

Cross-sectoral cooperation and innovation within Creative and Cultural Industries – practices, opportunities and policies within the area of the Northern Dimension Partnership on Culture

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Glossary

AAA	A term used for blockbuster games with big budgets.
Advergames	Games designed to change the attitude or behaviour of the target consumer through brand engagement and messaging.
Advertainment	Games which use elements of advertising to promote products or brands.
Avatar	A visual image that represents a person playing a games.
BSR	Baltic Sea Region
Edutainment	Games that are intended to be both educational and enjoyable.
ERDF	European Regional Development Fund
European Conference on Games-Based Learning (ECGBL)	The ECGBL, first held in 2007 is attended by academic scholars, practitioners, game designers and individuals who are engaged in various aspects of games-based learning and serious games. Participants usually come from over 40 countries.
E-sports (electronic sports)	Organised video game multiplayer competitions for spectators involving usually individual players or teams of professional gamers.
European Games Developer Federation (EGDF)	Represents games studios based in Austria, Belgium, Denmark, Finland, France, Germany, Italy, Norway, Malta, Poland, Romania, Spain, Sweden, The Netherlands, Turkey and the United Kingdom
Exergaming	Video game-driven physical activities that require participants to be physically active or to exercise in order to play the game.
Game-based Learning (GBL)	Use of any games in a learning context to engage endusers for a specific purpose e.g. to develop new knowledge and skills.
Game jam	An event, essentially a hackathon, where developers meet and create games together during a limited time often with a particular aim or theme.
Gameplay	The specific way in which players interact or connect with a game through its rules, plot and challenges etc.

Game mechanics	The rules and procedures that govern and guide the player's actions and the game's response to the player's moves or actions. Also the tools and design elements used to create a game or gamification.
Gamification	Application of game-design elements and game principles in non-game contexts to solve problems, motivate different behaviour or achieve learning outcomes.
Global Game Jam (GGJ)	It takes place over a weekend and encourages individuals worldwide to learn, experiment, and create together in the world's largest game creation event. In 2020 it took place in 934 locations in 118 countries and created 9,601 games on a specific theme.
International Game Developers Association (IGDA)	The world's largest nonprofit membership organisation promoting the interests of all individuals who create games.
Indie	An independent video game or 'indie game' created by individuals or smaller development teams.
Interactive Digital Storytelling (IDS)	A form of multimedia visualised information presentation used in many fields including in serious games and digital cultural heritage. IDS allows the user to become an active part in a story and to affect how the story unfolds. It can be an important learning, training, testing and entertainment tool.
Interactive Software Federation of Europe (ISFE)	An independent body representing the interests of the video game industry in Europe to the main stakeholders i.e. EU institutions, international organisations, academics and the general public.
Multi-User Virtual Environments (MUVES)	Environments that are digitally created to allow users, through the use of avatars, to interact with each other and the digital environment.
ND	Northern Dimension
NDPC	Northern Dimension Partnership on Culture consists of eleven participating countries: Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russian Federation and Sweden.
Nordic Game	Considered to be the leading games conference in Europe it is held annually in Malmo, Sweden.
Nordic Game Directory	The region's most comprehensive index of game developers and game-related organisations (see https://nordicgame.com/directory/)

Role-playing Game (RPG)	Games which seek to immerse the player in a character within an imaginary world.
Serious Games (SG)	Games with a principal purpose other than entertainment.
Serious Games Society (SGS)	Its mission is to foster technological innovation and excellence in the field of Serious Games and Gamification. It publishes the International Journal of Serious Games quarterly and organises an annual international conference.

1. Context and Background

This policy brief is a deliverable of the EU-funded project 'Cultural and Creative Industries Cooperation and Innovation in the Northern Dimension Countries'. While the project, like this brief, has as its intention to reach out widely, a key focus was to contribute to the Northern Dimension Partnership on Culture's strategy and actions for the period 2021–2024.

The project was conceived and its terms of reference defined in late 2019. It was launched in January 2020 before the COVID-19 pandemic. It would not be an exaggeration to state that it therefore spans two very different worlds. It had to be adapted as it progressed from the old world to the new one but far from involving compromise it has in fact proven to be a positive experience of capitalizing on opportunity.

COVID-19 in many areas acting as an accelerator and has, amongst other things, fueled a profound and widespread appetite for innovative thinking and fresh approaches in many important areas. In that context there has probably never been a more auspicious time for new policy development and for re-visiting strategies. When the project was conceived CCI cross-sectoral working and innovation were seen as something desirable. It became very clear early in the project that the word 'desirable' was needing to be replaced by 'essential'. For much of the Cultural and Creative Industries (CCI) sector to survive it is going to have to find new business models and additional and alternative sources of income and funding.

Contributing to post-COVID-19 economic and social priorities and drawing on budgets, income and financing dedicated to their agendas is going to need to be a way of life for many in the CCI sector. The ability of CCIs to connect with other sectors and contribute to cross-sectoral innovation is therefore going to be vitally important. This policy brief suggests that the serious games (SG) and gamification sector is very well-positioned in this respect. There is untapped potential and in this policy brief future opportunities are examined in relation to cross-sectoral innovation with the cultural heritage, education, medical, health and well-being sectors.

In addition, other developments augur well for the SG and gamification sector. In the case of the education and training sector one example would be accessing and contributing to opportunities potentially offered by the new European Commission 'Digital Education Action Plan – Resetting education and training for the digital age' (2021–2027).¹

One of the real challenges facing the games industry in the Northern Dimension countries and which represents a constraint in an otherwise booming context is the human resource dimension i.e. fostering talent and filling specialist jobs. For that reason we have included a section looking at some of those issues and the particular needs of SG start-ups.

Apart from a section on the wider games context, this policy brief is focusing on serious games and gamification not entertainment games. For that reason we do not touch on social issues such as gaming addiction or ongoing

¹ EU Digital Education Action Plan (2021-2027) - Resetting education and training for the digital age'. See https://ec.europa.eu/education/sites/default/files/document-library-docs/deap-communication-sept2020_en.pdf

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debates about children and gaming.

This policy brief reflects the inputs and ideas of many experts and specialists, some of whom are mentioned below.² We want to thank everyone for their participation. Those listed below actively contributed to an Experts' Focus Group 'Serious Games and Gamification – Everything to Play for?' which took place as an online event on 14th January 2021. It was an extremely stimulating occasion and most helpful in contributing to the final stages of the project.

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2. The Wider Games Context

The games industry is a quintessential example of the coalescence of technological, cultural and business innovation coming together in a new digital era. The entertainment games sector is also a booming big business. The global video games industry was estimated to be worth roughly \$159 billion in 2020 representing a 9.3% growth rate from the previous year. That figure for the global games industry is more than four times the box office revenue of the film industry and almost three times the revenue of the music industry.³ Like the film industry games sometimes require big development and production budgets. Although the production budget of Hollywood blockbusters can be much greater, at the top end of the games industry an AAA game (a term used for games with the highest development budgets and levels of promotion) requires a budget of between \$60 million and \$80 million. The history and development of the gaming phenomenon can be traced back to the 1950s with its real beginnings in the 1970's.⁴

It can be argued that the game industry is the most dynamic, certainly in commercial terms, creative industry worldwide with an exponential growth rate almost everywhere. In Europe video games represent one of its most striking economic success stories. In 2019, the European video game industry was worth Euros 21.6 billion, an increase from the previous year of 3.3%.⁵ In 2020 the figure was Euros 24 billion, an increase of 9% compared to 2019. This impressive growth was at least in part attributable to the demand for home entertainment during the COVID-19 pandemic.⁶

The Northern Dimension region's games industry, already successful and growing, is part of this economic narrative. Countries such as Sweden,⁷ Finland, Denmark, Norway and Iceland, positively cooperating rather than negatively competing, are already amongst the world's leaders. Germany, the Russian Federation and Poland certainly also feature strongly in any 'league tables' while the small Baltic 'arrivals' are developing their games industry potential and learning fast from their neighbours.

The gaming sector and its statistics can be counted and described in many different ways making cross-country comparisons difficult or approximate. For example, because of the different methods of measuring the size of companies and other factors, the figures below are not immediately comparable but do give a rough picture of the countries in relation to each other.

3 <https://www.marketwatch.com/story/videogames-are-a-bigger-industry-than-sports-and-movies-combined-thanks-to-the-pandemic-11608654990>

4 https://en.wikipedia.org/wiki/History_of_video_games

5 See <https://www.gamesindustry.biz/articles/2020-08-27-european-market-made-21-6-billion-in-revenue-in-2019>

6 EY report for GESAC: 'Rebuilding Europe – The cultural and creative industries before and after the COVID-19 crisis (January 2021), p.6 and p.15.

7 Sweden is famous for many games such as Minecraft, Battlefield, Candy Crush etc. It is claimed by the national games industry agency of the country (Dataspelsbranschen) that every eighth person in the world has played a game made by Swedes. Swedish games industry revenues grew to EUR 2.3 billion in 2019, an increase of 24% according to the Swedish Game Developer Index 2020 – <https://dataspelsbranschen.se/game-developer-index>. Sweden boasts the second-highest concentration of video game studios in the world. Malmö, Sweden's third largest city, has one of the highest concentrations of game developers per capita of anywhere in Europe, with games made in the city played by an estimated 500 million people worldwide. Malmö is an interesting example of a wider Northern Dimension feature – games industry development is not confined to the capitals but in many cases is quite strongly regionalised.

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Country	Number of companies	Revenue (million Euros)	Number of employees
Sweden (2019)	435	2318	5925
Finland (2018)	230	2200	3200
Denmark (2018)	159	123	1009
Norway (2018)	388	37	285
Iceland (2016)	18	53	450

This table is taken from Game Developer Index 2020. Dataspelebranschen – Swedish Game Industry, December 2020, p.37. For a comprehensive overview of the Swedish games industry see: https://static1.squarespace.com/static/5a61edb7a803bb7a65252b2d/t/6019540bb998091dce5eac98/1612272696621/15122020_GDI_EN_48p_digital_s.pdf.

The eleventh largest worldwide, the Russian gaming market is expected by analysts to exceed \$2.8 billion by 2024.⁸ It has been suggested that the widespread interest in games can be traced back to the popularity of computer clubs in the first decade of this century which offered equipment, internet access, and a gamer community. In the case of e-Sports it is worth noting that the Russian Federation was the first country worldwide to recognise video game competitions as a professional sports discipline.⁹ The Russian video games industry grew by 14 percent in 2019 compared to the previous year with the fastest-growing segment being mobile gaming. PC gaming is at a high level with a recent COVID-19 lockdown survey indicating that this was the chosen leisure-time activity of 25% of those polled.

Germany was ranked eighth in the world for games software in 2020 with an estimated revenue of Euros 1,980 million.¹⁰ Software revenue had increased by 11 per cent in 2019. The games industry as a whole i.e. including purchase of hardware, revenue from online services, in-game purchases etc. increased by 6% and totalled about Euros 3,900 million.¹¹ A public funding scheme specially dedicated to the game industry was introduced on a national level in 2019. The German Games Fund has an annual budget of Euros 50 million for game developers. A 2020 survey quoted by game – the German Games Industry Association suggested the market for serious games is expected to grow significantly in the coming years with sales revenue in Germany likely to increase by an average of 19 per cent annually and reaching 370 million US dollars by 2023.¹²

In 2019, the revenue of the Polish game industry exceeded Euros 105 million which represented fairly spectacular growth over a period of only a few years. All countries have their own particular features and in the case of Poland it is that the consumer market is quite big, an estimated \$596 million, but up to 97% of spending on games is estimated to be on foreign titles. Paradoxically, Polish developers rely heavily on exporting their games, as 96% of total revenues are generated from other markets. It is thought that in game industry rankings worldwide Poland is in twentieth place.¹³ Polish studios are currently releasing about 480 games annually.¹⁴

8 See <https://www.statista.com/topics/6909/video-games-industry-in-russia/>

9 See <https://le-sf.org/news/3632>

10 <https://www.statista.com/outlook/203/137/video-games/germany#market-globalRevenue>

11 <https://www.game.de/en/german-games-market-grows-by-6-per-cent/>

12 <https://www.game.de/en/enormous-potential-for-serious-games-sales-revenue-expected-to-grow-by-19-per-cent-annually/>

13 Polish Agency for Enterprise Development: *The Game Industry Report 2020*

14 As with some other countries revenue statistics can be distorted by profits from an individual blockbuster game. This is the case with regard to Poland and CD Projekt Red's 'The Witcher 3', one of the best selling games of all time.

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A number of regional projects are bolstering general game industry developments in the Northern Dimension region. Some are being supported by EU funding through Baltic Sea region (BSR) initiatives. The 'Baltic Game Industry – Empowering a Booster for Regional Development', for example, has as its ambition to increase capacity for innovation and transform the game industry in the region into a global player with worldwide competitiveness. The project's components include development of durable game incubation structures and programmes to support game start-ups.¹⁵ There are also sub-regional projects supported through, for example, Nordic Innovation.¹⁶

Another EU-funded project 'Game Hub Scandinavia 2.0' is a Danish-Swedish partnership aimed at making the gaming industry a primary source of income for those countries. The goal was to generate 100 new companies and 400 new jobs in these two countries through incubating new businesses and knowledge-sharing.¹⁷

As can be seen, there is a lot of individual country, sub-regional and regional official support and activity happening in the Northern Dimension region focussed on training, start-ups and market development but related primarily to entertainment games. The potential of entertainment games is fully recognised in relation to employment creation and export potential.

It is less clear whether:

- ✚ the potential of SG is fully recognised,
- ✚ the difference between entertainment games and SG is understood and whether the differing needs of SG are being addressed,
- ✚ discussion of greater SG-specific policy intervention is taking place to harness its cross-sectoral innovation potential.

Digital games have not only been changing how people spend their leisure time but also the way people learn, train, exercise, conduct research and even buy products which is what SG is all about. While progress is being made a lot more could be done to unlock the full potential of SG as we discuss below.

15 See <http://baltic-games.eu/171/>

16 For example, the Nordic Urban Mobility 2050 Futures Game which has as its aim to engage stakeholders in a discussion on future mobility options and what people will want from Nordic cities in 2050 - <https://www.nordicinnovation.org/tools/NUM2050>

17 'Game Hub Scandinavia 2.0' is funded by the EU regional development fund Interreg Öresund-Kattegat-Skagerrak, sub-region Kattegat-Skagerrak (KASK) under the development-area "Employment". See <https://gamehubscandinavia.dk>

3. Serious Games (SG), Gamification and Cross-innovation

Game technology can be used to change the lives of individuals and even to change the world. Games can influence people to take action, for example, on global warming or to explore big data to make scientific breakthroughs. Serious games (SG), or applied games, as they are also sometimes called, are games designed, produced, marketed or used for purposes other than pure entertainment. In reality an oxymoron, the concept and term SG emerged in about 2002 and is attributed to an American, Ben Sawyer.¹⁸

In a serious game one moves into a virtual arena, where one can learn and do things or expose oneself to new experiences safely. One can fail and try again until one gets it right, one can explore without repercussions, play with 'what if' scenarios and go to otherwise impossible places. In a serious game the learner is supported and guided while performance can be tracked to measure what is happening. Extensive research, a booming industry like the game industry itself, is showing that serious games are very effective, engaging, in short, a very powerful and versatile tool.

There is a difference between SG and gamification. Gamification is the use of game design elements in non-game contexts. This means that instead of creating an immersive, fully-fledged game as in serious games, gamification creates experiences reminiscent of games. Gamification can be used to guide, nudge and motivate people towards a desired behaviour, to take one example, to encourage someone to adopt healthier eating.

The use of games provides instantaneous feedback that allows users to experience the effect of their choices immediately. It is learning by doing where different solutions can be tried out without the negative consequences one would face in real-life. As a result companies, for example, use game-based learning programmes and simulation training to provide a safe and highly realistic environment where staff can, for instance, be drilled on procedures related to a specific emergency situation.

There are established and emerging technologies relevant to SG. The established include:

- ✚ Virtual, augmented and mixed reality (VR, AR and MR);
- ✚ New interaction devices, toys and playthings;
- ✚ Simulations;
- ✚ 3D-rendering technologies;

Each has its own appropriate application. VR, for example, can provide increased realism, immersion and sense of scale that can be important factors to achieve some learning objectives. It can be a tool too for increasing, for example, the impact of virtual simulation training.

¹⁸ Sawyer, B., & Rejeski, D. (2002). *Serious Games: Improving Public Policy Through Game-based Learning and Simulation*. Woodrow Wilson International Center for Scholars.

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Serious games applications are multiplying at an impressively accelerating rate but those already established include, for example, games for:

- ✚ marketing (including advergames),
- ✚ training and skills development,
- ✚ research,
- ✚ social awareness,
- ✚ business, banking and finance,
- ✚ community engagement,
- ✚ healthcare and wellness,
- ✚ human resource training and development,
- ✚ patient rehabilitation and physiotherapy,
- ✚ senior citizens,
- ✚ activity in specific locations.

3.1 Serious Games/Gamification and the Cultural Heritage Sector

Museums and heritage sites have increasingly been making use of the virtual world. Through use of digital technology developments they can offer wider and improved access to their collections and cultural assets. The way they present the content of their collections using technological tools is however not always as engaging as it could be. Serious games and game-based learning approaches can often be solutions to this challenge.

There are numerous serious games that are based on, or contain, heritage content. Serious games related to tangible cultural heritage are the most common although intangible cultural heritage is being increasingly targeted. For example, game-based learning is now being seen as an important means of intangible heritage preservation. While the general trend in using new opportunities is positive, the museum world and heritage sites, especially the publicly-funded ones, are still often behind the curve in relation to SG and gamification. Many have not grasped the opportunity to tackle the updating and revision of their collections and assets and their presentation in the context of the revolution which has taken place in relation to new media and technological developments.

The best cultural heritage video games are highly absorbing and an excellent learning medium. These games can be categorized into three types:

- ✚ reconstruction of history,
- ✚ virtual museums,
- ✚ cultural demonstrations.






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Cultural demonstrations are particularly relevant to intangible cultural heritage such as capturing traditional music, dance or customs. Serious games and game-based learning can complement, enhance and augment the cultural offer of museums and heritage sites by making cultural content accessible to wider audiences and by providing an improved and immersive experience.

Virtual museum applications offer the opportunity of exploring a distant or remote site and of manipulating precious or fragile objects. Sometimes they offer the possibility of creating one's own exhibition from the museum's collections using cross-platform gaming technologies. Video games are an engaging way of presenting cultural heritage through integrating art, storytelling and digital technology. Of course this is not to say that in some cases museums may have had disappointing, sometimes expensive, negative experiences.

The positive effect of serious games on learning in a cultural context has been well researched and is characterised by the following:

-  The user is placed in a stimulating environment;
-  The user is rewarded for accomplishments;
-  Games fulfil educational needs;
-  Games are designed to complement, enhance and augment the cultural experience;
-  Serious games based on a multi-use virtual environment (MUVE) encourage and facilitate collaboration and team-work.

The degree to which gaming technologies are being used for cultural heritage purposes in the Northern Dimension region not surprisingly varies from country but there are many good examples. One well-established and very successful example is the 'Cultural Heritage and Game Technologies in Skaraborg' project.¹⁹ It is a regional development initiative in western Sweden focused on engaging citizens and children with local cultural heritage in a number of municipalities. The original funding for the project, which began in 2015, was extended until 2021 to facilitate further research and development. An innovative sub-project of the overarching project is KLUB. KLUB has produced published playable game and AR-enhanced books – one for each village or town, turning the region into a fairytale world for children through the books. The content in these books and the characters featured in the stories can be re-used and re-worked. The content can be re-purposed for web-based delivery or, to take a specific example, be turned into playable locative media for children. This was done, for example, to focus specifically on learning about environmental and scientific issues related to local geological formations at a regional geopark. One of the characteristics of the project is the use of different game types.

The KLUB sub-project is one of many initiatives of the Division of Game Development at the University of Skovde, the largest degree-awarding academic games programme in Northern Europe.²⁰ KLUB is an example of gaming technologies being exploited within immersive, affective mixed reality (MR) systems. While the technological

19 Its official name in Swedish is the KASTIS project.

20 The KLUB project has involved many University of Skovde game students and has also been used to develop a Masters Programme based on cultural heritage and game technologies. The university has over five hundred students and offers at undergraduate level programmes in sound, music, graphics, design programming and writing. Its postgraduate level programmes cover SG, game development, games user experience, digital narratives, cultural heritage and game technologies and games, stories, aesthetics. A PhD in informatics covers everything from technical system development to socio-technical issues. In addition they run an incubator programme to support new business development

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elements are of course important, it is the story-telling element which is the key – narrative innovation is at the core of the initiative.

The importance of cultural heritage projects like KLUB is that they can respond to the needs and interests of local communities. This empowers those communities to engage in a dialogue which strengthens local cultural identities. In identifying, revealing and recognising their local material and non-material cultural assets people are able to assert and enjoy their local and regional identity and gain ownership of the world in which they are living. Museums also have their role in this area by not being just repositories of artefacts but places of engagement where social and identity formation issues can be navigated. Games can be particularly useful to achieve that end.

Technological advances are making it easier for cultural heritage institutions and sites to respond more imaginatively and effectively to the key principles which progressive museums have developed and adopted over the past two decades or so. Those principles include an audience-centred approach, accessibility for all and creating the opportunity for the users/visitors to construct their own personal meaning (rather than passively accept a curatorially imposed one). In short, encouraging active participation and involving users/visitors in every respect is important, including, when possible, in the design and content of the cultural offering itself. The latter, of course, is a form of co-design and co-creation. Co-creation is being recognised as an essential element of game design too both for SG and entertainment games and is particularly important in the development of cultural heritage games and game-based learning.

While technological advances are making it easier for cultural heritage institutions and resources to respond more imaginatively and effectively to their users/visitors, it does very much depend on how the technology is used. The 'tech' is certainly not an answer in itself in presenting and promoting cultural heritage. Sometimes digital tools and gaming are used artificially or too much which 'overcrowds' the visitor experience. Technological possibilities such as AR and other digital tools need to be used in a meaningful way. The key dimension is the interpretation i.e. the storytelling which gives meaning to the museum artefacts or cultural heritage assets. Storytelling, can be done without 'tech', so it is the storytelling that comes first. The interpretation and storytelling must be based not only on the cultural artefacts and assets but also on the audience/user that needs to be engaged. Games need to be carefully crafted to be able to speak to their users effectively. Inappropriate use of games and technology can be distracting or at best irrelevant.

In the technical creation of a video game there are usually many different roles which have to come together to form a successful team – producers, programmers, video game designers, writers, audio engineers, animators, artists, game testers etc. The success of a cultural heritage game depends not only on that team but a further extended team of diverse people and stakeholders as was shown in the KLUB sub-project where local government officials, teachers, librarians and community groups have been key to its success.

SG related to cultural heritage is beginning to appear as a deliverable in some EU-funded projects. One interesting example, part of the project 'iMareCulture', has been the development of 'Seafarers', a multi-platform serious game.²¹ The 'iMareCulture' project is intended to raise identity awareness using Mediterranean cultural interaction and exchange. It is focused on underwater cultural heritage much of which, of course, is accessible only to people like marine archaeologists involved in excavations. Aimed at the general public and museum visitors the learning objective of 'Seafarers' is to make players aware of the ships, sea routes and commerce in the Mediterranean during

21 For more detail see https://www.researchgate.net/publication/320107379_A_Serious_Game_for_Understanding_Ancient_Seafaring_in_the_Mediterranean_Sea

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the Classical period, using extensive storytelling about commerce, harbours, ship engineering, sailing, etc.

Another example of how games can be used to make an important contribution to EU projects is the 'Business Game on Maritime Spatial Planning for Marine Cultural Heritage – If I were a Decision Maker'. This Maritime Spatial Planning Game²² engages participants in a role play game which enables them to explore the complicated governance issues related to marine cultural heritage and to be able to identify solutions to conflicts of interest among stakeholder groups and nature conservation. The interactive Maritime Spatial Planning Game was adapted for different stakeholder groups, a particular target being young people and students. Stakeholders engaging with the Game gain a better understanding of how to apply maritime spatial planning in practice.

Related to cultural and social planning rather than cultural heritage, the project UrbCulturalPlanning, running from 2019 to June 2021, seeks to encourage public authorities in the Baltic Sea Region and local NGOs and associations to collaborate on citizen-driven cultural planning.²³ Involving nine countries, one of the project's elements is using the game Minecraft to engage young people and secure their participation in the project. Minecraft is a very popular 3D video game that can be played in two modes: survival mode where players fight monsters and creative mode where players can build and explore.²⁴ Explaining its use, a municipal official from the Baltic region commented that normally it is hard for the authorities to reach youth but through Minecraft it was more than possible.

There is still a lot of scope for further development of the multiple uses of games in cultural heritage preservation, promotion and education. In that context the Pokemon Go phenomenon was indirectly an example. When it suddenly appeared it triggered a mania for exploration which not only had a knock-on effect in relation to interest in local history but also in the United States, for example, the national parks saw a surge of new visitors due to the game.

The Minecraft example above of the natural affinity of young people for gaming should remind us that different generations and age groups engage with cultural heritage in diverse ways. Games and gaming have become a natural and widespread feature of contemporary life, especially for young people. There is a need for cultural institutions and their funders, as part of their core mission, to work together to engage new and younger audiences through the development of successful SG and appropriate game-based learning strategies.

22 <https://www.balticwaterhub.net/tool/msp-game>

23 See <https://urbcultural.eu/about/> for more detail.

24 Since its release in 2011, Minecraft has gained more than 90 million active players worldwide.

3.2 Serious Games/Gamification and the Education Sector

Use of games, GBL (game-based learning) and gamification²⁵ in education does not guarantee automatically either motivation or positive learning outcomes. That said, it has been clearly shown that video games in the classroom used appropriately by teachers to complement other learning strategies can improve behaviour, make learning engaging and fun and help develop skills such as collaborative working, imaginative thinking, problem-solving and critical thinking. Use of video games can also increase digital skills and encourage children into technology training and later into related careers. Recent research shows that girls who play video games are more likely to enroll in STEM²⁶ programmes than those who do not.

The Covid-19 pandemic has undoubtedly been a game-changer in terms of EdTech.²⁷ This period of crisis has seen technology being used on an unprecedented scale in education and training. Educators and educational institutions have of course for some time been interested in the potential role of EdTech, including video games, to support young people's learning experiences and to increase student engagement and learning outcomes. Video games can help encourage teamwork and strategic thinking. They can also reconnect those students who have difficulties in school, especially when more traditional approaches to unlocking pupils' potential and managing behaviour have failed.

Effective educational interventions require appropriate learner engagement which can be difficult to achieve if the learner is inadequately motivated. There has been a lot of research showing that games possess powerful motivating traits that overcome barriers to engaging in activities which they may find difficult or boring. In several Northern Dimension countries digital startups are beginning to respond to the growing games, GBL and gamification demands related to educating, stimulating and safeguarding children. One result of this response will be that children can determine to a greater degree their own development with technology providing the platform.

The Northern Dimension region is well-positioned to be a world leader in SG related to education. It has internationally recognised²⁸ and admired education systems and practices and a growing presence of game design companies and start-ups with both export and profitability potential.

This potential is strikingly illustrated by the now established and extraordinarily successful Norwegian company

25 GBL is a strategy that uses the idea of playing a game to reach specific learning objectives related to knowledge, skills, or attitudes. Gamification is the application of game elements and digital game design techniques to non-game problems. Game elements can be points, achievements, badges, and leaderboards etc. The line between GBL and gamification is sometimes very thin - gamification elements are normally present in a GBL activity. With GBL the learning process comes as a result of playing the game. Gamification is about inserting some elements of a game into traditional activities.

26 STEM is a curriculum based on the idea of educating students in four specific disciplines – science, technology, engineering and mathematics – in an interdisciplinary and applied approach.

27 An example of this from the Northern Dimension region is Brainly, a startup from Poland, that has built a popular network for students and their parents to engage with each other for advice and help with homework. It has recently raised \$80 million of investment on the back of dramatic company growth which has seen its user base grow from 150 million users in 2019 to 350 million in 2020.

28 For example, PISA (Programme for International Student Assessment) which is a worldwide study by the OECD intended to evaluate the standard of education systems by measuring 15-year-old school pupils' scholastic performance in mathematics, science and reading. In the latest available results which are for 2018, all eleven Northern Dimension countries were in the top 32 with six in the top 20.

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Kahoot! Kahoot! is a game-based learning platform that makes it easy to create, share and play learning games or trivia quizzes. Kahoot! is used by 7 million teachers globally, by hundreds of millions of students and families and by 97% of the Fortune 500 companies. In 2020 more than 250 million games were played on the Kahoot! platform by 5 billion cumulative players worldwide. In the same year the company's invoiced revenue was \$45.2 million.

Although video games are increasingly widely used in teaching in schools, it seems that Poland is the first European country to make a video game part of the official curriculum.²⁹ The game, 'This War Of Mine', developed by a Polish studio, became an official educational tool for high school students in the 2020/2021 academic school year. The game, which is a wartime scenario that reverses typical war-theme video games, places the user in the role of a civilian, rather than combatant. Based around morality and difficult situations where decisions must be made in order to secure basic necessities such as food, medicines and shelter, the game has learning applications related to sociology, ethics, philosophy and history.

Regional cooperation in the use of games, GBL and gamification in schools exists, but regional cooperation at a practical level seems not to be as active as regional cooperation between the Nordic/Baltic countries in many other spheres. Why such cooperation is important is that the eleven Northern Dimension countries are at different stages, are developing in different ways and as a result have a diversity of experiences which it might be extremely productive to share.

One example of past cooperation is a Nordplus-funded initiative. Nordplus is the Nordic Council of Ministers' largest education programme for lifelong learning. In 2016-18 it funded the Nordplus Horizontal project, 'Digital Computer Games for learning in the Nordic countries'.³⁰ This project aimed to provide teachers and other professionals who were willing to employ digital games in a learning context with relevant resources. The project envisaged an interactive website where teachers and other GBL enthusiasts could access research and information about digital game-based learning, locate reviews of relevant learning games, find digital learning plans and network with others practising game-based learning.

While there is now a substantial body of research about SG and GBL related to education, there is a paucity of such studies from the teachers' perspective. The problem exists, for example, that many teachers cannot accept the challenges of digital game-based learning. Whether this is generational or not is an interesting question. Bringing teachers on-board and giving them adequate training and resources is of course of key importance. If teachers are not enthused, trained, confident and given the resources they need, progress in terms of exploiting the contribution of games, GBL and gamification will be slow. In the school context the motivation of teachers is at least as important as the motivation of pupils. The teacher has to have a specific understanding of games and gaming in order to be able to be a promoter of game-based learning.

An interesting concept and approach which is still in an experimental phase in the Norwegian educational system is the use in selected schools of SG specialists to support teaching staff. There are currently six such people who are acting as a spearhead for the development of the use of games in schools and simultaneously pursuing publicly-funded PhDs and producing grass-roots practical research. Notwithstanding this progressive initiative there is not

29 At the time the decision was hailed as a significant milestone by both the Head of SPIDOR (the official representative body of the Polish video games industry) and the CEO of ISFE. See <https://www.isfe.eu/news/poland-is-first-government-worldwide-to-add-video-games-to-official-school-reading-list-as-educational-resource/>

30 The Nordplus Programme offers financial support to the eight participating countries and three autonomous regions in the Baltic and Nordic area in relation to education and life-long learning projects.

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yet any national training programme for trainee teachers or in-service teacher training programme in the use of games, GBL and gamification in schools.

The question could be asked as to what extent COVID-19, distance learning and a growth in GBL are leading to a revisiting of de-schooling ideas³¹ and accelerating thinking on the nature of the schools of the future. Teaching and schooling are now happening in a different way due to COVID-19 and the likelihood is that the experience will shape the future. While the COVID-19 situation has made traditional schooling in some countries, at least temporarily, unviable it has in other respects highlighted how important the 'physical school' is.

Which games are used in schools and how they are used is of course an important consideration. A common view is that the role of the teacher is crucial and so in this respect games that leave out the teacher are often not effective. Gaming in the teaching system is very different from the games children play at home. Games in the classroom are best seen as teaching aids. Video games can supplement traditional learning but not replace it. The right games³² used appropriately can develop children both in respect of the cognitive domain and the affective domain i.e. developing their knowledge and intellectual skills on the one hand and their ability to engage emotionally and attitudinally on the other.

While there are areas of cooperation more comparative knowledge would be useful on a number of issues related to SG and GBL. For example, to what extent are SG and GBL used in schools in the Northern Dimension country? Where they are used, where do they stand in relation to national educational systems and syllabuses? How are the countries training and supporting their teachers in relation to SG and GBL?

3.3 Serious Games/Gamification and the Health, Well-being and Medical Sectors

The health, well-being and medical sectors have been amongst the most active in absorbing and using gaming technologies and new game and gamification possibilities. For example serious games are widely used in medical education and training as are VR and simulators.

Serious games are also widely available as tools to promote health and wellbeing. This includes their use in condition-specific interventions, for example related to cognitive and motor therapies and to rehabilitation processes. The already wide range of illnesses and conditions being treated in these ways is constantly expanding.

In terms of personal health and fitness, a whole sub-genre of SG has emerged - exergames. Exergaming is the use of video games in an exercise activity. Such exergames sometimes target specific groups. An example is tackling the high levels of obesity in developed countries especially amongst children. The planned outcome of such a game is that the fascination that video games have can be harnessed to engage children in greater physical activity. Exergames are also being successfully used with the elderly to improve mobility, balance and quality of life.

The arrival, accelerated by COVID-19, of increased use of telehealth (i.e. remote patient care) and mHealth (utilisation of mobile technology usually on an individual basis to achieve improved health goals) has in certain cases led to an overlapping of games and gamification with them. This is in the wider context of the paradigm change in most European countries towards a user-centred approach in health care. This puts the patient at the centre of the health

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care system usually also with an expectation that the individual will take increased responsibility for his/her own health.

In the medical sector the introduction of gaming technologies, SG and gamification has been impressive especially bearing in mind that in the medical world avoidance of risk and adoption of extreme caution are a sine qua non. Use has spread from surgically-oriented simulation games to almost all other medical branches: internal medicine, neurology, geriatrics, intensive care, emergency medicine, general surgery, urology, obstetrics, paediatrics, pharmacy, nursing, pathology as well as all areas of medical education and training. A wide range of game types is being used e.g. simulations, quizzes, puzzles, adventure games, board games etc.

Video games, for example, are becoming an integral part of occupational therapy practice. In the area of recovery and rehabilitation they are being found to be particularly effective. Apart from rehabilitation related to chronic conditions (e.g., cerebral palsy, multiple sclerosis, stroke and Parkinson's disease), research is showing SG is also sometimes relevant to short- and medium-term rehabilitation (e.g. after trauma or orthopaedic surgery). Rehabilitation after burn injury using video games has been shown to be equally effective as standard therapy, including video game play even resulting in less pain experienced.

The same is true in health areas where behavioural change is either a part of the treatment or is needed in relation to prevention. In connection with the latter SG approaches can be used to promote health education and health-related information such as encouraging physical fitness or self-directed and self-managed care.

As use of games and gamification widens, so it is becoming more focused and more commonly used in relation to specific illnesses, health issues and treatments. Examples where it has been particularly developed include stroke rehabilitation, management of diabetes, the treatment of mental illness, dealing with cognitive problems and as a tool in distraction therapy.

There have been attempts by researchers to categorise the different types of situation when SG and gamification might have relevance in the medical, health and well-being sectors. One such categorisation is:

- ✚ Pain,
- ✚ Boredom (short-term hospital stay),
- ✚ Boredom (long-term hospital stay),
- ✚ Anxiety/Hyperactivity,
- ✚ Sadness and depression,
- ✚ Cognitive impairment.

Another categorisation produced by research sees six major categories of SG activity as relevant specifically to mental health:

- ✚ exergames,
- ✚ virtual reality,
- ✚ cognitive behaviour therapy-based games,
- ✚ entertainment games,
- ✚ biofeedback and cognitive training games.

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The general point coming out of research into SG and gamification in the medical sphere is that it is viable to translate traditional evidence-based interventions into computer gaming formats for therapeutic and other medical and health purposes.

COVID-19 has been intensifying previously existing concerns about mental health. It would seem that SG and gamification strategies have the potential to increase the impact of telehealth interventions related to mental health in three ways. Firstly, by extending the reach of online programmes with games or gamification elements to those who might not otherwise be able to access traditional interventions. Secondly, by improving engagement through both game-based and related motivational dynamics. Thirdly, by utilising varied mechanisms for behavioural change, including therapeutic processes with gaming features.

The medical, health and welfare sectors in relation to SG cross-innovation were chosen for this policy brief as a focus for a very specific reason. It is because in the Northern Dimension region, led by the Nordics, is becoming a world leader in innovative medical, health and welfare solutions. Amongst other things this area has significant export potential. Alongside this is the region's growing and internationally commercially successful game industry. While attention to the region's game industry success has mainly been focussed on the entertainment games sector and the 'unicorn' companies it has produced, it would be unfortunate if global SG market opportunities related to medical, health and well-being applications were neglected.

It does not require much imagination to see greater policy-generated synergies created at all levels between the potential of the innovative parts of the Northern Dimension medical, health and welfare sectors and the region's games and gamification industry.

This is not to say that nothing is happening. A couple of random regional examples can illustrate this. The Hedda project developed by the Latvian company NeuroTech is a combination of a biofeedback-induced video game and a headset that integrates real-time biometric data as an additional input into the gameplay. The game is helping children with mental disorders. Hedda offers an opportunity to use video games to train children's self-regulation skills. It measurably improves the child's well-being through prompting beneficial states of mind and body by visually rewarding the child in classic gameplay fashion.

The Gamified Solutions in Healthcare (GSH) research project (2014–2016) was a joint project between Turku University of Applied Sciences and the University of Turku in Finland. The purpose of the project was to promote exercise, social inclusiveness and enhance quality of life, aiming at developing new services and effective activity solutions for the elderly through gamification. The project combined the expertise of many different disciplines and was linked to company-driven projects that develop scalable international serious games solutions for healthcare sector utilisation.

It has been mentioned above that SG is being used in relation to stroke patients. The Rehabilitation Gaming System (RGS) is already established in hospitals and other centres but EIT Health (see below) is funding a project to scale up ICT-based neuro-rehabilitation to personalised home care where patients play virtual games to aid motor and cognitive recovery. By allowing people to play RGS games in their homes, the project which involves Sweden (with France and Spain) will reduce the cost of therapy while increasing patients' quality of life.

Obviously use of SG and gamification in innovative medicine and healthcare are relevant domestically in the Northern Dimension countries but the export angle could act as a booster or accelerator. The potential is perhaps illustrated by the fact that in mid-2020 the US Food and Drug Administration approved the first official video game treatment, a game for children aged 8–12 with certain types of attention-deficit/hyperactivity disorder (ADHD) which is one of

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the most common mental disorders affecting children. EndeavorRx can be downloaded with a prescription onto a mobile device and is intended for use in tandem with other treatments. Children with the disorder play it for 30 minutes a day, 5 days a week, over a month-long treatment plan.

In Europe the health challenges of an ageing population is a major issue and innovative medical and health approaches are needed. This is the main focus of EIT Health which operates throughout Europe and has a regional presence through EIT Health Scandinavia. Made up of public, private, academic and innovation partners it is supporting health initiatives and projects, carried out by multi-disciplinary cross-sectoral teams, that promote entrepreneurship, education and innovation in the areas of healthy living and active ageing. It aims to strengthen national healthcare systems and empower citizens to lead healthier and more productive lives. EIT Health Scandinavia's staff includes two dedicated innovation managers based in Denmark and Estonia³³ EIT Health support has included projects with SG and gamification elements.

In 2018 EIT Health Scandinavia ran a three-week summer school 'Innovation Game: Applying Serious Game Design in Health Care and Education' at Uppsala University in Sweden. It focussed on game design and innovative processes as tools to improve healthcare services and enhance self-management of health. Participants gained skills in working in multidisciplinary teams cooperating with serious gaming experts and professionals from the business and public healthcare sector.

One of the most striking examples of the use of games in the medical and health sphere and one that illustrates the untapped potential impact of SG is the mobile game 'Sea Hero Quest'. It has been developed by Deutsche Telekom in collaboration with international research institutes and game designers.³⁴ Linked to research on dementia, over 4.3 Million players played the game for a total time of over 117 years providing scientists with data that they claimed would have taken traditional research methods 176 centuries to collect! One of the first symptoms of dementia is loss of navigational skills and 'Sea Hero Quest' mobile provided enough data to help create the world's first benchmark for human spatial navigation.

A new version, 'Sea Hero Quest VR', with an intuitive feature allows even more subtle and detailed tracking of reactions such as eye movements, as well as replicating highly credible lab-based experiments not possible with the original version. 'Sea Hero Quest' and 'Sea Hero Quest VR' gather a wide range of anonymous data about a player's orientation behaviour in the game and this provides scientists around the world with a comprehensive database that can be carefully analysed. Players who wish proactively to support dementia research can voluntarily provide additional information such as their age, gender and country of origin.

Another example that illustrates the untapped potential impact of SG is a novel research collaboration between architects and game designers to investigate and develop mobile, context-sensitive exergames, i.e. games for sports and health. Specifically, it is exploring a new approach that aims to design exergames which interact with the player's built, topographic and social environment in a meaningful way. The aim is to identify strategies on how to integrate research on health-oriented urban design and planning to the design of such games.³⁵

33 For detailed information see <https://www.eithealth-scandinavia.eu>

34 See <https://www.telekom.com/en/company/management-unplugged/details/the-game-in-the-fight-against-dementia-363322>

35 https://www.researchgate.net/publication/262085892_Urban_Exergames_How_Architects_and_Serious_Gaming_Researchers_Collaborate_on_the_Design_of_Digital_Games_that_Make_You_Move

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Recent significant sales growth and the ready adoption of wellness apps and wearables with gaming features demonstrates their popularity and potential. The ability of games and gamification to motivate, engage and entertain offers a natural way to train and motivate users to improve their performance and change their behaviour. The latter is the common thread which makes SG and gamification so transferable and such an important tool of healthcare cross-innovation.

It was mentioned above that in the medical and health sectors safety of patients and avoidance of risk is a prerequisite. This has meant that some clinicians and health professionals have been wary of the introduction of SG and gamification for reasons of both patient safety and how SG compares with already existing approved treatments and therapies. Without research or other reliable information it is of course difficult to know if a given game or gamification approach can meet the claims it might make for itself.

This issue is now being addressed by a non-profit society, the Dutch Society for Simulation in Healthcare.³⁶ It is an organisation which promotes and facilitates the development and implementation of simulation and SG in healthcare. In order to raise standards of education, training, research and patient safety, it has established the 'Quality Label for Serious Games in Medicine'. Through this 'Quality Label' developers of serious games can show that their serious game is an internationally valid and responsible product meeting current scientific and legal standards. The extent to which these requirements are met is evaluated using a professional scientifically-based framework.

4.

Incubating Serious Games Start-ups and Projects and Fostering Talent

One starting point when looking at SG incubation needs is to consider what exactly the differences are between developing serious games and entertainment games. In many respects the term 'serious games' is not helpful. Serious games should be entertaining, not 'serious' in the sense of the opposite of fun while of course many entertainment games are, or can be, serious. In reality SG and entertainment games are on the same spectrum with many common features. Nevertheless the question still arises as to whether they are two faces of the same industry or two separate industries with different needs.

While there are features common to both SG and entertainment games there are also significant differences. While the game mechanics can be the same and there are other technical areas where there is no difference, there are at least two important intertwined areas where serious games development is much more complicated.

The first is that producing any game, SG or entertainment, requires the assembling of a diverse cross-sectoral team - producer, artist, animator, writer, audio engineer, software designer etc. A serious game, however, needs to extend that to include people from the sector or area for which the game is being developed and this means in practice the assembly, management and bridging of two teams. In addition, the SG developer has to 'get inside' or have a good degree of understanding of the area for which the game is intended. This can of course be a problem. To take the example of a game being developed for classroom teaching, this probably requires on the part of the game designer some level of knowledge of pedagogy and child psychology even when working with consultant teachers.

The second area of difference is connected with the nature of the relationship between the SG development team and the client/customer for whom it is intended. For the reason just given in many cases it has to be a collaborative relationship rather than a traditional client or customer relationship. This throws up the very important question of how serious games are commissioned and probably explains why SG has not in the past been a boom business in the same way that the entertainment games sector has been. The problem for an SG business is that in most cases they will simply not have the knowledge to be able to go to a specialised sector with a specific game idea. Similarly a potential client will in many cases not be able to specify what they want other than a 'game'.

So one particular need of SG start-ups is connecting to experts from relevant disciplines or having contact with specific public sector bodies. This is often difficult to achieve. Many SG developers need to work with the public sector and it is not only hard to make the breakthrough but even after that collaboration processes are often slow. An SG start-up needs to make these connections in the incubation period. This SG 'connection need' is therefore something that incubators should either provide or facilitate. When assessing any game incubators an important consideration is what add-ons they offer in addition to basic resources and access to expertise. Such add-ons can range from mentoring to access to networks, from seed-funding to being able to tap finance and accounting, legal and IP etc professional services and advice. Unfortunately start-up professionals in game development, whether SG or entertainment, all too often do not know enough about games as a business i.e. about running a company, defining a target audience and other areas essential specifically for an entrepreneur. It is not unusual for game

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developers to be so focused on the game to the exclusion of everything else.

When looking for models of good practice in terms of developing a games industry, Finland is one of the countries that has led the way and created one of the most successful game industries in the world. One contributory factor amongst many others has been consistent and appropriate government support. The 'ecosystem' around the industry is impressive, not least in terms of relevant education and training provision and the encouragement of knowledge sharing. The latter often means that mentoring for start-ups is not a problem. Plenty of companies are founded yearly in Finland and elsewhere in the region and it is the incubation period where most of the framework support for start-ups is needed and concentrated.

A critically important reason for the sudden explosion of game start-ups and appearance of so many indie game studios and businesses has been the arrival of smart mobile devices. Apart from affecting the relative percentages of computer, console and mobile game sales, it has revolutionised the value chain. A game developer is now able to publish mobile games directly through distribution channels such as Google Play and App Store making game developer self-publishing possible. It has of course affected traditional distribution channels.

In spite of some predictions to the contrary, SG has not yet grown into a fully-fledged market of its own and certainly not proven as successful in terms of revenue and market share as the market for entertainment games. Comparatively few businesses build their portfolio and shape their business profile for a serious games/gamification market. Many game companies are still considering gamification and serious games as only part of a contingency plan if needed. It seems, however, that there has not been much discussion on how to approach incubation or mentoring for companies aiming at building up a business as serious game specialists.

For an emerging industry as the game industry, talent growth is amongst the key challenges to ensure the sector continues to prosper. Game incubators, accelerators and other forms of startup and young business support are amongst the key drivers of talent growth. At present the Northern Dimension region has a problem in that the supply of local industry talent is not sufficient to its needs.³⁷

³⁷ Finland and Sweden provide examples of this. In 2016-2018, the latest period for which figures are available, 27% of those working in the Finnish game industry were foreign. Sourcing experienced professionals locally has been and remains probably the biggest Finnish challenge in this area. A similar problem in Sweden is being partly addressed through Swedish companies buying foreign acquisitions, reportedly about thirty-five in 2020.

5. Everything to Play for? Conclusions and Recommendations

For each of the sectors included in this brief and for the SG development needs component in terms of start-up incubation and fostering talent, certain questions were posited although the research and conclusions have not been limited to them. The questions were:

+ Games/Gamification and the Cultural Heritage Sector

What stage is games/gaming at in terms of the cultural heritage sector? Where is it going and what are, or should be, the 'big' questions? Is gaming and gamification a fashion or is it impacting fundamentally on the mission of cultural heritage institutions, for example in terms of building new, younger audiences?

+ Games/Gamification and the Education Sector

Games Based Learning (GBL) - where is it in relation to the traditional educational systems and syllabuses in the Northern Dimension countries? To what extent are COVID-19, distance learning and a GBL revolution leading to accelerated thinking on the nature and function of the schools of the future?

+ Games/Gamification and the Health, Well-being and Medical Sectors

These sectors are amongst the leaders in Serious Games (SG) acceptance in areas such as surgeon training, therapies and self-help well-being apps. How do they become adopted? Who invites whom to dance - the health, well-being and medical sector or the CCIs? What is needed in policy and practical terms to stimulate more cross-innovation between CCIs and the health, well-being and medical sectors when such cooperation has already proved so productive?

+ Incubating Games Start-ups and Projects and Fostering Talent

Entertainment games and Serious Games - two faces of the same industry or two separate industries with different needs? Whichever, what is needed in terms of SG incubation? What are the main factors inhibiting the growth of SG start-ups?

In terms of SG and gamification related to the cultural heritage sector the outlook in the Northern Dimension region is very healthy with good product available and quite evidently serious growth opportunities. Against this very positive background there seem to be three main issues. The first is making sure SG products and gamification really do address the audience at which they are aimed which often will require very substantial time and effort in developing such products. The second is inappropriate use of games and gamification which often manifests itself at some museums and heritage sites in the form of technology for technology's sake i.e where technology or the

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technological means used is not the right or best way of ensuring the most positive visitor experience. The third issue concerns museums and heritage organisations not reviewing their collections and assets in the light of new technological possibilities. There is no question that the potential of SG and gamification to satisfy new, especially young, audiences and in general to enhance the visitor experience is real.

In terms of SG and gamification related to the education sector, in the school sector alone there is serious unfulfilled potential especially as a sometimes past hostile parental understanding of games and gaming is being challenged. It must only be a matter of time before GBL becomes ubiquitous in the schooling systems of the region. One of the issues will be the extent to which SG and gamification address curriculum demands and identified learning outcomes while at the same time curricula and syllabuses evolve to make best use of GBL possibilities. Similarly the role of the teacher is an issue. Recognised as important and central, there seem to be three areas that need addressing. The first is in-service training to help teachers to understand how to use SG and gamification in the classroom. The second area is giving attention to teachers who are failed or unwilling 'digital immigrants' and are simply averse to using computers and new technology. The third area is making sure that courses for teacher training students are updated to take full account of GBL, SG and gamification. All of this needs to feature in current thinking about the school of the future³⁸ and the lessons being learnt in relation to online learning in the age of COVID-19.

In terms of SG and gamification related to the health, welfare and the medical sector, use of SG and gamification is quite impressive given that it is a sector which by its nature does not readily take risks and where proven outcomes and patient care are the priorities. World-leading healthcare systems exist in the Northern Dimension region and healthcare could become a much more important source of export growth for some of the countries. Putting the gaming sector and the health, welfare and medical sectors together is a very obvious thing to do. Because in most cases the initiative will need to come from the healthcare side rather than the SG side, this needs to be achieved through appropriate practical healthcare policies. At present it seems that much of what is happening is the result of individual initiative and ad hoc couplings rather than as part of proactive exploration of SG and gamification by the health and medical sectors. In terms of well-being strategies, societal and personal, there is already ample evidence that SG and gamification can bring real innovative solutions to the healthcare system both in relation to cure and prevention.

It is clear that at present SG and entertainment games are not two separate industries but they do have different needs. The entertainment games sector has been highly successful in several Northern Dimension countries with in many cases very effective government policy and funding support. This has been motivated primarily by factors such as creating employment and export potential. The SG sector needs more and special attention, for reasons discussed earlier, if it is to fulfil its potential in relation to cross-sectoral innovation. If those needs can be met, probably of all the CCI sub-sectors, SG is possibly the one that holds the most promise.

The special needs include the exploration of SG and gamification opportunities being part of other sectors' policies so that there is 'pull' which provides openings for SG developers to move in. In addition SG start-ups and individual SG developers have additional needs which need to be recognised and be more clearly defined by the existing incubation structures.

The games industry is the most vibrant of all the cultural and creative industries with booming revenues, real growth of product and an exponential rise in the number of users from all ages and backgrounds. In this global success story several Northern Dimension countries are star performers with the expectation that there is better and more to come. While less-developed than the entertainment games sector, SG and gamification have enormous untapped potential.

SERIOUS GAMES (SG) AND GAMIFICATION - EVERYTHING TO PLAY FOR?

SG/GAMIFICATION CROSS-INNOVATION AND THE CULTURAL HERITAGE, EDUCATION, MEDICAL, HEALTH AND WELL-BEING SECTORS

In many of the Northern Dimension countries the ecosystem or infrastructure for further development and growth of the games industry is looking healthy with increasingly good support mechanisms for developing talent and training industry workers. In a similarly healthy state, and expanding, is support for start-ups. Dedicated games incubators and games start-up programmes within general business incubators are proliferating. Educational institutions are increasingly offering courses related to all aspects of games development. A lot of research is being carried out related to games and gaming. Events related to the gaming industry in the region – conferences, trade shows, game camps and game jams, hackathons etc – increase with every year. COVID-19 which has been so cruel to many CCI sub-sectors has been a boon for the games sector both in terms of the surge of demand for home entertainment and in terms of the heightened familiarity and skill level of people who have had to move into a more technologically-driven world as a result of home working and other factors. All of this is good for the SG and gamification sector but further SG-specific policy interventions are needed if it is going to make the widespread cross-sectoral innovation impact which it can achieve.

While the impact of the game developers of the countries of the region, especially in relation to exports, has mainly centred on entertainment games, the area of SG should be getting more attention. Hitherto, the belief by some that SG would grow into a fully-fledged industry in its own right has not happened but there is enormous unfulfilled potential. Although there are businesses dedicated to SG, in most cases SG is a minor part or 'rainy day option' for mainstream game developers. While that is one of the reasons for an SG revolution not materialising, there are also other constraints and issues.

One main and inherent issue is the matching up of SG game possibilities with areas, problems or partners where SG could make a contribution. Cross-sectoral initiatives are constrained by the fact that there is still not enough awareness in other sectors of the potential of games and gaming and exactly how they could be used. In addition to that, without a fairly intimate or detailed knowledge of another sector or area it is very difficult for SG developers to make proposals or identify needs. Another factor is that most games development businesses are small and simply do not have either the time or resources to do the necessary research to enable them to explore cross-sectoral opportunities.

This means that the potential SG market is somewhat suppressed and does not operate like the entertainment games market. The traditional model of a customer-supplier or client-supplier relationship is not well suited to SG development because of the need for specialist knowledge of the area to which application of SG is appropriate. This means that there will often need to be a collaborative partnership relationship.

SG can be a strong driver of innovation in the Northern Dimension region, partnering with other sectors, especially those which are particularly strong such as healthcare, cultural tourism and education as well as with new emerging sectors. Using gaming and gamification will in many cases offer cost-effective innovation opportunities but additional SG-specific policy and support measures are needed. In general in the Northern Dimension region a much greater differentiated approach needs to be taken between developing the serious games sector and the entertainment games sector. At present because of the entertainment games 'unicorn' successes attention to that sector predominates in terms of governmental and public authority support while the longer-term promise of the SG sector, a 'slow burner', is poorly recognised.

In policy terms the starting point and central issue related to beginning to fulfil the cross-innovation potential of the SG and gamification sector is a deficit of awareness at several levels. Addressing the awareness gap will bring about the inter-sectoral connectivity which is fundamental to SG growth. The current awareness deficit includes the following:

1. The generally good, and in some cases really excellent, support being given to the development of the games industry in the Northern Dimension region is focussed on entertainment games or games as a

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generality. There seems to be little or limited awareness that the SG sector, while having much in common technologically with the entertainment sector, is fundamentally quite different.

2. Flowing from that is insufficient awareness and lack of exploration/definition of the special needs of SG in terms of support for its development. These needs range from SG start-up incubation specificities through to recognition of the differing nature and much more complex client-customer relationship needed to develop SG cross-innovation.

3. The SG market clearly has a long-term future and its potential is extremely promising both commercially and in terms of societal benefits. It needs to be seen however in terms of steady investment and steady returns, not in terms of short-term spectacular commercial success which sometimes characterises the entertainment games sector.

4. While there needs to be SG-specific policy thinking and initiatives on the part of governments through their innovation and business development strategies, it is equally important that application of SG and gamification is promoted through policies related to other sectors. Some of those sectors have been highlighted in this brief. In some sectors there have already been trail-blazers and so policy simply needs to build on that experience, in others there needs to be an injection of imaginative thinking. The latter could include dedicated special SG funding, for example through some kind of voucher scheme, a mechanism which has often worked well in other situations.

Finally, two other points for consideration. It was noted above that serious games have successfully featured recently as deliverables in EU-funded projects. While development of serious games will not be suitable for most projects, it would be good if they could be added to the EU 'project toolbox' as an option for when it is appropriate to use them.

In the context of the NDPC 2021-2024 Strategy, SG and gamification would seem to offer an area where the NDPC could usefully make a contribution. This could perhaps be through events and actions which look more closely at the individual countries and could involve detailed comparison of any SG policies, where they exist, and any support measures to see how effective they are and what more is needed.

In the case of SG, gamification and GBL in the Northern Dimension countries one can confidently say there is certainly everything to play for!

