Final report: Digital storytelling tools

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Introduction

"The art challenges technology. Technology inspires the art."
—John Lasseter

Technology is a driving force that allows creators to extend themselves to see and think beyond. When art and technology converse with each other, they realize that it's not possible to push their borders without working together. Art and technology is complementary, they exist in collaboration with each other to innovate.

Similarly, in digital storytelling, art and technology is inseparable and mutually defining one another. Digital storytelling is formed because of the need to extend beyond traditional storytelling. With this as a backdrop we decided early summer 2013 to form an interdisciplinary team to explore and capture the value within the mutual relationship of digital technologies, arts/humanities and the media industries. The triangular identity of the pilot project autumn 2013 consisted of two main partners from NTNU Norwegian University of Science and Technology (Faculty of Electronics and Telecommunication, Faculty of Humanities/The Performativity Group) and the business partner NxtMedia. In an international context this kind of interdisciplinary, collaborating teams are symptomatic of a bigger trend today where universities expand their role and agency in society by gathering and combining conventionally isolated knowledge clusters in new and innovative ways. Our team formed the following objectives for the Digital Storytelling Tools and Experiences project:

- Demonstrate existing digital storytelling tools used within the existing digital content,
- To specify and develop a prototype of a new digital storytelling tool based on the
 use of metadata for multimodal publishing in education, research, interactive art
 and experience-based system in general,
- Conduct a survey with NxtMedia to investigate the current usage and experience of digital storytelling tools,
- Assess the potential commercialization of the new digital storytelling tool,
- Prepare objectives to send applications for a national and international funding for further financing,
- Deliver a two-day seminar for evaluation and validation of digital storytelling tools.

Digital Storytelling

Digital Storytelling is a new form storytelling that combines various media content and technology such as images, music, voice, video and virtual worlds or real-time data. Digital Storytelling provides new dimensions to traditional storytelling by enhancing the intermediality of multimodal creativity and human experience.

With the aid of technology, Digital storytelling allows ordinary users to become creative storytellers. Digital Storytelling is the process of employing traditional and new ways of choosing a story topic, gathering data, composing the story or scriptwriting, and creating the multimedia contents. By using digital storytelling tools, several types of multimedia content such as computer based images, recorded sounds and voices, video clips, computer-generated materials, can be integrated together to form tailor-made and unique modes of expression.

Digital Storytelling has been around for decades, for instance, video producer Dana Atchley and Joe Lambert founded the Community Arts Movement in the late 1980s where they developed Digital Storytelling workshop for those who don't have access to expensive resources to tell their stories (MacLellan, 2007). In 1990s Atchley, Lambert and Nina Mullen co-founded the Digital Media Center and now known as the Center for Digital Storytelling in Berkeley, California.

Since the late 1990s, the Center for Digital Storytelling established Silence Speaks, an international digital storytelling initiative pushed Digital Storytelling from its mere narrative purpose to also provide a supportive venue in the use of digital stories for education, increased awareness of violence, and other conditions for the voiceless including abused women and at-risk youth from developing countries.

Today, there is evidently a dramatic growth of Digital Storytelling in education, research and journalism with increasing use of interactive data visualisations. The data visualisation approach is typical to the works of the New York Times (for instance, http://www.nytimes.com/newsgraphics/2013/12/30/year-in-interactive-storytelling/) and the Guardian media group. These visualisations, although not always interactive, they present large sets of data to the viewer that may transform the meaning of the story (Segel & Heer 2010). In the arts and humanities research publications increasingly invite researchers to submit multimodal, online contributions, for example Journal of Artistic Research (http://www.jar-online.net/call/call.html). While there are scholars who believe that digital media is good for learning (Gee, 2003), there are also arguments against the adaptation of technology, for instance Pew Research Center (2009) found that that young people are no longer reading the news and are less knowledgeable about current events. Mark Bauerlein author of the book, *The Dumbest Generation*, addresses some alarming trends amongst America's youth where young people are constantly occupied with Facebook, text messaging and other technological distractions that contribute to one-sided

influence and restricted learning environment and potentially keeping them away from learning something more meaningful.

Despite some disadvantages arising from the use of technology, it is enabling us to overcome some human limitations. Technology has become part of our lives; it is almost impossible to imagine our daily basis without computers, table-tops, mobile phone, or social media. George Lucas believes that in the current sophisticated world, we need various forms of communication (quoted by James Daly at http://www.edutopia.org/lifescreen):

"When people talk to me about the digital divide, I think of it not being so much about who has access to what technology as who knows how to create and express themselves in this new language of the screen. If students aren't taught the language of sound and images, shouldn't they be considered as illiterate as if they left college without being able to read or write?"

Digital Storytelling Definitions

While some may view digital storytelling as synonymous to the growth of the Web 2.0 technologies, other scholars believe that digital storytelling is more intimate and deeply rooted in human experience.

Meadows (2003) noted that digital stories were different from the ordinary television productions because the "contributors are not just originating their own material, for the first time they are editing it too. This is what first excited me – and still excites me – about Digital Storytelling, for no longer must the public tolerate being 'done' by media – that is, no longer must we tolerate media being done to us. No longer must we put up with professional documentarists recording us for hours and then throwing away most of what we tell them, keeping only those bits that tell our stories their own way and, more than likely, at our expense. If we will only learn the skills of Digital Storytelling then we can, quite literally, 'take the power back'" (2003; p.192).

On the other hand, McLellan (2007) suggest a broader technical definition of digital storytelling: "These include the interactive narrative forms from hypertext, web-based narratives combining image-sound-animation-video, the virtual cinema of narrative games or game-like conceptual pieces and other practices of using digital media tools (video, motion graphics, animation, etc) to explore both nonfiction and fictional narratives." (2007; p.70).

Results from the pilot project autumn

To demonstrate existing digital storytelling tools used within the existing digital content.

Our first objective was:

To demonstrate existing digital storytelling tools used within the existing digital content.

The development of online digital storytelling tools has led to "a greater proportion and number of people than ever before now have access to storytelling media — for both story production and consumption, united by myriad networks of critique, support, examples, and experimentation" (Bryan, p.14).

To identify the current state-of-the-art in the development of digital storytelling tools we have presented a document structured to demonstrate existing digital storytelling tools used within the existing digital content. The document is a structured collection of existing tools and demonstration of digital stories and is available on request.

The structured document or framework shows the transition from traditional visual storytelling with static graphics and texts that have long been used to support stories to dynamic visual storytelling. The structured document on existing digital storytelling tools accommodates the mixture between the traditional quality of storytelling as a one-way sender-receiver relationship, with the new media buzzword *interactivity*. Hence, several digital storytelling tools have been identified from static editing, interactive presentation, content management, and content curation to visualisation and tools.

Survey of NxtMedia partners use of digital storytelling and digital storytelling tools

Our second objective was:

To conduct a survey with NxtMedia to investigate the current usage and experience of digital storytelling tools.

We have conducted a survey with NxtMedia to investigate the current usage and experience of digital storytelling tools with 28 respondents (Appendix 1; see Figure 1) on an online survey. The survey was distributed through an email invitation to NxtMedia partners and NTNU affiliates. The subject where given at least 10 days to answer the questionnaires (https://www.surveymonkey.com/s/TJK6ZMQ).

The aim of this online survey was to collect basic information from educators, researchers, digital journalist, artists, humanists and other digital storytelling enthusiasts to identify the important variables they need in their usage of digital storytelling software or tools.

The survey shows that new stories infused with simplicity, aesthetics, beauty and intuition will go far. The result of the survey further demonstrated that interactivity is one of the most important component in digital storytelling. In the academic field, interactivity is also seen as the most important element in a digital technology because it incites engagement and agency. According to Gee (2003), in his book What Video Games Have to Teach Us About Learning and Literacy, "learners participate in extended engagement (longer time spent and practice) in relation to a virtual world that they find compelling" (p. 67).



Figure 1: A screenshot of the first page of the online survey form in Digital Storytelling tools and usage requirements.

Repository of existing and new digital storytelling tools

Our third objective was:

Specify and develop a prototype of a new digital storytelling tool based on the use of metadata for multimodal publishing in education, interactive art and experience-based system in general.

We took the results from the survey to specify and develop prototypes using various digital storytelling tools. Three supervised master students developed a prototype in 3 different types: Meta-tagging of a video-based performance piece (using Max/MSP; see Figure 3), an interactive 3D environment using a wearable technology (Oculus Rift; see Figure 4) and a mini media asset management system concept (using Python Scripting). In addition, a java script tool implementation and the usage of readily available authoring toolkit called Scrollkit were also utilized to develop the digital storytelling prototype for "The Red Shoes" project (an interactive performance by Lise Hovik, PhD student in Drama and Theatre Studies, Faculty of Humanities, representing the Performativity group). The process of developing these prototypes suggests that different stories or content requires different technologies or digital environment. With the wave of advanced technology such as Web 2.0, it is possible to combine several forms of digital storytelling tools into one user presentation or graphical interface in the future (see Figure 2).



Figure 2: The possibility of combining several storytelling tools into one graphical interface using Web 2.0.



Figure 3: Meta-tagging interface of a video-based performance piece



Figure 4: An interactive 3D environment using Oculus Rift

Based on the survey that we conducted on digital storytelling elements required by users, we made an evaluation of various storytelling tools to accommodate interactivity, intuition and aesthetics (to name only a few). Then we started working on the list of 10 tools that would cover various types of user storytelling experience and content requirements with

the plan of including these in our own two-day event exploring and validating existing and emergent digital storytelling tools. The tools were:

- 1. Scrollkit , register at: http://www.scrollkit.com/
- 2. Popcorn maker, register at: http://popcorn.webmaker.org/
- 3. Windows Movie Maker, download a free version at: http://www.windows-movie-maker.org/
- 4. Thinglink, register at http://www.thinglink.com/
- 5. Gimp 2.8, download a free version at: http://www.gimp.org/downloads/
- 6. XML Spy, download a free trial at: http://www.altova.com/download.html
- 7. WordPress, you need to sign-up for a web-hosted website at http://wordpress.org/; free-hosting will not work. Alternatively, we will be working on a dummy website host during the workshop, http://foto.lysbilde.com/
- 8. Oculus Rift, the device and software is provided for testing at the Sense-IT laboratory.
- 9. Javascript and HTML download this zip file, https://github.com/hakimel/reveal.js & we will use Komodo Edit or editor of your choice as an IDE: http://www.activestate.com/komodo-edit/downloads
- 10. Max/MSP (Max 6.1.6) -You can download a trial version here: http://cycling74.com/downloads/
- 11. Google Chrome This is a must for all web browsers: https://www.google.com/intl/en/chrome/browser/

Workathon and Seminar

Our fourth objective was:

Deliver a two-day seminar for evaluation and validation of digital storytelling tools.

We arranged a two-day workshop and closing seminar for evaluation and validation of digital storytelling tools January 30 and 31, 2014 that we called the "workathon". The workathon was inspired by various successful front-runners in digital storytelling in journalism such as the New York Time's *Snowfall* and the Guardian's *Firestorm* which provided the glimpse towards the future of digital storytelling in the Internet. However, these digital stories are not something that non-programmers, storytellers, artistic and arts-based researchers or journalist can produce easily or quickly. These digital stories were initially developed by various teams of journalists, designers, photographers, filmmakers, and programmers to put the package together for several months to even half a.

But that's not always the case, our hands-on evaluation of various digital storytelling tools combined with the survey of user requirements proved that various readily available toolkits are already present in the market. These can be used to explore what can be accomplished without being a multimedia and/or coding expert, such as most of the participants in the workathon. Furthermore, the workathon served as a basis to further evaluate the impact and effectiveness of the various chosen digital storytelling toolkits.



Figure 5: The workathon, January 2014

Four groups participated in the workathon:

- 1. One group from Norway's main broadcasting company, NRK, headed by Bjarte Johannesen,
- 2. One group representing the main newspaper in the Trondheim area, Addressavisen led by Hilde Østmoe,
- 3. One group representing two other Norwegian newspapers, Sunnmørsposten and Trønderavisa, led by Liv Jorunn Håker Ottesen,
- 4. One group representing The Performativity group at the Faculty of Humanities (NTNU) with the arts-based research project *The Tower Block Post Mortem*, headed by Barbro Rønning.

Below are some of the participant's comments about the storytelling tools and references to their developed projects during the workathon:

When it comes to the tools, we decided on doing it the hard way – with javascript based on the jquery-library, together with some plug-ins. The tools presented looked ok, but in general we find these free and cloud-based tools a bit limited. We need tools and solutions that easily can use media from our internal databases/production systems. There are a lot of editorial issues when it comes to "moving" content to e.g. YouTube. Other issues are related to output, and the missing/limited possibility of freely using the output together with our internal CMSsystem/templates (e.g. without linking to another company website). There are no guarantees with javascript, and it is more work and time consuming doing it this way, but it's the preferable workflow.

- Bjarte Johannesen (NRK)

Figure 6: On the right is NRK's "Det brenner i Trøndelag" screenshots

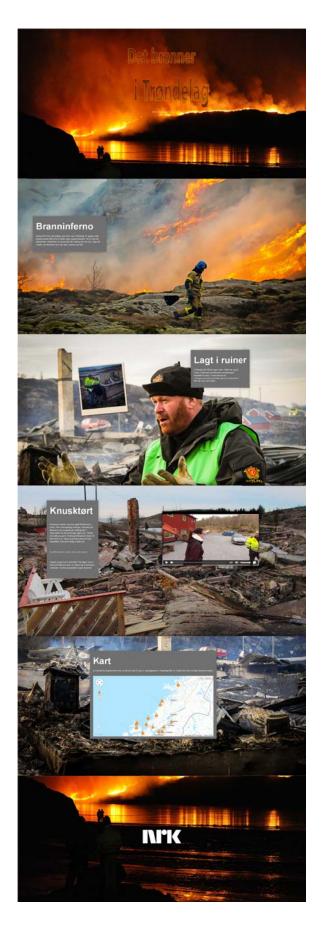






Figure 7: Four groups participated in the workathon

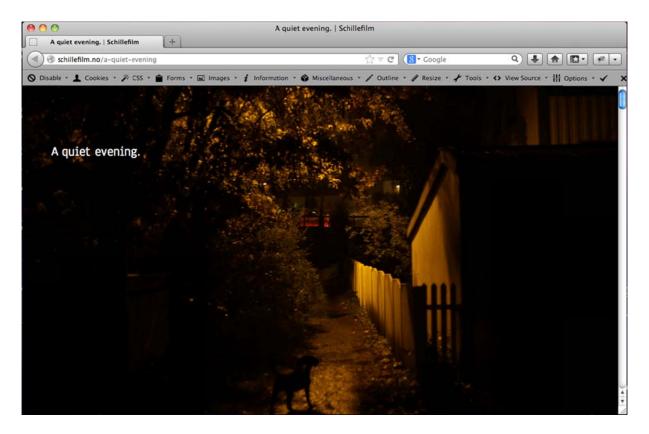


Figure 8: Andreas Schille's "A quiet evening" website

An inspiring and productive event where we could try out different tools suiting different purposes. For me I found Scrollkit an eye-opener and look forward to teaching my students in high school this intuitive and flexible way of creating web pages. In my project I wanted the photographies to stand out - as a mean to tell a story in combination with words.

_Andreas Schille - Kunstakademiet i Trondheim KIT, Trondheim Arts Academy, member of the The Performativity Group



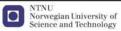
Figure 9: Sunnmørsposten's "Fjellmannen"

Scrollkit: not a perfect software, but definitely the coolest software we tried during the workathon. A bit hard to understand at first, but with a bit of help we managed to create something that looked ok... We tried it again at home after the workathon, and suddenly it fell much easier. We are going to present it in a workshop in the newsroom and we might use it further... The problem with...[free/commercial digital storytelling tool] is that it cannot be implemented in our CMS and we have to post it on an external server. Then we will lose links to the rest of our content and spots for commercials.

- Sunnmørsposten/Trønder-Avisa

The Seminar on DIGITAL STORYTELLING







The workathon was followed by the official seminar on DIGITAL STORYTELLING, at Gløshaugen 30th January 2014. During the seminar the outcomes of the workathon were shared with a mixed audience of university staff, media industry people, artists, researchers and students. The event also included a presentation of the process of the pilot project during the autumn term that reinforced the triple identity of the collaboration between the two NTNU faculties with the media industry. The fruitful collaboration across humanistic and technological disciplines at NTNU Norwegian University of Science and Technology with NxtMedia has resulted in new knowledge production for all parties that points towards future practices where the conventional isolation and division of education, research and innovation are blurred and the universities have increased agency and responsibility within society and as active agent in social development and entrepreneurship.

http://www.iet-multimedialabs.org/workathon2014/

EU Project Proposal

Our fifth objective was:

Prepare objectives to apply for a national and international funding for further financing.

We are currently preparing and seeking collaborations for our project proposal for the EU Horizon 2020. The call requires creative experience tools that use various bodily sensations to allow richer, more collaborative and interactive experiences that will enhance and contribute to the understanding of human creativity. The call seeks for creative tools that are cost effective, with special attention to users like SMEs, enthusiasts and creative individuals. The proposed project should be demonstrated in the real world environment for various entertainment, storytelling, or creative industries such as advertising, arts, broadcasting, design, fashion, films, journalism, music, video games, etc.

We believe that the efforts made in the current project are directly aligned to the requirements set in the Horizon 2020 call. With the pilot project the team has now solid prerequisite to embark on a bigger project together. The triangulation of technology, arts/humanities and industry represents in itself innovation in how to think and organize new knowledge production adequate and adapted to the needs of the 21st century. Details of the call were announced and can be found at:

http://ec.europa.eu/programmes/horizon2020/

http://ec.europa.eu/research/participants/portal/desktop/en/home.html

http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/

89-ict-18-2014.html (Deadline 23.04.14)

http://ec.europa.eu/research/participants/portal/doc/call/h2020/common/1587758-

<u>05i. ict wp 2014-2015 en.pdf</u> (ICT-19 deadline early 2015)

Potential Commercialisation

Our final objective was:

Assess the potential commercialization of the new digital storytelling tool.

We access the potential commercialisation of integrating various digital storytelling tools within various user contents such as meta-tagging of a recorded musical performance, user interaction and audio-visual content in a 3D environment, archiving of multimedia contents, and narrating the multimedia collection of an art installation and process documentary in Web 2.0 (see Section 3). Based on the evaluation of the developed prototypes and the inputs from the participants from the organised workathon event, it is clearly evident that commercialisation of an integrated digital storytelling tool or even a single tool may face several outstanding issues in its commercialisation:

- Development of a tool fit for a specific requirement is expensive and may take several months to years. The development of a digital storytelling tool customised for a specific requirement and functionality requires some multimedia and/or coding experts.
- Online authoring tools are the cheapest alternative to digital storytelling creation but they have privacy, security or ownership issues. Often, they lack functionality that professionally customised or programmed tools can accommodate. Here are some of the comments of the participants during the workathon:
 - "There are a lot of editorial issues when it comes to "moving" content to e.g. YouTube. Other issues are related to output, and the missing/limited possibility of freely using the output together with our internal CMS-system/templates (e.g. without linking to another company website)."
 - "We also made a very simple story in Popcorn maker, but that is removed due to privacy and ownership-issues."
 - "We find Popcorn easy to use, but the result is not very pretty. The main problem for us is anyway that it does not work on mobile units (tested with iphone 4s and ipad). That makes the tool not useable for a modern news site, so we will not use it."
 - "The problem with...[free/commercial digital storytelling tool] is that it cannot be implemented in our CMS and we have to post it on an external server. Then we will lose links to the rest of our content and spots for commercials."

Conclusion

The benefits of digital storytelling far outweigh the disadvantages. Technology advances in content creation allow non-experts to create interactive media.

We do not regard information technology as an isolated instrument or tool. On the contrary, we have seen and experienced that new information technology moves boundaries and patterns of thinking and doing in and as part of the world. The perspectives and consequences of a fast changing global society are complex and hardly transparent for one discipline alone. This is why we, like others in similar positions around the world, have challenged conventional academic and main stream thinking and invested in developing some common ground for meeting complex future knowledge production with sustainability and innovation as common goals.

The pilot project has uncovered the frustration and opportunities of inter-disciplinary work. We have been through an intense learning curve and realized the benefits that lie ahead. All indicators and trends point in this direction and we will pursue our current track and continue to develop the field through both individual efforts and further our strong collaboration.

It is our strong belief that a major project involving all the participations of the pilot would be of great benefit and would produce ground breaking results.

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EU Horizon2020, Objective 8.1, 'Technologies and Scientific Foundations in the field of creativity'- http://cordis.europa.eu/fp7/ict/creativity/creativity-objectives_en.html)

http://silencespeaks.org/

http://www.iet-multimedialabs.org/current-research/

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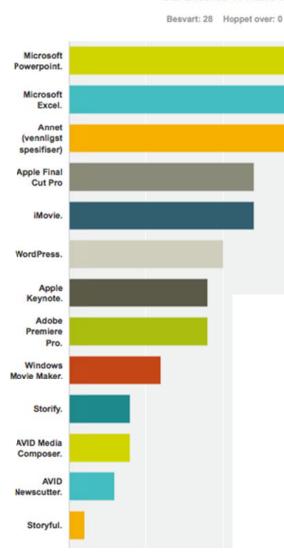
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Appendix 1 - Survey

This section shows the statistical charts generated by the Survey Monkey software. The Digital Storytelling Tools survey was conducted online with 28 Respondents

Har du benyttet digitale fortell så tilfelle hvilke?



Processing;

VDMX, Modul 8, Logic Pro, Pro Tools, m.m;

Google fusion tables, datawrapper, infogr.am, js timeline, crowdmap etc.; Enklere web-baserte verktøy for grafisk framstilling av data type Google Fusion Tables, Datawrapper, JS Timeline, infogr.am etc;

Pinacle

Adobe Edge Animate, Illustrator, Photoshop, InDesign, Thinglink, Crowdmap, JS Timeline. Adobe Illustrator, Adobe Photoshop,

Adobe Illustrator, Adobe Photoshop, Adobe Edge Animate, thinglink, crowdmap, JS Timeline etc.

Tumblr

Utviklet egne

Sosiale medier som facebook.

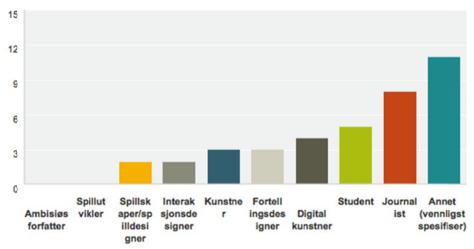
Diverse programvare for å lage tidslinjer og kart med tekst på web

Prezi

Andre CMS-systemer, Popcorn, Prezi, div Egenutviklede løsninger, Tumblr

Vennligst beskriv din bakgrunn eller faginteresse:

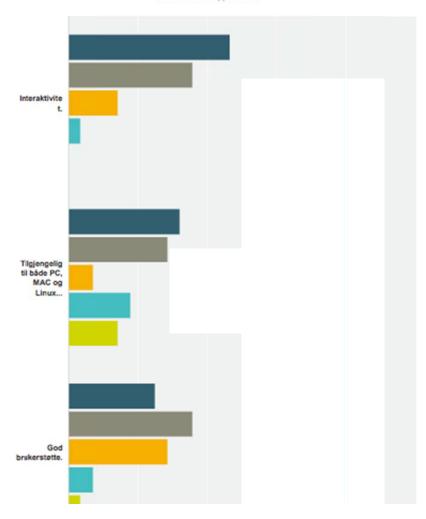
Besvart: 28 Hoppet over: 0



Multimedia Lab ansvarlig Prosjektdirektør Grafiker Kosulent/teknologiut vikler Webutvikler, Webdesigner Ingeniør Medielærer

Hvor viktig er disse ulike egenskapene til et digitalt fortellerverktøy for deg? Ranger dem på skalaen fra 1 til 5, desto høyere verdi desto viktigere.

Besvart: 28 Hoppet over: 0



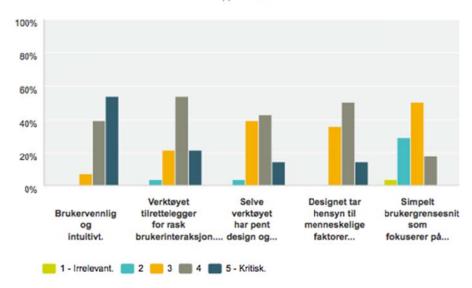
Hvor viktig er disse ulike egenskapene til et digitalt fortellerverktøy for deg? Ranger dem på skalaen fra 1 til 5, desto høyere verdi desto viktigere.

Besvart: 28 Hoppet over: 0

	1 - Irrelevant.	2 +	3 -	4 ~	5 - Kritisk.	Totalt
Interaktivitet.	0% 0	3,57% 1	14,29% 4	35,71% 10	46,43% 13	28
Tilgjengelig til både PC, MAC og Linux (Multiplattform).	14,29%	17,86% 5	7,14% 2	28,57% 8	32,14% 9	28
God brukerstøtte.	3,57% 1	7,14% 2	28,57% 8	35,71% 10	25% 7	28
Web-basert.	3,57% 1	10,71% 3	35,71% 10	39,29% 11	10,71% 3	28
Mulighet for å legge inn instrukser eller kode i verktøyet. Dette vil gi avanserte brukere mer kontroll.	7,14% 2	17,86% 5	25% 7	39,29% 11	10,71% 3	28
Grafikk og spesialeffekter som ser profesjonelle ut.	0% 0	25% 7	28,57% 8	35,71% 10	10,71% 3	28
Gratis.	14,29%	21,43% 6	28,57% 8	32,14% 9	3,57% 1	28
Åpen kildekode (Open Source).	10,71% 3	25% 7	32,14% 9	28,57% 8	3,57% 1	28
Ferdige stilarter og temaer. Dette er vanlig i Word og Powerpoint for eksempel.	7,14% 2	42,86% 12	21,43% 6	25% 7	3,57% 1	28
Ferdige fortellingsmaler for økt effektivitet.	0% 0	46,43% 13	32,14% 9	21,43% 6	0% 0	28

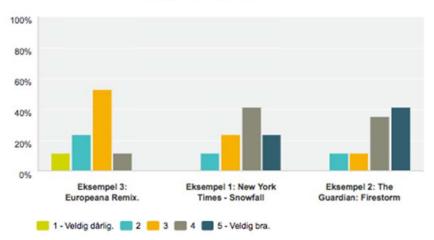
Hvor viktig er disse ulike egenskapene knyttet til brukergrensesnitt og design for deg? Ranger dem på skalaen fra 1 til 5, desto høyere verdi desto viktigere.

Besvart: 28 Hoppet over: 0



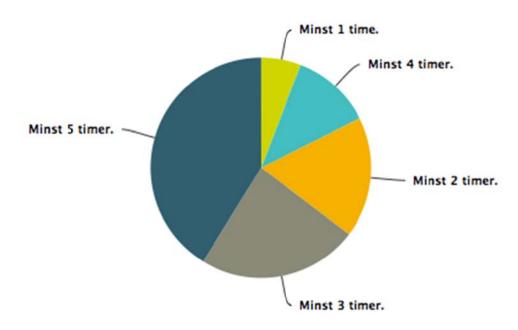
Hva synes du om eksemplene nedenfor? Her er det eksempler på noen digitale fortellinger som dere kan åpne i ny fane ved å trykke på bildet, for så å avgi svar om dem under her. Skalaen går fra 1 til 5, hvor 5 betyr at du likte den veldig godt og 1 betyr at du mislikte den. Eksempel 1: New York Times - Snowfall. Et eksempel på den første suksessfulle digitale fortellingen innenfor journalistikk. Eksempel 2: The Guardian: Firestorm. Denne fortellingen er om en Tasmansk skogbrann. Eksempel 3: Europeana Remix. Dette er en interaktiv digital fortelling med både video, bilder, og informasjon. Det er i tillegg mulig å legge til kommentarer og lese andres kommentarer underveis i presentasjonen.

Besvart: 17 Hoppet over: 11



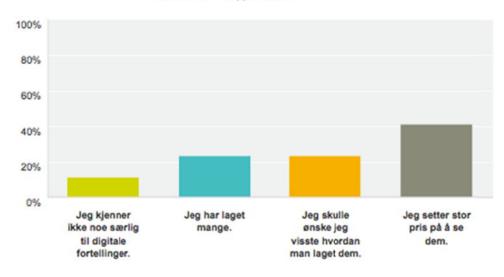
Hvor mye tid benytter du på Internett i gjennomsnitt per dag?

Besvart: 17 Hoppet over: 11



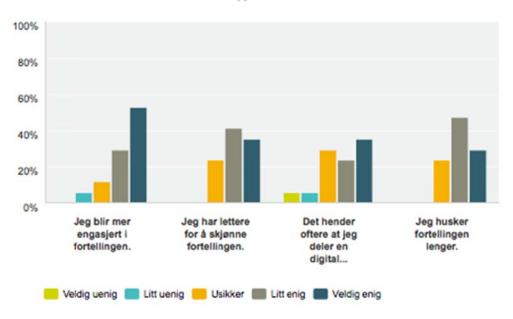
Hva beskriver ditt kjennskap til digitale fortellinger best?

Besvart: 17 Hoppet over: 11



Hvordan stemmer følgende utsagn om hvordan du opplever digitale fortellinger?

Besvart: 17 Hoppet over: 11



Hva koster det digitale fortellerverktøyet du benytter?

Besvart: 14 Hoppet over: 14

