Everyone is invited

How access to development tools influences innovation democracy and bridges the digital divide

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Abstract

Indie studios, which used to have a challenging time creating and releasing games, are on the rise. In the past, these studios have had a hard time getting their hands on useable tools. Indie developers at the time had to work with basic tools in order to create games less technologically advanced. This created a gap between triple-A and indie studios that, at the time, was widely disregarded. This stands as the lens for our study. We begin by conducting a prestudy that looks at the statistics behind games on steam. After this we form our interview questions and conducted both standardized open-ended interviews as well as surveys. The data collected suggest that there is a correlation between the availability of ease-of-use tools and content created. In our discussion we bring forth ideas about how this may help reduce the knowledge gap, and nurture the online innovation democracy.

Keywords: Innovation democracy, second level digital divide, indie games

1. A spark of innovation

In a digital age where an ever increasing amount of users and consumers gain access to Information and Communications Technologies (ICT), a need is growing. Digital escapism has become the new everyday pastime. We run through digital corridors, travel between voxel-based stars, and walk over distant pixelated landscapes. The tools to create these worlds have long been restricted to the larger, more established, studios. But with demand come supply, and the companies responsible for these development tools are starting to listen to the needs of the smaller studios. For a long time the development of these games have been dominated by multi-million dollar studios, so called AAA-studios or triple-A. But in the last few years we have seen a new trend rising within the digital game scene; a paradigm shift from triple-A to Independent (also known as Indie). These new Indie studios are mostly comprised of few but enthusiastic developers, frequently using the power of crowdfunding in order to support them in developing their creations. Often adhering to the old definition of Indie, these studios develop, create, and publish their titles in-house to ensure creative independence.

Larger companies with a long list of developed games often inherently have access to the tools required for their projects. To them the developmental landscape is an easy one to navigate. This stands in stark contrast to the landscapes that Indie developers have inhabited in the past, and to some degree still do. The limitations in access to development tools and graphical engines stood as an unsurpassable mountain to these smaller studios, often ending potential projects before they were even started. But the times are changing, and we are seeing a steady rise in indie developed games (Steamspy, 2016).

Human-Computer Interaction (HCI) is a field in which we strive to understand the user in order to properly design for their needs. The line between user and developer is becoming less distinct due to the changes in the online innovation democracy, a user may
be both consumer and developer. This democracy is important to HCI, as it defines this user-developer field and the limitations that currently surround them. As such, our hope is that this study will provide an understanding of the changing context that the users are experiencing, as well as the change in the online innovation democracy that follows. With these aspects in mind, our research questions are:

- How is the current paradigm shift in game development affecting the online innovation democracy?
- How is this paradigm shift changing the access to developmental technology?
- How does this change in access to developmental technology affect the users?

### 1.1 Game distribution platforms

Next to this game development shift, digital game distribution platforms such as Steam are changing. Some of these platforms are taking a step away from only hosting games, aiming to include software tools such as CryEngine and Blender as well. Steam is the platform that we have decided to focus on. The reason for this is that the platform itself stands at the forefront of the indie development scene. It has become a paragon for the smaller studios, offering crowd-publishing as well as support for those that need it.

### 1.2 Terminology

In this section we will aim to determine the vaguely defined terms used in this study. As these terms often originate among the grassroots of society, there are as many interpretations of these terms as there are gamers and developers. Everyone has their own way of describing what they do, and the tools they use. In the following you can find the list of terms used in the text along with their definitions.

#### 1.2.1 Modder

A modder is someone who creates and modifies content to already existing software, to games in particular. This is mainly done using existing tools that have been made available by the developers of the product, for example level editors that can be used to create new maps with custom objectives. There are also a large amount of modders that use the same tools as the developers, just to a lesser degree. What we mean by this is that modders use these tools, not to develop, but to modify the already existing artifacts created by the developers.

#### 1.2.2 Indie

Indie as a term comes from the word Independent, usually carrying the meaning that the entity is separated from the mainstream corporate stakeholders, although exceptions do exist in other media such as music and cinema. As such, the common definition of indie is that they lack the economical backing that non-indie do, which lets them wield greater creative control due to the lack of high-profile stakeholders looking to influence the results
for profitability reasons. This lack of economic safety means they have little to no way of paying salary, resulting in very small teams.

Because the term Indie lacks a truly solid definition, we decided to frame our definition of Indie as a studio with few developers that lacks outside economic influence in the form of a publisher or investor. This is the definition we will use in this study.

1.2.3 Tools
Throughout this thesis we will be talking about development tools. In the context of this thesis, we are including everything from game development tools such as RPG-Maker to 3D Animation and rendering programs such as Blender. Any tool that is used in the creation of indie games or is otherwise relevant to game development falls under this definition.

2. Related Research
In this section we will present the research that has already been conducted in the areas that are relevant to our study, namely the Digital Divide (DD), Innovation Democracy (ID), and Game studies. The research starts at the wide end of the spectrum with an overview of how the digital divide and second level digital divide (SLDD) affects the users through differences in access to Information Communication Technology (ICT) and the associated knowledge. This is then narrowed down to how the digital divide and second level digital divide relate to the innovation democracy, and to a greater focus on the users of ICT in regard to innovation democracy. Lastly, all of the above boils down to how the game industry is affected by these two major concepts, and in what way this has taken shape in actual tools and games released over time.

2.1 Digital divide
In our digital age we focus ever more on the construction and evolution of our digital networks. The rapid development of information and communication technologies (ICT) is granting us greater access to a wealth of information every day. However, a study conducted in the United States (US) shows us the negative sides of this rapid development. As most industrialized, developing countries get greater access to ICT, a divide is created between those who have access to ICT and those who do not. This access, or lack thereof, is impacting several aspects of human life. The lack of access to educational websites as well as networking possibilities can hinder the development of businesses, universities, and individuals (Sciadas & Charron, 2003). Even in places where ICT is made publicly available, through a telecentre or similar venue, factors such as poor network connectivity can render it next to useless (Tucker, 2004). Originally started as a study on a socioeconomic level, digital divide has now gathered a global interest. Sometimes referred to as the “Knowledge Divide”, it attempts to explain the differences in education and understanding in the use of ITC. The focus of this initial study was to look into the inequalities between individuals, households, businesses, and geographical areas and their access to ICT. However, research into this digital divide has in recent years been
expanded from only looking at the core access to ICT, to also include the surrounding user context. The recent addition of the so called “second-level” of the digital divide (SLDD) no longer focuses on the black and white between the have and have not of ICT, instead it is aimed towards the level of access provided.

As such, second level digital divide is focused towards how we use technology. This divide lies in what we access, create, and consume online. Where some may have access to development tools, others may not. In addition there are several other factors that may influence this divide. For instance, individual differences and social factors have a great impact on how we use ICT in our daily lives (Reinhart, Thomas & Toriskie, 2011). Everything from gender to social status influences how you use ICT, and what you can achieve online. There are many studies that report on second level digital divide as a serious issue, which ripples through not only the physical socio-economical world but the digital one as well.

In relation to the digital divide, Graham (2011) talks about a time before the computer, in the era of the telegraph, where a disconnect from the tools and informational content could cause social polarization amongst both groups and individuals. He states that “To be disconnected is to be both economically and socially absent from the information/knowledge revolution” (Graham, 2011, p.3). This “revolution” in information and knowledge is something that can be seen again in our modern day (Tucker, 2004). Going online gets us ever greater access to developmental tools and techniques. These nodes of information empower the users and give them the ability to develop, write, and produce higher quality digital artifacts in everything from game development to music production.

2.2 Innovation democracy

On a similar note, innovation democracy can be defined as the ability for users to innovate services and products for themselves, rather than depending on big corporations to innovate whatever the users feel they need or want. Additionally, the users do not always have to develop everything by themselves. They can draw upon the works of other users that has created and shared their innovations freely (Hippel, 2005). The changing climate for user driven innovation can even be seen in the way that users were previously defined. As Kanstrup and Christiansen (2006) put it, users have changed “[...] from “victims” needing support in the 1970s to “competent practitioners” in the 1980s, to “serious professionals” in the 1990s, to today’s valuable “source of inspiration”.” (Kanstrup & Christiansen, 2006, p.1).

Innovation democracy is further empowered by the rise of crowdfunding platforms such as Kickstarter. As Gerber & Hui (2013) puts it, crowdfunding allows individuals and small teams to fund their projects by the generosity and enthusiasm of others, giving new ideas and innovations a chance to succeed - ideas and innovations that might have remained unrealized without crowdfunding. Of the roughly 290 000 projects that has been approved for crowdfunding since the launch of Kickstarter, 36% of them have been successfully funded. In contrast, only 15% of projects never receive any funding at all (Kickstarter Stats, 2016).
2.3 Game studies

In addition to the changes in the innovation democracy and the SLDD, the game development landscape is also shifting. The game industry is often imagined as a market where large studios spend millions of dollars into creating technologically advanced experiences (Keogh, 2015). However, the landscape has shifted from being populated mainly by multi-million dollar triple-A published games, to the crowdfunded Indie developed titles taking an increasing share of the market. The latter has grown significantly in the last decade, with searches for Indie Games on google having increased eightfold in the last ten years.

Image 1: Comparison of Google search results for Indie game under the media genre during January 2006 and January 2016.

Indie games are often known as low-budget games, visually resembling the graphics of game generations long past. The studios that develop them usually work with tight economic restrictions, relying on in-house skill rather than outsourcing aspects of their projects, trying to remain independent of the influence of commercial sponsorship (Martin & Deuze, 2009).

While this independence from publishers aids their creative freedom, it often creates obstacles in the shape of budgeting. However, with the advance of crowdfunding platforms such as Kickstarter, the drawback of indie development turns around to be an advantage. Given the economic resources available to triple-A developers through publishers like Activision, they are not an attractive entity for individual gamers to donate money to. As such, the independent game developers have a greater potential to compete with already existing powerhouses in the game development industry (Lipkin, 2012).

Looking at the digital game distribution platform Steam, the growth of Indie titles can clearly be seen (see image 2). Going back ten years, to 2006, there were only 17 Indie titles on Steam. In contrast, currently in the second quarter of 2016, there are around 4800 Indie games on Steam. While a growth like this is to be expected when looking at such a large timeframe, most of the change happened in the last few years. From May 2015 to
May 2016 the Indie game market on Steam grew by over 200%, an increase from 2280 titles to over 4800. This means that in those twelve months alone the Indie market on Steam grew by more than double what it had done in the nine years prior. While Steam is not the only platform that markets games digitally, it is considered as one of the oldest and most widely used (Steamspy, 2016).

**Number of Indie games released per year**

![Graph of indie games released on Steam per year](image)

*Image 2: Number of indie games released on Steam per year, seen over a 12 year period*

Another aspect of the growth on Steam can be seen in the availability of tools. Over the years Steam has added more and more tools to the platform. These range from production suits for music, to 3D and 2D art programs. Seeing the large rise in indie titles in image 2, we found that a closer look into the tools released in that timespan was of interest to us.

Image 3 shows the timespan that had the most change in Steams lifetime. Starting in 2012 and ending in 2015, there was a rise in game development tools on Steam. These tools, as stated above, ranged from 3D design programs to game creation tools. When placed next to a graph showing the release of indie games during the same time span, a pattern can be seen. As the availability of tools rose, so did the amount of indie titles on Steam.
Image 3: Number of game development tools released per year on Steam between 2012 and 2015

Image 4: Number of indie games released on Steam per year between 2012 and 2015


2.4 Validation of study

There have been several studies conducted on the correlation between HCI and the digital divide (Kim, 2005), (Blythe & Monk 2005), (Tucker 2004). We feel that this study, focused on the second level of this divide, falls within the same category of HCI research. It is a critical look at how our designs shape the user-developer landscape. Alongside this there has also been research done into the place of democracy within design (Kanstrup & Christiansen, 2006). These two fields together form the backdrop for our study.

3. Method

In this section we will describe and motivate for our choice of methods, explain the data collection process of our study and the analysis methods used on that data set. In addition, we account for the identified shortcomings of our methods, and finally we dedicate a section on the ethical considerations that we adhered to. Patton (2002) states that the methods are an essential tool for reaching research goals. The way of framing such a goal is with our research question. We aimed to find out how the paradigm shift in indie game development is affecting the innovation democracy? How this is changing the access to developmental technology? And lastly how this all affects the users?

We wanted to make use of data triangulation in our study. This mixed method approach entails using several kinds of methods or data, sometimes even with a mix of qualitative and quantitative approaches. When using only one method studies are more vulnerable to any errors linked to that particular method than studies that are conducted with a multi-method approach (Patton, 2002). It is due to this that we decided to collect data from three different methods using observations, interviews, and surveys. Since the research question in part aims to understand how the paradigm shift impacts the users, we decided that qualitative data collection would suit us best. The reasoning behind this is the emphasis that qualitative research methods place on the interpretation of words and reality that people experience, rather than on statistics (Bryman, 2012).

3.1 Data collection

We conducted a prestudy in which we gathered data using observations. This data consisted of the number of games and tools released per year on the digital distribution platform Steam. We sought to find nuance in the data collection by interviewing people who had a rich history in creating mods for games, but also people with a background in developing entire games. This was accomplished by conducting interviews over skype calls, and through an online survey distributed on the social news network site Reddit. The skype interviews were conducted in a standardized open-ended fashion, and the survey also followed a qualitative approach by asking standardized open-ended questions that required free-text answers. Both the interview questions as well as the survey can be found in the appendix (appendix 1, interview) (appendix 2, survey). The only question that did not follow this format was whether they identified themselves as more of a game developer or a game modder. Depending on their answer, they would be forwarded to a new section where the questions were formulated differently to accommodate for how they identified
themselves. Other than that, the questions were identical. We had a total of four respondents in the skype interviews and 41 respondents on the survey.

3.1.1 Prestudy
We conducted a prestudy in order to factually conclude the magnitude of Triple-A games in comparison to Indie games, viewed over time (see image 2). The platform chosen for this study was the digital distribution platform Steam due to the fact that Steam houses both Triple-A and Indie games, and it is the largest of the digital distribution platforms ("Valve", 2016). We analyzed the Steam platform through the Steam-specific analysis site SteamSpy. This site utilizes the Steam API, allowing you to sort, label, and find the relevant data in a simple process. By counting the number of games with the indie label for each year since it added the indie label category, we could determine the actual increase in indie games over time. This process was then performed again for the label of Game development. This showed us a large increase in the tools labeled as game development on Steam over time.

3.1.2 Interviews
Interviews, and interviewing, are done to allow us access to another person’s perspective (Patton, 2002). It is due to this that interviews were so important for this study. We had a need to look at the previous experiences and thoughts of the indie developers we contacted. With this in mind, we conducted a standardized open-ended interview. These types of interviews require a carefully worded list of questions to be used (Patton, 2002). Our interviews were built as to ascertain indie developers and modders take on the current situation, as well as allowing us to get a glimpse into what the situation had been like previously.

The strength of interviews that we wanted to utilize was the ability of the respondent to freely talk about what they found to be the issues along with being able to ask follow ups, instead of just answering strict questions. Finally this mode of interview was chosen as it facilitates analysis by making responses easy to find, and easy to compare (Patton, 2002).

3.1.3 Survey
A survey was conducted as a part of our triangulation method. It was conducted as we wanted to have more data that we could use to strengthen the data collected from our interviews and observations. We found this to be the best way to handle the situation given the limited time we had to work with. The goal of a survey is to ask the same questions to the same respondents in the same context. Surveys are strong in dealing with questions like what, where, how and when. They deal with the facts behind actions and thoughts. This proved to be a good solution to our time constriction, since we received thirty-eight (38) responses in the first twenty-four (24) hours of posting it (Bell & Nilsson, 2000).

3.1.4 Sampling of respondents
The game developer respondents in our Skype interviews were selected by contacting the developers of games that were categorized as Indie on Steam and did not have a publisher.
The modding respondent of the Skype interview was contacted through the personal connection of one of the authors, and was selected due to that respondent’s extensive experience with modding games. The survey was posted on the online social network Reddit, in two of its subreddits specially designated for game developers and indie developers; GameDev and IndieDev respectively. In addition to this, it was posted on the forum of modding website ModDB.com.

3.1.5 Sample size
Our initial plan was to gather at least ten interview respondents. After having sent out two waves of emails to over fifty different indie development studios, we only received one reply. Qualitative inquiry typically focuses on in depth data collection on relatively small samples that are selected purposefully (Patton, 2002). We feel that the sampling of interview respondents were sufficient for the study in question, based upon the resulting data. The power of purposeful sampling, as Patton (2002) states, lies in the selection of information-rich cases for study. These cases are defined as those from which one can gather relevant and ample data about issues central to the purpose of inquiry (Patton, 2002). We find that this is true in our case as the respondents belonged to the relevant field of study.

After the interview was scheduled for the studio that replied, we were told that two more developers wanted to join in the study. Therefore, the three developers all belonged to the same indie studio (HyperBerryGames), and all three developers were interviewed in the same sitting. In total we managed to interview three indie developers and one modder. For transparency we want it to be known that the modder is an acquaintance of one of the researchers.

Our conducted survey gathered a larger sample size, a total of forty-one (41) respondents. After seventy-two (72) hours we closed the survey as we felt that we had gathered enough responses to warrant a start of the data analysis.

3.2 Data analysis
Our data was processed by transcribing the interviews and performing a thematic analysis on the entire data set from both the interviews and the surveys. The thematic analysis
method was chosen due to the need to condense (Bryman, 2012) the large amount of qualitative data from the 9 pages long interview transcripts and the 41 survey responses. This analysis identified recurring subjects that was later grouped into core themes that could be found in both the interviews and the surveys. These core themes included the respondents’ background, the definition of indie, the availability of tools over time, the availability of knowledge over time, increased exposure in present time, and what the future may hold.

3.3 Methodology criticism
Due to the geographical locations of our interview respondents, we decided that Skype interviews would be the most cost effective. Interviews over Skype are not preferable over face to face interviews due to the lack of ability to read the respondents body language, in case of discomfort over the questions asked (Bryman, 2012). However, arranging interviews with such a narrow group of respondents meant that we had to make some allowances. Bryman (2012) also noted that there are little to no differences in the type of responses when making phone interviews compared to face to face interviews. Since we considered the topic at hand, and the questions that were asked, as non-sensitive, body language was not a concern for our study.

Due to the anonymous nature of our online qualitative survey it is difficult to verify whether or not the respondents actually have the experience they claimed. While we acknowledge that this could have had an effect on the results, the majority of the data collected through the surveys correlated with the data gathered from the interviews. We also acknowledge that there is an inherent risk of untruthful and deceiving answers connected with anonymous online surveys; however, all of the responses were relevant to the questions asked. Additionally, our hope was that the required effort to complete the survey would be too large for someone simply looking to obstruct the study, save for those who actually wanted to help us with it.

3.4 Ethical considerations
Due to the strict research ethics put forward by the Swedish authority, Vetenskapsrådet (2002), we will place these considerations into four select parts. The demand of information, confidentiality, concurrence, and rights of usage.

The demand of information calls for the researcher to properly inform the participants that the data is collected for a scientific study. They need to understand the purpose of the collected data. The demand of concurrence states that any participant is there by their own volition, it is a form of volunteering that they can end at any time. Confidentiality and the rights of usage governs how the data may be used, and to whom it can be shown (Vetenskapsrådet, 2002).

With these considerations in mind we made sure that the first part of our interviews and qualitative surveys were dedicated to informing the participants about these ethical guidelines, and our adherence to them. We asked for permission before any recordings were made, and made sure that anyone who wanted to stay anonymous had the ability to do so. However, it should be noted that none of the respondents expressed a want to be
anonymous. It was also made clear that no data were to be used outside of the study, and this was adhered to as well.

4. Results

Our gathered data was put through a thematic analysis where we identified specific groupings and sub-themes. The groups are labeled Background, and Indie development. Background concerns the respondents experience with indie development or modding, and Indie development concerns the respondents’ feelings about indie development. We also defined sub-themes within the indie development group. These are; Definition, Availability of tools, Availability of knowledge, Exposure, and Going forward. These groups and themes helped us structure the data and find correlations between our transcribed interviews and surveys. This data, from both our interviews and surveys, were then formatted into the groupings and themes described above.

4.1 Background

The first thing that struck us when we started organizing the survey data was that the vast majority of the respondents had gotten into indie game development in the last ten years. Most of them started their indie careers in the latter part of 2000-2010. Another intriguing point was that very few of the respondents had any prior education within the field. Instead all but five respondents were completely self-taught. Aspects like programming and concept art were learnt from online resources such as YouTube tutorials and design forums. While half of the respondents had computer experience in the form of a degree in computer science, almost as many had no prior experience within the game development field whatsoever.

I didn’t start as a programmer, I started as an illustrator as well, just as Ricardo. But I spent a couple of years learning how to code video games and I really got to like it a lot, and eventually for this project I basically manage most of the programming needs. - Respondent 1 (HyperBerryGames)

For many of our respondents programming is seen as a big issue however. In order to create most of the new, interesting, and beautifully crafted games, programming knowledge is needed. The programming aspect of modding used to be more pervasive in the past than it is today, signifying that newer versions of modding tools have been refined to require less programming knowledge in order to learn how to create new assets for a game.

4.2 Indie Development

Indie development stands at the core of what we are using as our lens, that is, we are using indie game development as a lens through which we look at ID and SLDD. Because of how the game development industry has changed in the last years, they are at the forefront of the paradigm shift that we are studying.
4.2.1 Definition
The definition of indie games and developers is an interesting one. While all of our respondents agreed that a small team with a small budget was the core definition, many additional nuances appeared in our data. One respondent felt that in order to be truly indie, the developers would have to stand outside the influence of any other company or person. If they were to be swayed, impacted, or funded by anyone, their indie status would be gone. Another key aspect is publishing. If the developers hire someone else to publish it, many of our respondents would deem them as non-indie. To these respondents, outsourcing the publishing to another company is the same as receiving funding, and that they cannot be certain that restrictions have not been placed upon the developers as a result.

4.2.2 Availability of tools
When asked about the tools used to develop their games, almost all of the respondents spoke of the difficulty of game development in the past. One of the hardest things in indie game development ten years ago was finding the proper tools for what was required. The tools were expensive and exclusive to the larger studios. There were game and graphics engines that companies did not want to sell to smaller studios. Instead their licenses were sold to the potentially more lucrative triple-A-studios. Indie developers at the time had to work with very basic tools in order to create games far less technologically advanced. This created a large gap between triple-A and indie studios that, at the time, was widely disregarded.

The good thing about the recent changes is that we have actually lived the change in the industry where the big companies weren’t interested in helping indie developers developing their things until they start realizing that “wow indie developers do have a lot to offer, we might as well give them the tools, and we can sort of find out an arrangement to get a profit out of that”. - Respondent 1 (HyperBerryGames)

One of the respondents said that even though those were hard times, the products created were generally better. This was due to a much higher barrier of entry into the market. A small studio could not hastily throw something together and hope for someone to crowdfund it through Kickstarter.

In the present day much has changed. The respondents talk about how engines are easier to procure now. Engines like Unity and Unreal 4 changing their business model to accommodate smaller studios has made a huge difference. The smaller studios can now pay for the engine license if a game sells instead of doing it right away, hoping to earn enough to cover the costs that they have already footed. There are a lot more open source and free tools available now. One of the respondents describe how certain tools are free until the game you have created has made a certain amount of money, at which point they start charging a percent of the income.

More than just the business models have changed however. In the latest iteration of the Unreal engine they have made changes to make it easier for beginners to create games.
Instead of using the old system of coding everything, the core development has been changed to simpler a drag and drop function. One of the modder respondents speaks of this as a step closer to letting everyone create the things they want. Overall the vast majority of the respondents agree that tools are now an easy thing to acquire, having drastically increased in availability in the last few years.

*I think we are living in a sort of golden era of games dev already. I am proof an interested individual can start knowing very little.. and very quickly gain the knowledge and reap rewards once limited to those with traditional education who started at the bottom in standard industry jobs in exchange for mentorship.* - Survey respondent

Relating to the access to development tools one of the respondents also say that he/she thinks that games are moving towards the same place that music is in today. A place where it is easy to create things, but the sheer oceans of user created content mean that few people will make a living off directly selling their creations. Platforms like Steam are important for these developers to succeed.

### 4.2.3 Availability of knowledge

When looking back at tools and documentation as they were ten years ago, the respondents had much to say. Tools at the time were not easy to understand and get into. One respondent talks about how tools at the time assumed that you already knew what you were doing, that they were not designed to be beginner friendly. Instead of reading the often very limited documentation that came with the tools, developers and modders started communities to share information freely. Out of this came new ideas and innovations.

*Information was limited. If I had a problem I would have to really dig through the internet to find it, and maybe then it wasn't even solved. But today with how many people that is doing these things, the chance that someone else has had the same problem, and solved it, is rather large. And that is what makes it easy now, before it was more “this doesn’t work, I’ll have to find another way”. - Respondent 2 (Modder) translated from Swedish by authors*

In today’s information society the respondents find that the access to tutorials and documentation is much greater. According to them many tools are now designed for beginners in mind. As written above; the tools are now created to frequently not require programming, instead focusing on being able to be picked up and used by anyone. When asked what the biggest issue with today’s indie game development is, the majority of the respondents answered that it was marketing, developing, and time management. None of our 41 respondents found access to knowledge to be of any concern today.
4.2.4 Exposure
Exposure is a core aspect of indie development. Our respondents’ talk of systems such as Steam’s Greenlight that help new developers get into the gaming market. Steam Greenlight is a subsection of Steam that lets users market their game to the collective community of the platform. The users can then vote for games that they would like Steam to “greenlight” for publishing in their library of games. Respondent 1 of HyperBerryGames states that if it was not for Greenlight, their game would never have been known. The power of what gets sold and what does not is in the hands of the users and developers themselves, not the big studios and their backers.

4.2.5 Going forward
When asked what they thought of the future of indie development, the respondents wished for an even lower entry level for software in order to make the tools even more inclusive. Two of the respondents wished for the continued development of workshops such as Steam’s, where users can upload their creations to already published games. One of the respondents even went so far as to predict that the market will continue to saturate itself, as more and more users get into indie development.

5. Discussion
As we have seen in the data collected, there is a greater availability of tools and knowledge now compared to a decade ago. Both of our observations and interviews reveal a rise in the indie game development scene. These findings were then matched with responses from our 41 survey respondents. With this as the outline, we started looking at the aspects that are the catalysts of this boom in indie development.

When comparing our results with the increase in indie games released on Steam, a clear picture emerges. More and more users have turned into user-developers due to the entry level barrier being much lower than it has previously been. We feel that this lets the users experience and express a greater variety of innovation. Lowering the barrier for entry in game design means more people can feel invited to make their own creations come to life. We feel that this really highlights the importance of tools that are specifically aimed for the beginners within game design, not only on a purely technical level, but also on a marketing and publishing level. As crowdfunding in the forms of Kickstarter and publishing possibilities in the form of Steam’s Greenlight system prove, other users can be a significant help in shaping the future of the industry through approving and funding indie projects.

Looking at our data we can really start to see correlation between availability of tools and a rise in the innovation democracy. Supported by our prestudy findings, we can clearly see that more indie games are being released today than any year prior. Not only this, but we can see that the availability of tools, something that our respondents pointed out to be a big issue previously, is growing alongside it. For these developers it is no longer a matter of gaining access to exclusive tools and hard-to-manage software, instead their focus is placed on the exposure and publishing of their creations.
As such, the freedom to create has been given to a larger part of the game development field, which in our eyes signifies a rise in the innovation democracy. We argue that as the level of innovation democracy is rising, there is a lessening of the SLDD. With the inclusion of more and smaller studios, the divide has less of an impact on the game development side of the gaming industry.

We fully acknowledge that this lessening of the SLDD is limited to the type of development we are looking at, and should not be seen as a general lessening of the entire SLDD. Never the less, it is an important change with solutions that could possibly be replicated in other fields where the SLDD is still strong. In cases such as prosthetic limb replacements, they are often controlled by an official institution that produces high quality prosthetics that often are both time consuming to produce and expensive material-wise. The receiver of the prosthetic needs to get an appointment at a specific location to have measurements taken by an expert, and once created, there is little room for creating multiple prosthetics with specialized functionalities or different looks. If this process were to be democratized in a similar manner, the prosthetics could be created using 3D software and printed with a 3D printer, and the finished creation uploaded to be shared and modified with other people. This would shift the users from passive consumers to active produsers (Bruns, 2007). The responsibility to host 3D printers for common use could be a new venue for local companies, shifting the need for knowledge and design to the users who desired custom prosthetics. All of the knowledge and the tools required would be available, the only aspect required by the produser would be time put into learning the software, and the means to access a 3D printer.

6. Conclusion

We have studied how the current paradigm shift in game development affects the innovation democracy, the users, and the availability of tools. We feel that we have provided enough data to claim these as answered. Even though our findings did not bring us in the direction we thought, it has still lead us to a conclusion.

In this study we have looked at how the second level digital divide is being bridged by the creation of easy-to-use and easy-to-access tools. How the innovation democracy is furthered by this change, and how users are affected by both of these changes. In our study we found that as the access of easy to use tools grow, so does the amount of content created. When looking at how indie games have grown in the last few years, in contrast with how tools have become available, this fact becomes apparent. Our respondents speak of a development scene that is driven by more than just monetary gain. It is a place where passion can be made manifest, by anyone who wills it.

When we started looking into this study, we thought that the paradigm shift in game development was affecting the online innovation democracy. But we have come to realize that it is not that easy. SLDD is focused on how some people have access to development tools and resources while others do not, and how this affects and divides us as users and developers. But as we have seen, the creation of easier to use tools has lessened this divide. The tools themselves are the catalysts of this paradigm shift, both in game development,
and the innovation democracy. As the innovation democracy is strengthened, the SLDD is lessened.

While there still are other things that keep the SLDD a very real issue, we find that there is little we can do within HCI to change them. Things like internet access, social situation, or geographical location are things that we hold no sway over. But we feel that as designers we need to think about these things; what our designs can mean to people, and what changes they can bring forth.

7. Future research

For future research we primarily recommend that this phenomenon should be looked at from a broader perspective. What we mean by this is that there are more fields affected by this change in tools, everything from music production to illustration and art. The change in the innovation democracy affects all form of digital development and production, and the effects this has should be looked further into.

Secondly we would like to see research done into how this can benefit triple-A studios. If this user-developer change as well as the rise in smaller studios can become something beneficial, then perhaps these large companies will try to find ways to help. This may in turn further the decline in the second level digital divide.

Thirdly we suggest a study into how HCI-design in general can help reduce the SLDD perhaps by looking at how to design tools that are usable by everyone.
Special thanks

We would like to express our heartfelt gratitude to our supervisor Fatemeh Moradi, who provided us with so much enthusiasm and energy during our study.
8. References


Interview questions

- Could you tell us a bit about yourself?
- What is your background in Game Development/Modding?
- Do you remember what the first thing you created was?
- For how long have you been creating content? Either games, or modding games?
- How did you learn how to create things? Did someone show you, or did you read about it somewhere? Did the tools give you any help/instructions?
- Did you have any other experience beforehand that helped you get started? (programming knowledge, etc)
- Has the availability of developmental tools changed?
- What would you say is the greatest challenge with game development at the moment?
- What would you say was the greatest challenge with game development when you started?
- What do you hope will change within the industry in the coming years?
Appendix 2: Survey questions

How old are you?

What do you primarily identify yourself as?
  - A game developer
  - A modder

(Game developer questions)

- When did you start creating game related content? E.g games, mods, maps.
- How did you learn how to create that content?
- Did you have any previous experience that helped you getting started with this? E.g programming knowledge, school studies, etc.
- What would you say was the greatest challenge with game development when you started?
- What would you say is the greatest challenge with game development at the moment?
- In your experience, has the availability of development tools changed from when you started? Why/why not?
- What do you hope will change within the game development industry in the coming years?
- How would you define what makes a game “indie” developed?
- Do you have any additional thoughts about the questions we have asked or the subject matter in general?

(Modder questions)

- When did you start creating game related content? E.g games, mods, maps.
- How did you learn how to create that content?
- Did you have any previous experience that helped you getting started with this? E.g programming knowledge, school studies, etc.
- What would you say was the greatest challenge with game modding when you started?
- What would you say is the greatest challenge with game modding at the moment?
- In your experience, has the availability of development tools changed from when you started? Why/why not?
- What do you hope will change within the field of game modding in the coming years?
- How would you define what makes a game “indie” developed?
- Do you have any additional thoughts about the questions we have asked or the subject matter in general?