created enthusiasm among museum communication professionals, and audio guides became increasingly popular in Norwegian museums. Rogaland Kunstmuseum (RKM) boasted an innovative podcast project using mp3 players (iPods) in connection with the Damien Hirst *New Religion* exhibition (Buch Hansen 2006). The Drammen Museum ran a pilot education project using iPods to present the art of Christian Skredsvig to high school students (Norendal 2010). In the early 2010s, QR codes promised a new mobile communication revolution. QR-codes, similar to barcodes, were placed around the Norsk Folkemuseum to provide quick access to information about more than 50 buildings from rural and urban Norway (Norendal 2012:16–18).

The quantity of new museum and cultural heritage apps has accelerated due to changes in European law enforced in 2012. In a directive from 2012, the European Commission announced that ABM-sector (archives, libraries, and museums) should work to make their data available without restrictions, allowing commercial reuse (Øvrebø 2012). The Norwegian cultural sector responded with an extensive and ambitious app project known

as *KNappen*, which gathered information from different national databases and archives.¹

In addition, private stakeholders such as the Norwegian trust Sparebankstiftelsen DNB has contributed significantly to the development of digital tools in the cultural sector. One example is the prize-winning app *Kunstporten* (2014), inspired by the dialogue-based teaching approach. This app is the focus of this small case study. *Kunstporten* was inspired by seven art museums – Lillehammer Kunstmuseum, Henie Onstad Kunstsenter, Haugar Vestfold Kunstmuseum, Drammens Museum, Astrup Fearnley Museet, Nasjonalmuseet, and Munchmuseet – that joined forces to design an app for children and families.

Lately, museums have started to see the potential for augmented and virtual reality. Using the app *Oslo Havn 1798*, one can explore the port of Oslo in 1798 and see what the buildings looked 220 years ago. In 2018, the Oslo Museum (Bymuseet) launched *Bydetektiven*, an augmented reality app about the history of the city (Norendal 2017:8). Many of the cultural heritage and museum apps directed towards children are designed as a treasure hunt, with children in the role of detectives.

In addition to apps developed specifically by an individual museum, there are also many international private stakeholders promoting “one app for all museum” models. The two largest of these private actors are *Vizgu* and *Useum*, both developed in Denmark. Useum involves about twenty Danish museums and is used by the Museum of Oslo (Bymuseet and Arbeidermuseet) and Narvik Krigsmuseum in Norway.

As we can see, over the past two decades, both private and public money has been invested in developing digital tools in the cultural sector. I consider this a tendency that

Fig. 2. A school group using Kunstporten. Exhibition *Verk fra samlingen*, Haugar Vestfold Kunstmuseum, 2018. Photo: Mari Ravler Johansen, Haugar Vestfold Kunstmuseum.

deserves more in-depth case studies, especially considering how some apps become very popular, and others are seldom downloaded.

APPS AS MAPS, AFFORDANCES, AND DIALOGUE BASED-TEACHING

To explore why the same app is more successful in some museums than others, I will rely on three theoretical concepts in my analysis of the interviews and the apps interface; apps as maps, J. J. Gibson's theory of affordances and Olga Dysthe's dialogue based-teaching, the latter being actively used in designing the *Kunstporten*.

Museum apps are digital tools, which mirror the space of the museum and provide

information for getting around. A device with the installed app is held with the hands in front of the eyes during the museum visit, just like a paper map. Museum apps are epistemological maps of knowledge and, like any other map, they introduce only a tiny part of the exhibition realm. They present only the highlights and do not mention 99.9 per cent of the objects in the room. Selection is one of the main features of a map (Turchi 2004).

A museum app works as a map guiding a visitor around the affordances of the physical room and adding digital affordances on the top of it. The notion of affordances, originally introduced by James J. Gibson (1978), can be stated as follows: it is the possibility of an action on an object or environment. A chair

allows to be sat on; a ball allows to be thrown. A painting in the gallery allows to be stared at. According to affordance theory, human agents perceive an environment visually, focusing mostly on the opportunities it offers and not on the aesthetic qualities (Gibson 1986). If we put affordance-glasses on, we will see the world as a totality of the possibilities of actions. The concept of affordance provides a theoretical framework for thinking about the semantic and representational content of media (Ramstead *et al.* 2016). In the case of smartphone apps, their composition and layout constitute what they afford. Apps are assemblages of multimedia content, photo, video, text, templates, icons, frames, and hyperlinks, which afford, among other things, browsing, scrolling, learning, downloading, and sharing them with other Internet users.

The question of what apps afford their users is closely connected to their digitality. How digital are apps? The pure digitality of an app as an interpretive museum medium is a utopian idea. The most effective strategy for reaching visitors is a blended solution combining digital and traditional interpretative media such as wall texts (Samis 2018:60) or connecting the content to physical analogue tasks in museum workshops (Interview, Haugar 2019).

The *Kunstporten* app is inspired by the dialogue-based teaching approach and combines the potential of the digital affordances of the app and physical affordances of the museum space. In general, the museum environment can be described as a mixture of formal and informal sites of learning (Stuedal 2015:195). To match this type of environment, *Kunstporten* is based on dialogue pedagogy, which is a performative learning method that does not focus on the dissemination of information but instead on stimulating curiosity and independent thinking. The origin of this

approach lie in Mikhail Bakhtin's dialogic view of communication, knowledge, and learning. The design of the app and specific tasks (fig. 1) follow Olga Dysthe's "multivoiced classroom" concept as its overarching theoretical framework. In her research, Dysthe has demonstrated how students learn and develop through interaction and dialogue (Dysthe *et al.* 2006). The app uses dialogic conversation as the dominant mode of learning. As Dysthe put it herself:

The goal of museum teaching is not just to give students a positive experience of their encounter with art or to disseminate knowledge but also to develop understanding, insight, and critical reflection in students and to give them the opportunity to enter into a multivoiced dialogue about cultural matters. (Dysthe *et al.* 2013:78)

This perspective on the museum as a learning space corresponds with an on-going participatory turn in museums and a power shift focusing on visitors as co-producers of knowledge and experiences generated in the museum space (see, e.g., Kidd 2014, Simon 2010). The new role of museums – approaching visitors as participants, being inclusive and democratic – has been addressed in Norwegian government white papers (Ministry of Culture 2009:4.3) and Art Council reports (Brenna 2016).

INTERVIEWS AND WALKTHROUGHS

The investigation is primarily based on interviews with museum educators that were involved in developing the *Kunstporten* and in producing the content in connection with new exhibitions. All the educators I spoke to have used *Kunstporten* in their work during guided school trips. I chose to use the semi-

structured interview, which is neither an open everyday conversation nor a closed questionnaire (Angrosino 2007:42, Kvale 2007:11). The method enabled the systematic gathering of information on interpretive functions of the app from all the interviewees, and simultaneously gave them space to elaborate on the aspects of the app they found significant. In all, I conducted three interviews. In the first, I spoke to three educators from Haugar Vestfold Kunstmuseum, Mari Ravler Johanse, Gry Bø, and Caroline Berg; in the second, one educator from the Munchmuseet, Sivert Thue; and in the third the coordinator of the *Kunstporten* project from Lillehammer Kunstmuseum, Hilde Fauskerud. The interviews were conducted in the autumn 2019. Collecting data from three different museums of different size, in three different cities, all working with the same app, enabled me to identify how the physical affordances of the museums were intertwined with the digital affordances of the *Kunstporten* app. Each conversation took about one hour, and all the conducted interviews were transcribed.

In addition to interviews, the analysis is based on my walkthroughs of the *Kunstporten* app. The walkthrough method can be described as a form of participatory observation combined with audio-visual ethnography (Light *et al.* 2016). It is a form of software inspection, and careful evaluation of the interface grounded in science and technology studies and cultural studies approaches (Iranowska 2019b:42). It means that I placed myself as a researcher in a position of the user and systematically and carefully investigated the digital interface of the app over a defined period, taking notes and making screenshots, while keeping the research question in mind. I have used the app intensively for two weeks, carefully scrutinizing the content from two exhibitions

at the Haugar Vestfold Kunstmuseum: Munch and Warhol and Sverre Bjertnæs' exhibition. Although the walkthrough approach might be considered highly subjective, it has worked well in conjunction with the interview method. It revealed details about the app in question, allowed me to follow the step-by-step narration, test the affordances, and prepare in-depth questions for the interviews.

ANALYSIS

Kunstporten is an educational interactive multimedia app supporting a visitor-centred museum model. It was designed to engage visitors and enhance their museum experience by encouraging them to participate in a game. In particular, it was designed to help young visitors to connect with unfamiliar works of art and support the learning processes of older children. The app introduced rich media material containing sound, video, oral narration, and photography and tasks to solve (Varvin *et al.* 2014:277).

Designing and developing *Kunstporten* involved seven Norwegian museums during the period 2012–2013. The app had a budget of 2,1 million NOK and was sponsored by the Norwegian trust Sparebankstiftelsen DNB, which proposed the collaboration between museums as a response to simultaneous applications (Varvin *et al.* 2014:276; Interview, Lillehammer 2019). Developed by Making Waves, later Eygo and currently Dice, it won a bronze medal at the International Design and Communication Awards for best app in 2015 (Liven 2016). While some museums still successfully use it today, the National Museum, Munchmuseet, Henie Onstad and lately Astrup Fearnley Museet withdrew from the collaboration. Today *Kunstporten* is a collaboration between Lillehammer Art

Museum, Haugar Vestfold Kunstmuseum, and Drammen Museum. The working group plans to modernize and update the app in the near future (Interview, Lillehammer 2019).

In all the conducted interviews, the educators emphasized the importance of a dialogue-based teaching approach, which sets *Kunstporten* apart from an ordinary audio guide. It is a “head-up app”, which means that it challenges visitors to explore the exhibition and artwork instead of purely providing facts on the screen. As the educators put it themselves: “we try to encourage the visitors to slow down and spend time with works of art, possibly even creating their own individual experiences of it” (Varvin *et al.* 2014:276. The focus is not disseminating information but stimulating curiosity and reflexivity. Therefore, the app was designed to direct the attention towards the artwork – that is a principle of the “head-up” rule again (Stuedal, 2015). The educators behind *Kunstporten* discovered that the target group found it boring if they received instructions that were too strict (Varvin *et al.* 2014:275). This information should become a general rule important to keep in mind when designing digital tools in the cultural heritage sector (Iranowska 2019a). When creating tasks, the educators from Haugar, therefore looked for artwork that would trigger dialogue (Interview, Haugar 2019). In that way, the dialogue-teaching approach applied during the development of the app contributed to the fact that the affordances of the digital app and physical museum room are strongly intertwined (fig. 1). For example, at Haugar, the questions in the app prepare children to participate in a practical workshop at the end of the display. In this way, the digital affordances interplay with the physical affordances of the museum environment.

However, educators from the Munchmuseet

had quite a different experience and drew different conclusions about using the app as a dialogue-based teaching tool. They felt that the app worked well as a tool for communicating specific content or for asking multiple-choice questions, but not that well as a dialogue-based teaching tool using open questions and fostering discussion (Interview, Munch 2019). The museum educator from the Munchmuseet considers the necessity of constant shifting between a museum’s digital and physical spaces as one of the biggest challenges with using the app during guided school tours:

One thing is the museum. The museum room. Also, the digital space comes in addition. Each functions very well on its own. But the transition between these two rooms makes it difficult. A group of teenagers wearing caps arrives. We have to explain to them that they will use an iPod or phone. They ask “what’s up” and what to do with it. What should they press? Also, they need fully charged phones and to be divided into small groups to receive the instructions. (Interview, Munchmuseet 2019)

As described by the educator, the museum environment is fairly complex and adding digital affordances on top of the physical one might be challenging. That connects with the thinking of Kathleen Pirrie Adams (2019), who reads an entire museum space as a platform and its objects as assets and affordances. A museum app would thus be an affordance-oriented communication practice presenting the value of material culture via a touchable screen and a set of earphones. Apps are an interpretive medium providing contextual information using different type of media (sound, text, and image), and juxtaposing geographically and historically distant elements. In *Kunstporten* there are for instance short movies about Warhol, a video of

Fig. 3. Examples of tasks about Andy Warhol. Haugar Vestfold Kunstmuseum, September 2019. Photo: Screenshot from www.kunstporten.com.

Swedish children playing around *Nimis* by Lars Villks, and songs. Focusing on the affordances of the museum as a whole in the designing stage helps to dissolve the difficult opposition between digital and analogue elements in the museum setting; “rather than viewing media as an additive, it offers a perspective that views material culture as a medium and media as having a material dimension” (Pirrie Adams 2019:302). The affordances of the museum space and the affordances of the apps are intertwined and shape each other. Even tiny details such as hanging artworks (tiny prints) high up on the wall in the *Metafysica* (2019) exhibition limits how and whether they can be used in an app when designing content for children (Interview, Haugar 2019).

Most of the museums divided their content in *Kunstporten* into two categories – Kunstagenter (Art Agents) for families with children between ages five and nine and Huskelappen (Notepad) for students in

secondary school (Varvin *et al.* 2014:279). After analysing the interviews, it became clear that museums defined the main target groups for *Kunstporten* differently. For example, in the Haugar Kunstmuseum, *Kunstporten* is directed primarily at families and teenagers visiting the exhibition on their own, without the assistance of a museum educator. Educators admitted that using the app during guided tours for school groups presents many additional challenges (Interviews, Haugar 2019, Munchmuseet 2019). The museum guide often has to follow up to 30 pupils walking around the exhibition with a device at their own pace, shifting their attention between the mobile screen and the exhibition. (Interview, Haugar 2019) All in all, the educators’ experiences shows that *Kunstporten* works better as an alternative to an actual “human” guide than as supplement during a guided tour. (fig. 2) Haugar Kunstmuseum has positive experience with promoting the app among individual

guests, while the Munchmuseet used the app primarily during guided tours for schools.

That choice can be explained by the physical affordances of the museum space – Haugar Kunstmuseum is usually less busy, and information about the app is exposed at the ticket office and in the hall. The Munchmuseet is a busy museum in the capital with many visitors, a vibrant and colourful museum shop by the entrance, and cafeteria by the ticket office, which altogether made the information about the app less visible for the potential users.

Affordances of the physical room and the app have to do with the senses – mainly touch, sight and hearing. When it comes to hearing at Haugar, small groups using *Kunstporten* are encouraged to walk through the museum without using earphones, so they can all listen to the narration and questions together and discuss. The app's task is to stimulate interaction in the family, not only between the single user and the app (Interview, Haugar 2019). Use of *Kunstporten* might be problematic in a busy room or next to works of art that emit sound. It was also mentioned that some teens find it embarrassing to walk around without earphones, since they feel it disturbs the sacral silence one tends to associate with the gallery setting. That problem was resolved by designing the tasks so that the user could follow the narration or listening to the sound file or reading a text.

The metaphor of a journey was often used during the development of the *Kunstporten* app when the seven museums first met in 2013 (Varvin *et al.* 2014). *Kunstporten* is a journey for the visitor travelling in the physical space of the exhibition but also goes on a mental voyage. Each of the tasks that the educators prepare is a separate, mini travel route through the museum. They do not expect visitors to

have the capacity to explore all of the paths during one visit – “we wanted the visitor's journey through the exhibition not to follow a certain path, but to instead facilitate the visitor to follow his interests” (Varvin *et al.* 2014:281). If there is a route left unexplored, they have a reason to come back.

The walkthrough can be compared to a journey via the app. The web-based app is available at www.kunstporten.com,² from where one can choose between the three museums – Drammens Museum, Haugar Kunstmuseum, and Lillehammer Kunstmuseum. In this analysis, I will present results from walkthroughs of the tasks designed for Warhol på Huagar (2016–2019) and Sverre Bjertnæs' exhibition (2019) at Haugar Kunstmuseum. The walkthrough analysis provides a solid overview of the affordances of the app and how it applies the dialogue-based teaching approach.

The tasks about Warhol and Munch were among the first developed by the Haugar educators (Interview, Haugar 2019). The journey starts when opening the starting page, which provides basic information about the app. Underneath the introductory text we find a button “To the task” (*Til oppgavene*), which works as a signifier (Norman 1988) of the affordance. The next screen affords the choice between “Children” and “Young”. I choose the category “Young”, which takes me to a page with four different sets of tasks. I chose a group entitled “Eva Mudocci (After Munch)” and press the “Play” button. An audio file starts, inviting examine the print carefully:

Take some time to look at the artwork. Describe it for yourself or each other. What is your immediate impression? (See fig. 3, first screen).

The tasks strike a good balance when shifting from an epistemological to an ontological level

of stimulation. They provide a bit of information, but mostly they invite independent exploration, as in the screen “Warhol and Celebrities”:

Andy Warhol appropriated images of pop stars and celebrities such as Elvis Presley and Marilyn Monroe. He believed that Eva Mudocci was Munch’s Marilyn. What do you think he meant by that? And why was he so keen on appropriating images of celebrities? Which celebrities would he use today? (See fig. 3, second screen).

This exercise consists of open-ended questions and encourages users to express their own opinions, which illustrates the essence of dialogue-based teaching approach. The tasks stimulate engagement with the artworks and facilitate participation in discussion about art on a low-key level by referring to present-day pop culture. As researcher and consultant for the *Kunstporten* project Dagny Stuedahl has pointed out, solving the tasks designed after a “dialogue-based teaching” approach enables users to interpret the objects in a meaningful and more personal way (Stuedahl 2015:204).

The next screen is an assemblage of sound, image, and film (fig. 3, third screen). The audio file provides a simple explanation of the graphic technique used by Warhol known as silk screening. The content is also available as text, but information about the silk-screening technique is further explored in a short YouTube video – a media channel familiar to every teenager.

In addition to seeing *Warhol på Haugar* when visiting the museum in September 2019, I had seen the contemporary art exhibition *Metafysica* just a couple of days before its opening. The *Metafysica* explored topics such as philosophy and religion, refugees, and multicultural society. The museum educators used *Kunstporten* to design tasks focusing

attention on how artworks connect to these major world problems. The goal was to design the *Kunstporten*’s tasks so that users would see an artwork and then come up with questions they would not think of if they had gone on their own:

We have the opportunity to guide them, open doors or gates for them, and stimulate curiosity and knowledge so that they notice certain things. *Kunstporten* is about focusing attention on artworks and themes. (Interview, Haugar 2019)

Some topics, such as sexuality or gender, might be challenging to discuss with children, so the app functions as a guide in the conversation, besides being a map to the physical room. The purpose of *Kunstporten* is to present these complex topics in an accessible way (Varvin *et al.* 2014:275). Other examples of using *Kunstporten* in dealing with challenging topics were the exhibitions *Hen – Flytende Kjøen* (Hen - liquid gender) (Haugar, 2018), or *Reality check* (Haugar, 2017), which featured photography of a fetus in formalin displayed centrally by the entrance. In this case, the educators emphasized the importance of a well-thought-out sound file about the artwork.

The same applies to the content developed in connection to the retrospective exhibition of the Norwegian artist Sverre Bjertnæs at Haugar Kunstmuseum in 2019. It was very rich and deserved a walkthrough on its own. Six different sets of tasks were offered in *Kunstporten* connected to this exhibition (fig. 4). Here I focus on exploring affordances of the image *Nimis* and choose two “paths” or sets of tasks – *The violet room* (*Det lilla rommet*) and *Nimis*. The tasks connected to the installation encourage viewers to explore the room on its own: for example, “Find the red teeth and take a picture” or “There is a long bench in the

Fig. 4. Tasks offered in connection to the retrospective exhibition of the Norwegian artist Sverre Bjertnæs, Haugar Vestfold Kunstmuseum, September 2019. Photo: Screenshot from www.kunstporten.com.

middle of the room. Take your time and look carefully around". These are straightforward but concrete activities that help to explore a somewhat chaotic room overloaded with visual impulses. Above the tasks, the first screen affords to listen to a long reflective text on the nature of the room beginning as follows:

Have you ever been in such a room? It might be a bit like your own room where you have your things, the treasures that you collect. It is possible

to collect almost everything. Are you collecting anything? Rocks, teddy bears, whisperers or soda corks? It does not matter what we collect, because the point of collecting is the constant search for new things for the collection. Here in the room, you see paintings, sculptures in wood and bronze; drawings, photographs, fabrics and a fireplace. (Fig. 5, first screen)

The text continues and provides information on Bjertnæs' previous exhibitions and his

collaboration with Bjerne Melgaard, which was an inspiration for the installation.

The next screen that follows is about the frog sculpture designed by Bjertnæs but sculpted in Sri Lanka by local artists. This part is very much like a standard audio guide: the app explains the story behind the creation of the piece without affording much else, and then the user receives more information in the form of text or a sound file. After moving to the next screen, however, the app asks an open question about the painting Hanna Maria (2013):

By the oven, in a bookshelf, on the floor, you see this woman everywhere. For what reason? What do you think? (Fig. 5)

Although not every single task is as explorative and dialogue-stimulating, the set of tasks has a good balance between introducing information and encouraging exploration on your own. The narration for Sverre Bjertnæs' exhibition is divided into six different sets of tasks. However, like any map or guide *Kunstporten* introduces only a handful of the exhibits and omits many others. These "blank spaces" in the app – artworks that are not introduced – are more likely to be discovered along the way by the visitor, especially if they are highlights of the collection (Interview, Haugar 2019). The number of routes that could be developed in connection to each exhibition is infinite, just as there is an infinitely large number of maps that might be produced from the same data (Turchi 2004). The *Metafysica* featured 25 artists, but only a few of them were included in the app.

CONCLUSIONS

As digital media change our society, museums are trying to rethink their mission and benefit from the possibilities digital tools afford.

Digital interpretive media such as apps are increasingly used in Norwegian museums as a method of enhancing interpretation in the gallery. The example of *Kunstporten* has shown that the same digital tool can turn out to be much more successful in some art museum environments than others. As the analysis has shown, there are several reasons for that, and the most important one is the fact that the affordances of the digital app and physical museum space are strongly connected. The physical affordances of the smaller museums are different from those of big national institutions. Smaller museums are less complex museum environments and have a less elaborate program. They usually do not have the resources to produce their own apps, so this collaboration is especially important for them (Interview, Lillehammer 2019). As a result, smaller museum used *Kunstporten* more frequently due to its visibility for the visitors. In addition, in the small museums the digital tasks in the app were solidly intertwined with the affordances of the museum space as demonstrated by the invitation of app users to participate in a physical workshop at the end of the exhibition.

The second important reason for variable popularity of the app in the museums involved in the project seems to be in defining the main target group. For example, in the Haugar Kunstmuseum, *Kunstporten* is directed primarily at individual groups and families visiting the exhibition on their own, not the school trips like it used to be in the Munchmuseet. It turned out that using the app during guided tours for school was too demanding in the complex museum environments and constant shifting attention between the mobile screen and the exhibition did not work out that well when working with big groups. It looks like effective and smooth

Fig. 5. Examples of tasks in Kunstporten. Retrospective exhibition of the Norwegian artist Sverre Bjertnæs, Haugar Vestfold Kunstmuseum, September 2019. Photo: Screenshot from www.kunstporten.com.

shifting between these two plans is a key to well-functioning digital interpretive media, and that was difficult when working with big groups.

The example of *Kunstporten* shows how mobile technology can be successfully used as a support tool for dialogue-based teaching. The app stimulates critical reflection about what visitors see and observe in the gallery setting. Too strict rules and steering can discourage a young public, while *Kunstporten* succeeded in creating space for reflection and interaction. The app maintains its promise as a “head-up app,” enhancing the individual experience while keeping the art at the centre.

All in all, when designing a museum app, it is productive to think of the affordances of the museum as a whole, not solely the affordances of the digital tool. The physical meeting in the museum space is still the core of the museum visit, but as the example of *Kunstporten*

illustrates, a well-established app can enrich this meeting.

NOTES

1. The project (2012–2015) was a collaboration between the Norsk Kulturrådet, Riksantikvaren, Kartverket, and Direktoratet for naturforvaltning. To participate, museums had to add geo-data in Primus and Digitalt fortalt. The Arts Council Norway received a second-place prize for KNappen in the 2012 Apps4Norge competition in the category “Norges mest åpne etat 2013” (Amundsen 2013:5). Today KNappen is no longer active as an app (see: <http://knreise.no/demonstratorer/>).
2. Around 2016, *Kunstporten* was moved from the Apple App Store to the webpages of each museum because the large size of the app and the constant updates to the smartphones’ operating systems resulted in some of the functions, such as photo

uploading, not working properly. A web-based app solution does not require the museum visitor to download an app, and *Kunstporten* can also be accessed by teachers using smart boards during school teaching.

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- Haugar Vestfold Kunstmuseum, interview with Mari Ravler Johansen (Kunstformidler), Gry Bø (Formidlingsansvarlig) & Caroline Berg (Kunstformdiler), 24 September 2019.
- Munchmuseet, interview with Sivert Thue (Museumslektor), Munchmuseet, 10 September 2019.

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