Introduction

Museums are often considered to be a sort of 'prisons for exhibits', as visitors to these institutions are separated from objects on display with red ropes and 'Do Not Touch' signs. Such activities often handicap the contact with museum collections. However, it should be remembered that museums are constituted not only by exhibits, but also by people who willingly share their knowledge. Thus, museums are not only 'storage spaces', but also educational centres. In many cases, this is true not only for the field of culture, but also for nature. Such a place is, for example, Museum of King Jan III's Palace at Wilanów which, in addition to a complex of buildings, encompasses historic gardens and parks, including the one located in Morysin. The value of this place is emphasised by the number of applicable forms of monument protection (entries in the register of historic areas and premises, the Wilanów Cultural Park, the Historic Monument) and nature protection (nature reserve, protected landscape area, natural monuments).

Resolution No. 1, adopted by ICOM's 31st General Assembly on 9 July 2016 in Milan, pointed to the role of museums as institutions responsible for the landscape, including the dissemination of related knowledge.[1] As the document states, museums and landscapes are an important element of the physical, natural, social, and symbolic human environment, but also constitute a highly complex system of interconnected components. The recommendation gave origin to the concept of treating museums as institutions that create active bilateral relations with the environment, thus becoming centres, even shrines, of expert knowledge. This knowledge is the starting point for building long-lasting competences aimed at protecting and researching the displays of the most valuable artefacts, natural phenomena and human heritage, as well as educating the public about them in a way that would encourage the participants' consistent growth.[2]

Maciej Żołnierczuk
Museum of King Jan III's Palace at Wilanów

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1 Resolution No. 1 'The Responsibility of Museums Towards Landscape' adopted by ICOM's 31st General Assembly on 9 July 2016 in Milan, icom.museum/wp-content/uploads/2018/07/ICOMs-Resolutions_2016_Eng.pdf (accessed 11 March 2022).

2 D. Folga-Januszewska, 'Museum and Its Milieu – Bilateral Relations', in: D. Folga--Januszewska, P. Jaskanis, T. Makowski, S. Waltoś, *Extended Museum in Its Milieu* (Kraków, 2018); *Krajobraz kulturowy Polski. Województwo małopolskie*, ed. J. Bogdanowski (Kraków–Warszawa, 2001); U. Myga-Piątek, 'Kryteria i metody oceny krajobrazu kulturowego w procesie planowania przestrzennego na tle obowiązujących procedur' prawnych', in: *Waloryzacja środowiska przyrodniczego w planowaniu przestrzennym*, eds M. Kistowski, B. Korwel-Lejkowska (Gdańsk–Warszawa, 2007), pp. 101–10.

Why is nature education so important in the education process? The landscape is a testimony and a 'strict verifier' of human actions. It is also the sum of 'signs' that build up a 'semiotic landscape',[3] whose perception influences the sense of identity and engagement in protective actions. The use of landscape resources consistent with sustainable development, where culture is considered a stimulant, creates a chance to activate the local community and protect the cultural landscape.[4] It is worth noting that the HPI NEW Economics Foundation's global happiness index compares the satisfaction and life expectancy index with this life's environmental footprint.[5] There is no denying that the beauty of the environment, also related to its preservation and the quality of vegetation, influences the way we feel; this has been common knowledge for a long time.[6] The studies on leisure time spent by the inhabitants of the Miasteczko Wilanów housing area in 2012 and 2015, commissioned by the museum, confirmed it as well. Their results indicate that in just a few years, the palace and the park began to evoke more and more associations with contemplation and strolling. This proves that, among others, the residents want to escape from the area 'covered-over with concrete' to a more friendly space with a distinct natural value.[7]

This article presents an overview of the activities undertaken by the Museum of King Jan III's Palace at Wilanów to promote natural knowledge, especially using tools – traditional and digital – related to nature, especially the dendroflora. It also determines their effectiveness and defines the opportunities and threats posed by their use. It is also an attempt to answer the research question: which of the natural education tools used at the Museum of King Jan III's Palace is the most effective?

3   J. Bogdanowski, 'Kulturowy krajobraz zabytkowy i problemy jego ochrony', *Ochrona Zabytków*, vol. 51, 1998, no. 1, pp. 4–13.

4   M. Murzyn-Kupisz, 'Wpływ przedsięwzięć związanych z odnową obiektów i miejsc zabytkowych na gospodarkę lokalną i regionalną', *Ochrona Zabytków*, vol. 58, 2010, no. 1–4, pp. 139–56; ead., 'Kultura i dziedzictwo kulturowe a rozwój zrównoważony', in: *Gospodarka regionalna i lokalna a rozwój zrównoważony*, eds Z. Strzelecki, P. Legutko-Kobus (Warszawa, 2013), pp. 92–105.

5   L. Hosey, *Kształt zieleni. O estetyce, ekologii i projektowaniu* (Kraków, 2021).

6   R. Kaplan, S. Kaplan, *The Experience of Nature. A Psychological Perspective*, New York 1989; H. Özgüner, A.D. Kendle, 'Public attitudes towards naturalistic versus designed landscapes in the city of Sheffield (UK)', *Landscape and Urban Planning*, vol. 74, 2006, pp. 139–57; F. Williams, *Natura leczy, czyli co sprawia, że jesteśmy szczęśliwi, zdrowsi i bardziej kreatywni* (Kraków, 2018); A. Chojecka, 'Znaczenie terenów zielonych w przestrzeni publicznej oraz ich wpływ na jakość życia miejskiego', *Rynek –Społeczeństwo – Kultura*, vol. 9, 2014, no. 1, pp. 48–54; Ch. Montgomery, *Miasto szczęśliwe. Jak zmienić nasze życie zmieniając nasze miasta* (Kraków, 2015).

7   *Spędzanie wolnego czasu przez mieszkańców Miasteczka Wilanów – Raport dla Muzeum Pałacu Króla Jana III w Wilanowie przygotowany przez Millward Brown* (Wilanów, 2012); *Spędzanie wolnego czasu przez mieszkańców Miasteczka Wilanów – Raport dla Muzeum Pałacu Króla Jana III w Wilanowie przygotowany przez Millward Brown* (Wilanów, 2015).

Tools used at the Museum of King Jan III's Palace at Wilanów

Educational activities

The location of Wilanów and its natural values contributed to a long--established tradition of choosing it as a place for outdoor lessons as evidenced by, among others, this archival photo (Fig 1). The nature-related classes conducted at the museum are divided into themed walks, workshops and field games. Meetings are held for varying age groups, and their content and level of interactivity are adjusted to the age and expectations of the recipients in each group. Currently, lessons are conducted using props (Fig. 2). The teaching aids include such objects as antlers shed by animals, traces of bites, bird feathers, prepared insects; parts of plants: leaves of trees, their seeds, fruits, flowers; models illustrating development cycles in the world of nature. The presentation of such elements to the visitors is often the first and, in many cases, the only chance for them to see such items up close. An opportunity to look at the details, to note the phenomena of structures, functions and principles of operation, gives the participants a chance to delight in something that had previously provoked negative feelings. One of the best examples can be insects, generally perceived as repulsive pest.

Among the props used, there are also instruments that enable a closer observation of nature: magnifying glasses, binoculars. During the classes, participants receive coloured work cards which they fill in as the lesson goes on. The cards support memorisation and encourage the active acquisition of knowledge. It is a nice surprise for many of the participants

Fig. 1

Students of the Klementyna Hoffmanowa neé Tańska 9th State Gymnasium for Girls in Warsaw during a trip to Wilanów; open--air practical lesson at the water reservoir, students at microscopes, 1919–1939

Contemporary environmental education class conducted at the Museum of King Jan III's Palace at Wilanów. The basic attribute is a basket containing various types of props

when they are told they can take their 'tasks completed' notebook home, to show their parents how well they performed.

Nature-related lessons are conducted in the historic gardens surrounding the palace and in the Morysin Nature Reserve that belongs to the museum.[8] Close contact with the world of nature is an effective tool to promote pro-environmental attitudes based on well-advised care for natural heritage. Some of the classes, due to their specificity, are conducted indoors, in a picturesque building of the Pump Station located at the Wilanów Lake. Appropriate adaptation of the historic space to the needs of contemporary education is another way to strengthen the positive reception of the visit.

The educational offer also includes field games that make perfect use not only of the potential of gardens, but also of the younger visitors' irrepressible energy. The participants receive a map and a compass to help them find hidden treasures related to the nature in the park. This is an opportunity to acquire new skills, which begin to feel archaic in the GPS era. Field games also teach teamwork and conceptual thinking.

An increasing number of museums apply similar practices, referred to as 'museum suitcases' in some publications.[9] The Museum of History in Kielce, for instance, has introduced the program 'A Suitcase of History'.[10] At Wilanów, a wicker basket has been chosen to play the role of the 'suitcase'.

Before the COVID-19 pandemic, various nature-related activities organised by the museum, e.g. workshops and walks, had been attended by approx. 10,000 participants. The number of events ranged from 420 to 543 per year. The necessity of isolation and the transfer of schoolwork to computer screens resulted in a dramatic decrease in the number of participants (by approx. 88 per cent). To continue its educational mission, the museum decided to implement online classes (Table 1). This helped to extend the scope of influence: the lessons were watched by students in countries including the USA, Ireland, France, Bulgaria or Belgium.

8   The current offer is available on the museum website: www.wilanow-palac.pl (accessed 28 July 2022).

9   R. Pater, *Edukacja muzealna dla dzieci. Alternatywne przestrzenie* (Kraków, 2016).

10 I. Grabczak, '"Walizka z historią" – program edukacyjny realizowany w Muzeum Historii Kielc w latach 2016–2018', *Studia Muzealno-Historyczne*, vol. 10, 2018, pp. 173–79.

Table 1. Comparison of attendance in various natural activities conducted at the Museum of King Jan III's Palace at Wilanów in 2016–2021

Type of activity	Year	2016	2017	2018	2019	2020	2021
Traditional form (workshops, walks, etc.)	Number of classes	441	573	420	543	66	257
	average no. of participants	23	21	21	22	22	19
	estimated no. of participants	10143	12033	8820	11946	1452	4883
Online form	online classes	none	none	none	none	123	119
	average no. of participants	–	–	–	–	19	19
	estimated no. of participants	–	–	–	–	2337	2261
Total no. of participants		**10143**	**12033**	**8820**	**11946**	**3789**	**7144**

StoryMaps

The use of laptops, smartphones, tablets (known as the BYOD technology – Bring Your Own Device) is becoming increasingly popular, also in the dissemination of knowledge. The development of technology is one of the challenges of modern education;[11] it is thus reasonable to look for effective, innovative and effective teaching methods.[12] The digital narrative can take different forms. One of them is StoryMaps. It is a web application based on the GIS (Geographic Information System) technology, which was created to present history, stories about spaces, as well as data, shared together with maps, texts and other kinds of multimedia content. The tool makes it possible to create descriptions of phenomena, places, etc. using the story creator, to publish and share stories, to create and publish collections, and to manage stories.[13] StoryMaps applications can perform many functions. At Wilanów, three applications were related directly to nature. Importantly, they were all created using our own resources, thanks to the involvement of museum employees, especially the Documentation and Digitisation Department.

The first of those is the 'Park' application, created as a direct result of the completion of a dendrological inventory. The map shows the basic types of greenery found in parks and gardens, e.g., garden parterres, shrubs, trees. The application allows the users to identify trees while walking; all they need to do is to find the tree on the map and click on it to open a window with detailed data, including its species, diameter at breast

11   B. Kuźmińska-Sołśnia, 'Technologie mobilne w edukacji szkolnej', *Dydaktyka Informatyki*, vol. 12, 2017, pp. 117–23.

12   B. Kuźmińska-Sołśnia, 'Urządzenia mobilne i ich udział w edukacji XXI wieku', *Edukacja – Technika – Informatyka*, vol. 4, 2013, no. 2, pp. 257–63.

13   *What is ArcGIS StoryMaps?*, doc.arcgis.com/en/arcgis-storymaps/get-started/what-is-arcgis-storymaps.htm (accessed 11 March 2022).
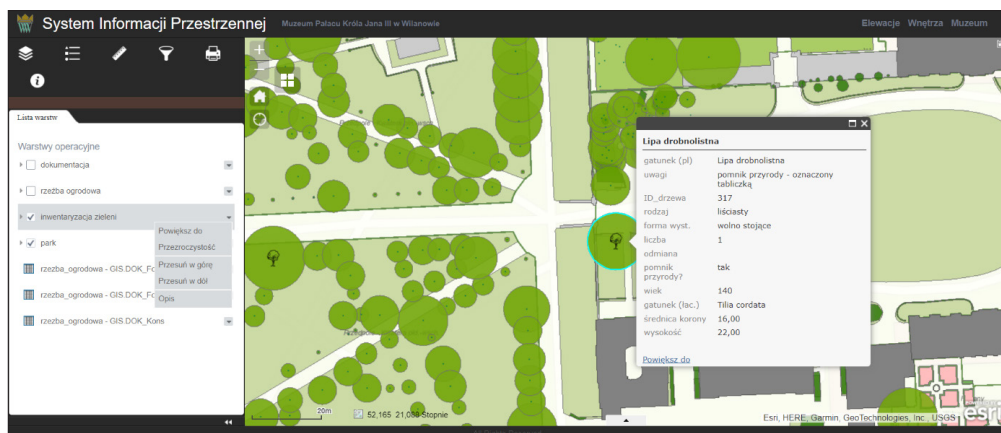
Fig. 3

View of the main window of
the 'Park' application with an
expanded details window for
a sample tree

height, or overall height (Fig. 3). The view that museum guests receive
is not much different from that used by the staff, so the application can
also be used by employees, e.g., when there is a risk of a tree tipping
over and it is necessary to determine a danger zone, the radius of which
should be at least equal to the height of the tree. The application makes
it possible to download data on selected trees, which is also useful when
writing scientific articles. During the 2,5 years of StoryMap's activity,
'Park' has been viewed 3147 times.

A slightly different function is performed by the 'MapStore' application
named 'Ścieżka dendrologiczna' [The Dendrological Route]. This ap-
plication was created on the occasion of the Landscape Day in 2020,
held under the motto 'Tree in the Landscape'. Since this was already
the pandemic period, the identified need was not only to create a tool
to support students who participated in remote classes, but also an el-
ement that would bring people locked down in their homes closer to
nature. Therefore, the application has a dual function. Just like the one
described earlier, it presents a map with a photo to help the user find an
object and its description. The text was divided into two parts: green,
intended for general familiarisation with the topic of a given object, and
white – for specialists, which contains more detailed information such
as the distance between seedlings, the height of an object, etc. (Fig. 4).
It is an excellent tool especially for students at landscape design tech-
nical colleges who are preparing for professional examinations. Over
the period of a year and a half, 1130 persons have used the application.

'New plantings' is the latest application. It captures both the past and the
future of the park. It presents the location, photo reports and stories re-
lated to trees planted in the palace and garden complex by contemporary
benefactors, for instance embassies, veterans of the Warsaw Uprising,
various associations. In addition, it is a tool that searches for the possi-
bility of planting further 'memorial trees': the map shows possible loca-
tions to choose from, along with the required nursery material, including

View of the main window of
the 'Ścieżka dendrologiczna'
application

the species, so as to keep the park structure ordered. The application was launched in mid-2022.

Smartphone apps

The Museum of King Jan III's Palace at Wilanów offered several applications that could be downloaded to smartphones. Three of them referred directly to natural elements.

The most interesting application is 'Park Detective', launched in 2016. At the time of its creation, an application whose users were tasked with catching Pokemons was in fashion. To encourage young people to learn about the flora and fauna, 'Park Detective' required the user to perform certain tasks while walking around the park, to earn points, which was possible only in pre-determined places. Therefore, an indispensable element was a map combined with the GPS, on which task-points were marked. The tasks were divided into three thematic blocks: birds, plants, and the micro-world (including insects). The first one showed the users how to help the avifauna, for instance in the winter season, but also how birds influence the human environment. The section devoted to plants provided, for example, culinary recipes related to the particular species as a reward for completing a task. The micro-world block, in turn, illustrated the influence of various phenomena on the environment. The application was made as part of the project 'Social education in the urbanisation versus ecology conflict at the Wilanów Palace Museum', implemented thanks to the support provided by Iceland, Liechtenstein and Norway under the European Economic Area Financial Mechanism.

The second application is the 'Wilanów Guide', also created in 2016. It has been downloaded more than 10,000 times over three years. It allowed the user to navigate several colour-coded thematic paths: the gold one – Interiors and Collections (a general path presenting the palace interiors), red – Women in Wilanów (the palace), purple – Conservation Discoveries (showing the work of conservators in the palace), blue – A Visit to the King (intended for children, with abbreviated text,

presenting the palace), and green – The Park. On each of the paths, there were several points marked with special plates with the number shown on the background of the colour corresponding to the path, and with a QR code. In addition, under the plate there were the so-called beacons, i.e. Bluetooth signal micro-transmitters. Every user was able to view the content related to the particular point by entering its number into the app manually, scanning the code, or waiting for a notification sent from the beacon. Unfortunately, the latter solution did not work well in the interiors, as individual devices interfered even between floors. An important advantage of the application was the possibility of listening to audio description or seeing a video in the Polish sign language. Information from all the points was also translated into seven foreign languages: English, German, French, Spanish, Italian, Russian, simplified Chinese. An interesting fact is that texts in the blue path were read by children. At each point, the user had a possibility to see photographs that made it easier to find objects in the surroundings and offered a closer view of some of the details. The application worked perfectly during the pandemic, when the use of audio guides had to be put on hold due to the need to replace the headphones after each lending.

Finally, the 'Masovian Nature Reserves' application aims to cover all the 189 protected areas in the Masovian Voivodeship. It was implemented thanks to the involvement of the Regional Directorate for Environmental Protection in Warsaw within the framework of the project 'Masovian Nature Reserves', co-financed by the Regional Fund for Environmental Protection and Water Management in Warsaw. The application was launched in 2020. More than 5,000 users have downloaded it so far. It is directly connected to the Wilanów area thanks to the Morysin Nature Reserve managed by the museum. The purpose of creating the application was to facilitate learning about environmentally valuable areas. The application is equipped with a map and a scanner of QR codes placed on wooden posts. During their installation in the Morysin area, particular attention was paid to ensuring that they were not placed in historically important or most frequently photographed points. The application has something to offer to the youngest users as well: 'Memory' games and quizzes. The application is complemented by numerous photos and audio files with voices of birds from the visited reserve.

Discussion

The technological development influences the appearance of museum exhibitions. New ways of presenting collections are one of the directions for the transformation of exhibition rooms.[14] This is related to the

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14   M. Stefanik, M. Kamel, 'Muzea i wystawy interaktywne w Polsce – współczesna atrakcja turystyczna', *Turystyka Kulturowa*, 2013, no. 8, pp. 5–22.

institution's willingness to adapt to new expectations of the audience.[15] These changes are also a result of the striving to increase the effectiveness of learning, which is largely dependent on sensory stimuli.[16] Increasing the amount of multimedia at exhibitions often allows to satisfy individual cognitive needs.[17] This also applies to natural museums, for instance those established at national parks. A new, more dynamic narration and exhibition-space design engages the senses, influences emotions and experiences. All this adds life to spaces filled with exhibits and to the stories those exhibits convey. This is confirmed by research carried out at the Powerhouse Museum and the Scitech Discovery Centre in Australia, which showed that audiences appreciate the possibility of personal involvement, communication, performing certain tasks together with other museum visitors, and 'learning by doing'.[18] Nikos Bubaris also added that sound enriches the narrative and is a motivating element for active sightseeing.[19] Moreover, as Katherine D. Arbuthnott and her team have shown, a visit to a museum with active exhibitions can increase engagement in pro-environment activities.[20] This direction and purpose of action is also valid in Poland, where education includes four equal pillars: environment, society, culture and economy. Therefore, for an even deeper influence on the a person's awareness, it is necessary to perceive environmental changes as a result of socio-economic development not only in theory, but also in practice, by observing the surrounding world.[21]

Slightly different requirements can be outlined for field lessons, which offer different possibilities and allow for a holistic approach to teaching.[22] They create favourable conditions for independent or team searches that enable the acquisition of new knowledge in a creative way.[23] They also

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15 A. Kolasińska, 'Wykorzystanie nowych technologii cyfrowych w ramach ekspozycji przyrodniczych funkcjonujących w polskich parkach narodowych', *Turystyka Kulturowa*, 2019, no. 6, pp. 19–33.

16 I. Paśko, 'Eyetrackingowe badania we wczesnej edukacji przyrodniczej', *Pedagogika Przedszkolna i Wczesnoszkolna*, vol. 2, 2017, no. 1, pp. 197–207.

17 A. Mikos von Rohrscheidt, 'Poznańskie muzea w kontekście standardów i potrzeb współczesnej turystyki kulturowej', in: *Obcy w Poznaniu. Historyczna metropolia jako ośrodek turystyki kulturowej*, ed. A. Mikos von Rohrscheidt (Poznań–Kraków, 2011).

18 Kolasińska, 'Wykorzystanie nowych technologii cyfrowych', pp. 19–33.

19 N. Bubaris, 'Sound in museums – museums in sound', *Museum Management and Curatorship*, vol. 29, 2014, pp. 391–402.

20 K.D. Arbuthnott, G.C. Sutter, C.T. Heidt, 'Natural history museums, parks, and connection with nature', *Museum Management and Curatorship*, vol. 29, 2014, pp. 102–21.

21 J. Angiel, P. Pokojska, W. Pokojski, 'Szanse, cele i możliwości edukacji ekologicznej nauczycieli z wykorzystaniem mediów i webGIS', *Edukacja Ustawiczna Dorosłych*, 2017, no. 2, pp. 52–62.

22 A. Szyszko-Bohusz, 'Pedagogika holistyczna', in: *Encyklopedia pedagogiczna XXI wieku*, vol. 4: *P*, eds Pilch et al. (Warszawa, 2005).

23 W. Okoń, *Wprowadzenie do dydaktyki ogólnej* (Warszawa, 1996).

give opportunities for direct contact with nature, with living plants and animals, for learning about direct relationships between them, their living conditions, as well as the effects of disrupting natural processes.[24] Here, every leaf or cone, or bark on a tree trunk can become a source of knowledge about nature.[25] In the open space, keeping such 'living exhibits' immobile is hardly possible, due to the blowing wind if not for other reasons. Total silence cannot be kept either, as sounds like rustling, the squeaking of trees, the pat-patting of falling acorns can be continuously heard. Analysing the results of the frequency of the use of individual educational tools applied in the museum, it can be noted that the largest number of recipients used traditional forms of classes, such as walks or workshops. This is due, among other reasons, to the fact that landscape offers great teaching opportunities. Almost everything can be touched, sniffed, listened to, and sometimes even tasted. Properly conducted field lessons teach how to observe and describe the environment, but also enable the acquisition of practical skills, such as using maps, plant and animal atlases, or research equipment.[26] Yet the initial information that should be provided to the student or tourist matters as well. An additional factor that favours traditional forms of classes is the fact that parks and gardens are a place of escape from excessive digitisation of life (as it has been demonstrated by studies including the already mentioned research, commissioned by the museum in 2012 and 2015). Visitors to the park wish to relax just as much as they want to broaden their knowledge through observation. Hardly anyone will keep looking at the small smartphone screen to search for information. Conversely, people gladly pause during a walk at small structures that display information elements. It is, of course, important that such objects do not dominate the space and do not disturb its harmony.

Elements of BYOD technology during field lessons should play a complementary role. Their task was appreciated during the pandemic, when going out was not permitted. At that time, online applications and activities allowed for indirect contact with nature. Limited use of GIS tools (for instance StoryMap) in the education process results, among others, from the teachers' not yet adequate knowledge of the subject.[27] It is worth

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24 I. Majcher, A. Kossobucka, 'Klucze dydaktyczne – klucze do przyrody', *Edukacja przyrodnicza w szkole podstawowej*, 2007, vol. 3–4, pp. 191–95.

25 E. Roland, 'Zajęcia terenowe – ekscytująca przygoda z przyrodą', *Edukacja biologiczna i środowisko*, 2017, vol. 2, pp. 103–06.

26 W. Stawiński, 'Zajęcia terenowe – wycieczki', in: *Dydaktyka biologii i ochrony środowiska*, ed. idem (Warszawa, 2006).

27 J. Szczęsna, L. Gawrysiak, 'Potrzeby nauczycieli w zakresie kształtowania umiejętności związanych z TIK oraz ograniczenia w korzystaniu z narzędzi geoinformatycznych', in: *Technologie informacyjno-komunikacyjne w kształceniu geograficznym, założenia teoretyczne, diagnoza wykorzystania*, eds A. Hibszer, E. Szkurłat, Prace Komisji Edukacji Geograficznej PTG, vol. 4 (Łódź 2015), pp. 123–35; W. Koman, 'Technologie

noting, however, that the development of GIS in Poland gives new opportunities in many areas; this information should be circulated, all the more that most of these tools are free and can be used in professional work as well.

The museum's experience shows that launching an application does not exhaust the list of activities that need to be performed for its proper functioning. It is necessary to check that it operates correctly, and the check should be performed on several devices supporting a range of systems. This also involves requesting fixes and updates (Table 2). In the case of several applications being in operation, it is necessary to assign an employee to their service, since a malfunctioning application causes increasing dissatisfaction and frustration among tourists. Currently, due to high maintenance and service costs, only one application remains in operation; it is managed by the Regional Directorate for Environmental Protection in Warsaw.

The use of BYOD technology makes it possible to create a personalised learning environment and choose an appropriate educational path.[28] The students' desire to learn is indispensable here. Restricting the work to ICT (Information and Communications Technology) tools will certainly not stimulate their curiosity of the world, only making the education process more monotonous instead. It should also be remembered that using digital tools only carries certain risks. Digital aids may be interesting for children and young people, but they will often be a barrier difficult to overcome for people less familiar with technological innovations (e.g., the elderly). This is related to the concept of digital exclusion which means, according to the definition of the Organisation for Economic Co-operation and Development (OECD), the phenomenon of social inequalities or even a socio-economic developmental gap between individual people, households, enterprises, and regions, related to access to and use of information and communication technologies in all spheres of economic activity.[29] Although Poland might seem to be developing in terms of the use of electronic devices (including the BYOD), it ranked fifth lowest in the European Union digitalisation ranking (encompassing communication, human capital, Internet connection, integration of digital technologies, access to digital public services) conducted in 2020.[30] This is confirmed by Eurostat data on Internet use and digital skills

informacyjno-komunikacyjne w pracy nauczyciela geografii i przyrody – wnioski i spostrzeżenia', in: *Technologie informacyjno-komunikacyjne*, pp. 195–204.

28   S. Iskierka, J. Krzemiński, Z. Wężgowiec, 'Technologia BYOD w polskich szkołach', *Dydaktyka Informatyki*, 2015, no. 10, pp. 80–89.

29   *Understanding the Digital Divide* (Paris 2001), www.oecd.org/sti/1888451.pdf (accessed 15 September 2022).

30   www.statista.com/statistics/1245595/eu-digitalization-level/t (accessed 11 March 2022).

presented by Małgorzata Ćwiek. who stated that Poland is in the group of nine EU countries where digital exclusion is the deepest.[31]

As Elżbieta Roland emphasises, information technologies cannot replace field lessons, and they can be used effectively only when they are conducted according to pertinent didactic principles.[32] It should be noted, however, that the appropriate program of online classes, as well as the architecture of the applications and StoryMap, create an opportunity to reach a wider audience, for instance online visitors from abroad, foreigners who do not speak Polish, as well as people with disabilities; this was also confirmed by Dorota Żuchowska-Skiba in her research.[33] Therefore, each of the tools used at the Museum of King Jan III's Palace at Wilanów has its advantages and disadvantages. The aim to be pursued should consist in making their interoperation as balanced as possible, so that the information – presented in an interesting form and encouraging further action – reaches as many recipients as possible. A discussion conducted some time ago – on whether tree leaves should be digitised or not – serves as confirmation here. For a child in the field, a digitised leaf is no attraction; it will be more interesting to pick up a real leaf and study it live from all sides. However, the same digitised leaf will be interesting to a person on the other side of the world because it belongs to a species uncommon in their latitude. This shows that the coexistence of certain tools is possible and sometimes necessary.

31 M. Ćwiek, 'Wykluczenie cyfrowe w Polsce na tle Unii Europejskiej', *Ekonomiczne Problemy Usług*, vol. 2, 2018, no. 2, pp. 217–24.

32 E. Roland, 'Odkrywcy przyrody – zajęcia terenowe wspomagane komputerem', *Studia i Materiały CEPL w Rogowie*, 17, 2015, vol. 43/2, pp. 65–70.

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Table 2. Comparison of features of various educational tools

Form	Educational classes in traditional form	Online educational classes	MapStore	Smartphone apps
Number of users per year	>8800	<150	ca. 1000	ca. 3500
Costs	low	low	relatively low (if software is at hand)	high cost of production and maintenance
Staff	qualified staff necessary to conduct classes	qualified staff necessary to conduct classes	need to hire highly qualified GIS staff	highly qualified external company required
Need to be present at the venue	YES	NO	NO	YES/NO (depending on application type)
Possibility of digital exclusion	NO	YES	YES	YES
Additional advantages	possibility of interaction between participants (teamwork, social interactions)	alternative solution during the pandemic	alternative solution during the pandemic	Properly selected content can be attractive for varying age groups. Possibility to replace traditional audio guides
Additional disadvantages	-	the need to have a computer with an Internet connection	the need to have a computer with an internet connection or a smartphone	the need for continuous supervision related to system updates, the need to carry out system functioning tests at least once a month; owning a smartphone

Conclusions

Despite the development of digitisation, the best tools for field activities are still walks and workshops which permit direct contact with nature and which develop personal identity, as well as the sense of the need to protect natural and cultural values. The number of stimuli reaching a museum visitor from the environment often makes it unnecessary to use additional digital tools; these should only offer supplemental information in the field. Tourists moving through parks and gardens look for relaxation and detachment from everyday life, often also from electronic devices which they constantly need to use elsewhere. Online classes, applications and StoryMap are good educational tools in times of crisis, such as the pandemic, when restrictions limited the possibility of walks and visits to the museum. When properly arranged and designed, digital

tools make it possible to reach a wider group of recipients, e.g., foreigners, people from locations different from the place of presentation, people with disabilities (e.g., the hearing-impaired, the deaf). Experience garnered by the Wilanów Museum shows that the relation of the costs of the application's production and maintenance to the number of downloads (i.e. potential users) is much higher than the relation of the costs associated with conducting classes (walks, workshops) to the number of their participants.

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LIST OF ILLUSTRATIONS

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