

Swedish Game Education: 2001-2016

An overview of the past and present of
Swedish, academic, game-related
educations



A report from the 'EU Interreg Öresund-Kattegat-Skagerrak' funded project *GameHub Scandinavia*.



Game Hub
Scandinavia

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Preface

This report is written as a part of the EU Interreg Öresund-Kattegat-Skagerrak funded project *GameHub Scandinavia*. The aim of the project is to provide resources and services to developers, educators, researchers, and supporting actors that are involved in the Scandinavian game industry.

The report is intended to be a continuation of a series of reports written at the University of Skövde regarding the state of Swedish game educations. The inaugural report, *Spelutbildarindex 2011*, provided the first inventory of Swedish game educations on the tertiary level, and intended to discuss their rapid rate of expansion and the ways in which universities and vocational schools accommodated for changing demands in the industry. A second report, *Game Development, Education & Incubation*, delved deeper into incubation and industry, and provided a larger, but rather brief, overview of game educations in Denmark and Norway as a supplement to the Swedish statistics.

This report, which once again is back to only covering Swedish game educations, is a smaller part of a larger on-going inventory process. The end-goal of our work in 2016 is to produce an overview that takes the entirety of Fenno-Scandinavia into account. This region has continued to make its mark on the international game development scene, and thus it is our ambition to map out the institutions and processes that help supply these small, but efficient and innovative, industries with new talent.

Important to note while reading this report, is that there are some differences in the numbers presented here and the ones presented in earlier reports. This is partly due to minor changes being made in the method through which the programmes were filtered. In the earlier inventory, conducted for the *Spelutbildarindex 2011* report, the filtration process was slightly different than the one employed for this report. This has led to an increase in some numbers, and a decrease in others (e.g. some programmes included in the previous study are not included in this one). Another factor is changes in the available statistics – during 2012/2013, the previous organization that hosted the statistics for Swedish university applications and enrolment was shut down and replaced with a new institution which presents the statistics in a different format. Regardless of the compatibility with previous reports, the report aims to provide as accurate an overview as possible of the current state of Swedish game educations with the means available.

Retrospective

Between 2001 and 2011, game development focused courses and programmes at the tertiary level had rapidly grown from being nearly non-existent, to being a common occurrence in many Swedish universities. In the first report in this series, we reported that Swedish game education programmes had progressed from being a rarity with 2 programmes being provided by two universities, to being a regular feature in universities where 37 programmes were hosted at 17 different universities. On top of the increase in academic interest in game education, four vocational training programmes (*FutureGames Academy*, *Nackademin*, *The Game Assembly*, and *PlaygroundSquad*) were also launched during the same time period.

In the latest instalment of the Swedish Games Industry's *Game Developer Index* report series, it was noted that one of the primary challenges the Swedish gaming industry is currently facing is the access to competent workers during times of industry growth. This issue was prevalent five years ago when the first game education index was published as well, which was cause for some concern; even though game educations were rapidly proliferating, the industry still saw the access to employees as a significant bottleneck for their continued growth. However, during most of the '00s, the enrolment of students and issued degrees in game-related programmes often outnumbered the growth of the industry's work force. This dissonance led to the question: is the rapid expansion of game education programmes accommodating for industry demands, or are 'games' primarily adopted into university curricula as a way of keeping up with current trends and attracting more students?

Around 2011-2012, several game education programmes and institutions were criticized by both students and industry actors for not measuring up to their requirements and expectations. One of the main highlighted issues were that many programmes had employed a 'game'-prefix or suffix to their names, or had 'game development' heavily featured in the marketing of their programmes, without significantly revising their curriculum to actually correspond to the competencies that are important in game development. It is, however, important to take the context of these changes into account. In the mid-to-late '00s, the craft of game development and game studies had just barely started being codified into its own field of expertise – the general consensus regarding the craft of game development was, in essence, that it was largely synonymous with general software or media production. Since then, the nuances that make game development unique have started becoming better understood, and the programmes that intend to prepare students for work within the industry are becoming increasingly refined.

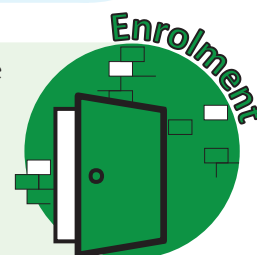
In our interpretation of the numbers produced for this report, Swedish game educations have transitioned from being in a state of rapid expansion to a more steady rhythm that has more space for internal reform and quality assurance. For example, the amount of graduates from game educations dwarfed the increase of employees in the industry by a factor of roughly 3:1 during the period of 2007-2011. These severe discrepancies, among many other inconsistencies between academia and industry, have either been alleviated or eliminated entirely.

Executive Summary



Applicants to university programmes started to plateau after 2013, during which a total of 3099 1st hand applications were made to game-related programmes. In 2015, the number of 1st hand applications decreased to 3015. As a comparison, 1st hand applicant numbers increased by an average of 244 per year between 2002 and 2012 (with a peak increase of 551 in 2010).

The **enrolment** to university programmes is still increasing, but at a slower rate than the pre-2013 period, with 1393 students being enrolled in 2013, and 1505 being enrolled in 2015. This constitutes an 8.0% increase, which is considerably smaller than, for instance, the 47.2% increase during the more intensive growth period of 2010-2012.



The decrease in enrolment is much due to the declining rate in which new **programmes** is being established. After a peak of 41 programmes in 2012, the total amount of programmes have slowly decreased to 35 in 2016. As a comparison, the amount of programmes between 2001 and 2007 steadily grew from 3 to 26, and in 2008 to 2011 they continued to grow, albeit at a slower rate, from 29 to 35.

When looking at total enrolments of the outspokenly game-related programmes (i.e. programmes where games are more heavily featured as the focal point of the programme) from 2011 to 2015, 44% of students were enrolled in programming, 22% to graphics, 19% to design, 10% to audio, and 5% to other disciplines of game development expertise (e.g. writing or game research programmes).



When it comes to **gender distribution**, game educations are on par with the overall games industry, as only 18.7% of students being enrolled in game-related programmes in 2015 were female. While this number in itself is rather low, it still constitutes an increase of 6.9 percentage points (or a 58.4% improvement) from 2011 where only 11.8% of the students enrolled were female.

Statistics Overview

This report will essentially describe Swedish game education as a tale of two different eras; the pre-2013 proliferation era, and the post-2013 plateau era. Previously produced reports on the topics were written during a period where game educations were rapidly proliferating, and when the games industry was in a more volatile state than it is currently. The state of both academia and industry differs immensely between this millennium's two inaugural decades. Throughout the '00s, game educations grew at a rate that seemed to favour accommodation for student interests rather than processes of quality assurance, deliberation, and programme improvement. In the '10s, the amount of programmes have stopped increasing, and most of the statistics regarding student numbers have plateaued, and are in some cases even decreasing. The recent decrease in first-hand student application numbers, for example, constitute the first decrease in applications since 2005 (when the total amount of first-hand applications, very modestly, decreased by 3).

Game education in the '10s

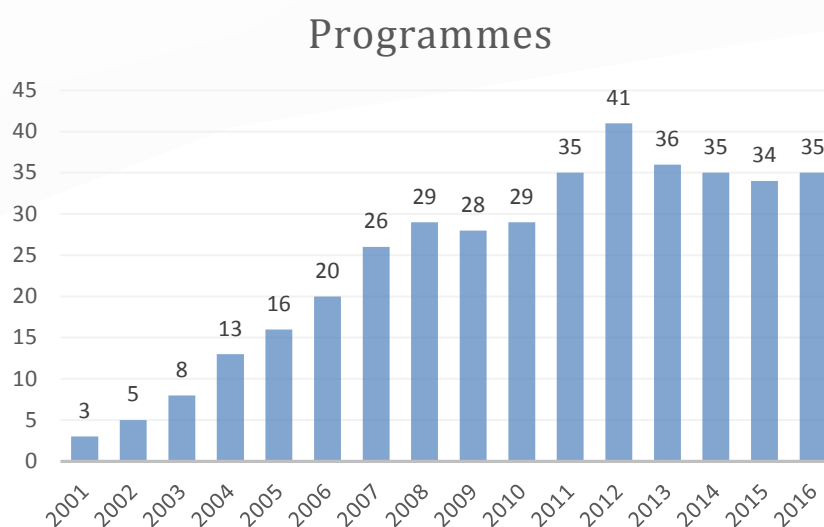
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| No. of programmes | 29 | 35 | 41 | 36 | 35 | 34 |
| 1st hand applicants | 2126 | 2501 | 2771 | 3099 | 3123 | 3042 |
| Enrolled students | 961 | 1304 | 1379 | 1393 | 1433 | 1505 |
| Female students | 125 (13.0%) | 155 (11.9%) | 210 (15.3%) | 249 (18.0%) | 226 (15.9%) | 280 (18.7%) |

Game Educations, 2001-2016

The amount of programmes that labelled themselves as being games-related (either directly in their programme title, or in their marketing and curriculum) grew steadily from 2001-2012, with the most rapid expansion taking place before 2008. The increase in available programmes peaked in 2012 when 41 game-related programmes were actively enrolling students, but it has since started slowly decreasing and in 2016, 35 game-related programmes were accepting student applications (this number can decrease slightly, as programmes with few applicants may close or merge with other programmes).

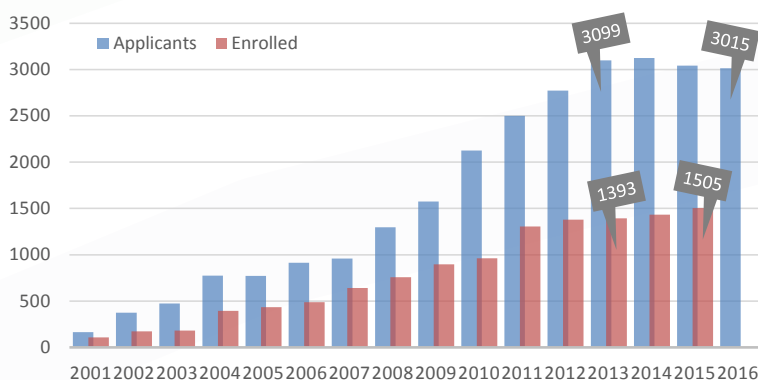
As the amount of available programmes grew, so of course did the amount of applications and enrolled students. In 2010, the amount of annual first-hand applicants to game-related programmes had reached ~2100, and annual enrolment were at ~950 students. This was the result of an

average increase of 215 applications per year, and of 92 enrolled students per year, throughout the '00s. From 2011 onward, the average yearly increase in first-hand applications have slowed down to 150 per year, but the average number of annually enrolled students has increased to the 103 students per year.



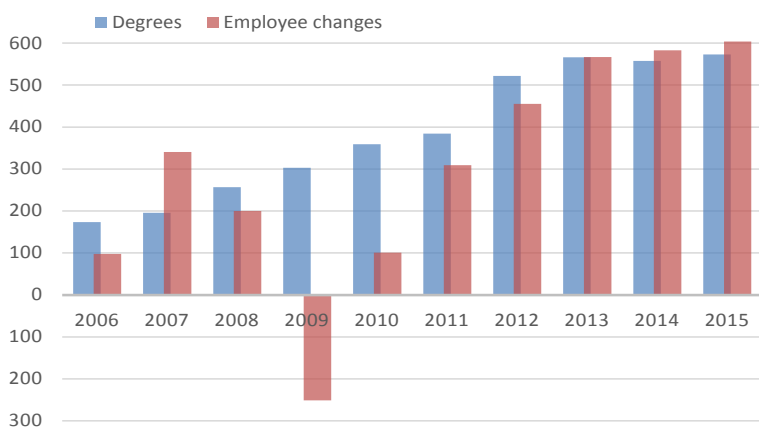
However, if we treat the numbers from 2013-2016 separately, a slightly different image emerges. As previously stated, almost all statistics associated with game-related educations has plateaued since 2013; as the amount of available programmes have stopped increasing, so have the amount of first-hand applications. While the number of enrolled students per year is still increasing, it does so at a very slow rate, with 72 more students being enrolled in 2015 than 2014 – a much smaller increase than we saw between most years in the pre-2013 growth period. It should also be noted that the number of applicants and enrolment likely suffers from changes in birth rates in Sweden during the mid-to-late '90s. The size of the population that is now likely to start applying to university programmes is smaller than it has been in many decades, and the years leading up to 1998 (i.e. the age cohorts that are likely to currently be applying to universities) in particular has seen rapidly declining birth rates*.

It is important to point out that sudden increases or decreases in the amounts of available programmes (e.g. the spike in 2012) do not always necessarily mean that a large amount of brand new programmes were opened or that old programmes were altogether terminated, or that the state of game educations have been in rapid decline in recent years. In some cases, a singular programme may have been divided into several separate slightly smaller programmes to increase programme specificity or to make room for more students. In other cases, several smaller programmes might be merged together into one larger programme. These types of mergers and divisions can thus change the amounts of available programmes negatively or positively during different years, but it might not significantly impact student application or enrolment numbers. Programmes being merged together, rather than being terminated altogether, accounts for the disproportional decrease in programme numbers and relative stability of student application and increased enrolment since 2013.



Academia & Industry

In previous years there have been concerns regarding whether game educations are granting degrees at a higher rate than the industry's growth and employment rate can accommodate for. Leading up to 2011, this concern was rooted in the average enrolment of students and the amount of granted degrees (when adjusted for an assumed 3-year study period) severely surpassing the industry's predicted growth. When also including vocational training schools, the difference between Sweden's total student output and the industry's growth was even higher. A big factor contributing to this discrepancy was the turbulent state of the industry – the closure of big studios and the uncertain economic climate made changes in employee numbers fluctuate wildly between 2006 and 2011 especially, making predictions of industry growth difficult.

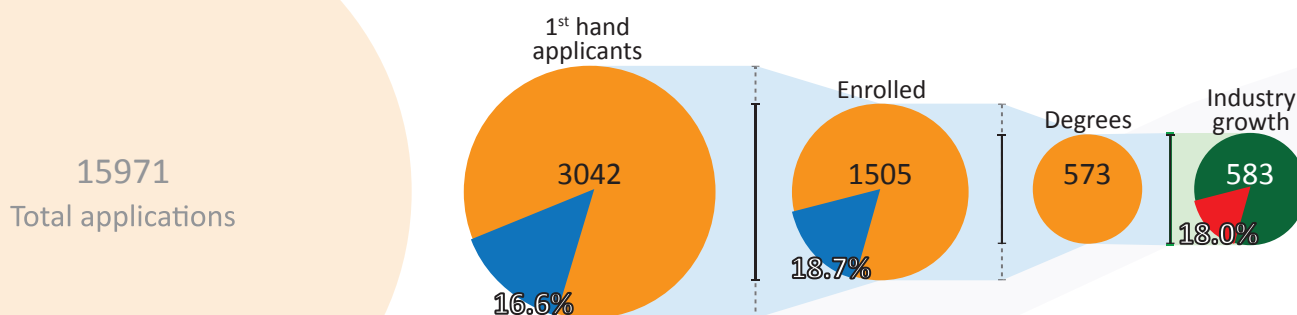


However, since the amount of applicants, enrolled students, and granted degrees has plateaued since 2013**, and as the industry has been growing at a steady and unhindered rate, the numeric relationships between academia and industry is changing. The amount of degrees being issued by academic institutions (i.e. not including vocational schools) has consistently been lower than the increase of industry employees ever since 2013.

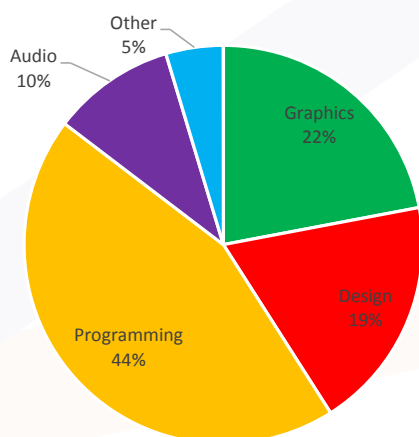
* According to The National Board of Health and Welfare (Socialstyrelsen), ~84,000 births were registered in 1998 (the lowest number recorded in their database, which reaches back to 1973). For comparison, ~120,000 births were registered in 1990. Ever since the 1998 dip, however, annual birth rates have been steadily increasing.

** With an assumed 40% student throughput – refer to the 'Methodological Considerations' section for more details.

As a result of these changes, the pipeline from education to employment is vastly different than it has been in previous years. As an example, the below diagram shows how the numbers of applicants, first-hand applicants, enrolled students, and issued degrees coincided with the industry's employment numbers in 2015. Given the current growth of the industry, and the relative stasis of education programmes, future years might see an increasing discrepancy between issued degrees and industry growth.



When it comes to the distribution of students between disciplines, the most notable change has been in the increase of design programmes. In the previously conducted study, 40% of students were found to be studying programming, 35% studied graphics, 12% studied audio, and 13% studied design.



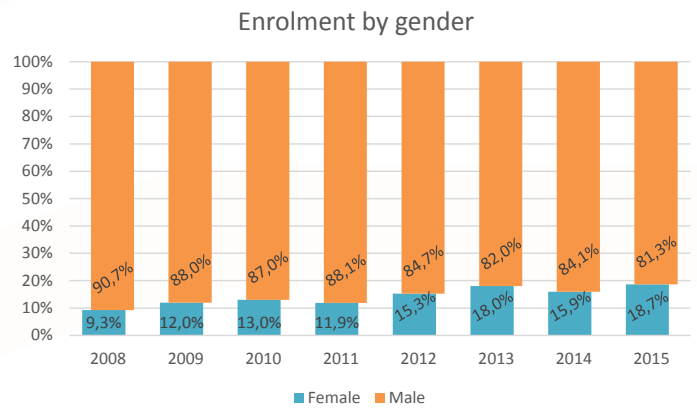
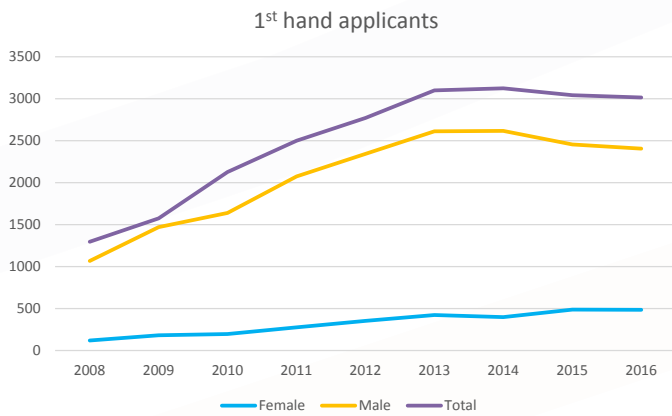
When collating enrolment numbers from the years since (i.e. combining enrolment numbers from 2012-2015), the situation looks quite different, with 44% of students being enrolled in programming, 22% in graphics, 19% in design, 10% in audio, and 5% in programmes that don't fit as neatly into either these categorizations (such as games research or game writing programmes).

Design programmes have seen the most growth in recent years, as the amount of students enrolled in

design programs increased from roughly ~130 students in 2011 to ~230 students in 2015. Graphics have also grown in popularity, although relative less so than design, increasing from ~190 to ~250 student in the same time period. Programming have been comparatively stable, remaining on ~420 students throughout 2012-2015. It should, once again, be noted that these particular statistics were compiled using only numbers from more outspokenly games-related programmes (i.e. programmes with games featured in the title, or heavily featured in their marketing or curriculum descriptions). If more general programmes were to be included, many of which are computer science oriented, programming has an even larger presence.

Gender Distribution

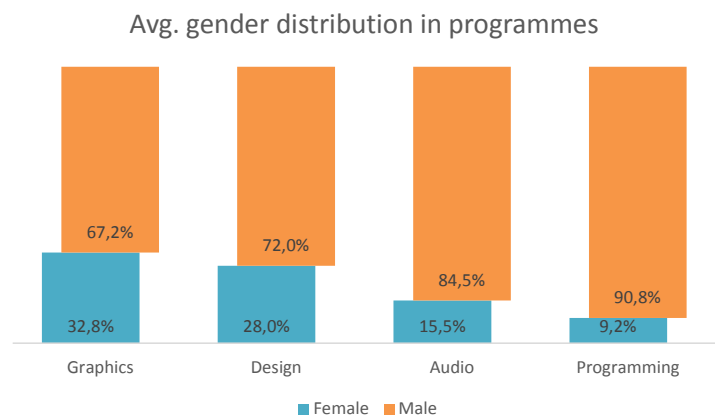
When it comes to gender distribution among the students and the available games-related programmes, academia seems to follow the same general trend as the games industry. In the most recent enrolment period in 2015, 18.7% of the total amount of enrolled students were female, which closely resembles the gender distribution in the industry which was reported at 18.0% in *Game Developer Index 2015**. While these enrolment number may look discouragingly low, it is important to acknowledge that it still constitutes an increase of 5.7 percentage points (or a ~44% improvement) from 2010, when only 13.0% of the enrolled students were female. It should also be note that, in general, the gender distribution is more lopsided for first-hand applications than it is in for enrolment. In 2015, for example, 16.6% of first-hand applicants to game-related programmes were female, whereas females constituted 18.7% of enrolled students the same year.



Some of the more noticeable bumps and setbacks in terms of gender distribution (e.g. the 2.1% decline in 2011), is often caused by the inauguration of new programmes within disciplines that are struggling when it comes to equalizing gender distribution. The gender distribution in some programmes, both in terms of application numbers and employment, still varies significantly depending on their target “discipline” within game development.

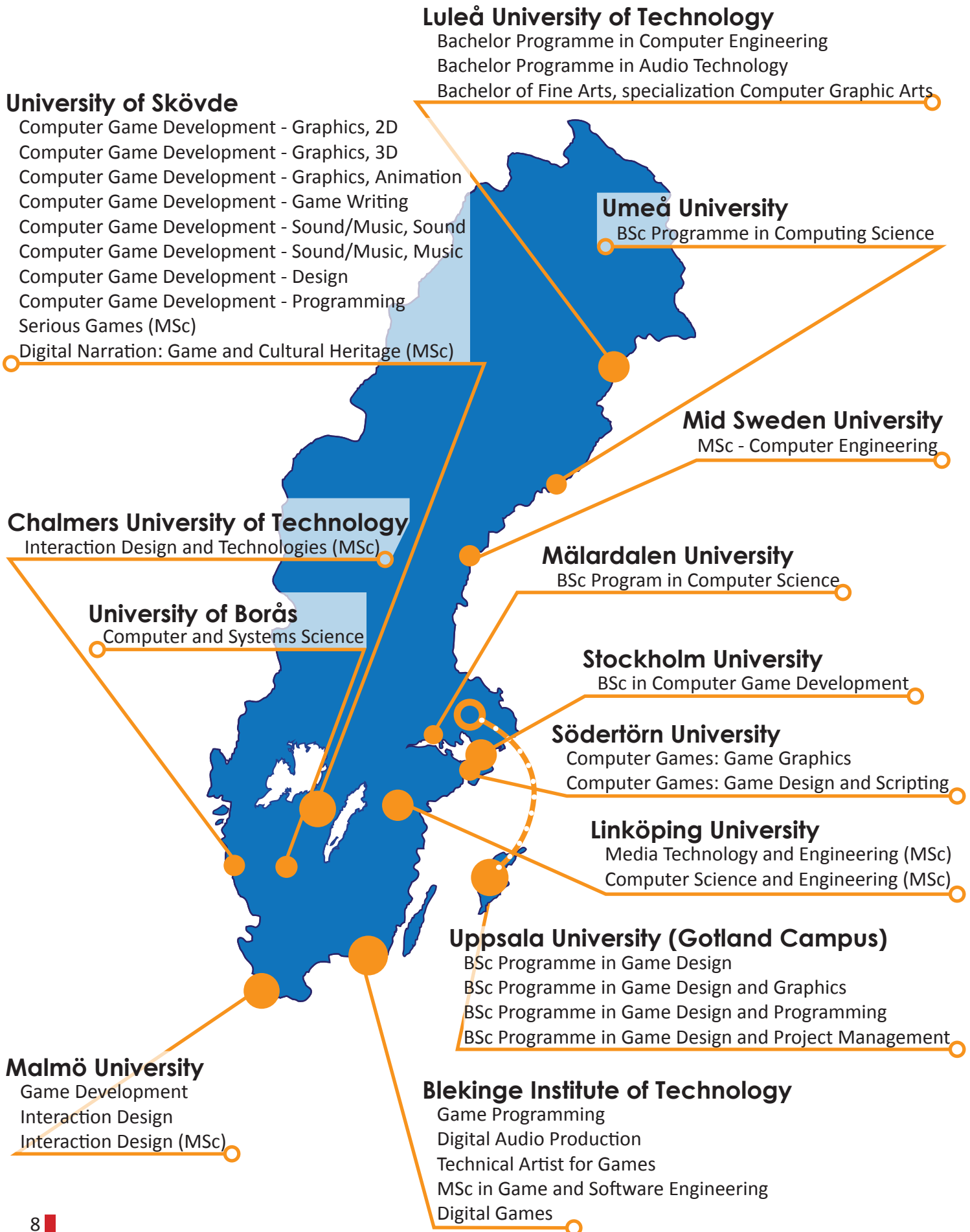
Gender distribution numbers can fluctuate quite a bit from year to year, so only looking at one specific year’s student cohort to discuss gender distributions can produce a somewhat inaccurate image of what the larger situation is like. For the purposes of this inventory, enrolment numbers to the more outspokenly game-related programmes during the past five years (from 2011 to 2015) have thus been collated and analysed together to produce some more reliable numbers.

During the past five years, the gender distribution in programming has had a tendency of being especially lopsided. Across the 2011-2015 time period, only 9.2% of enrolled programming students have been female, and 2014 was especially uneven as the number dropped to 4.1%. In 2015, however, programming jumped back up to 9.2%. When it comes to other programme disciplines, graphics have the highest ratio of enrolled female students at 32.8%, trailed by design at 28%, which is subsequently followed by audio at a much lower 15.5%. Graphic programmes have seen the most rapid equalization of gender distribution, going from 18.6% to 29.0% enrolled female from 2011 to 2015 (being as high as ~33% in 2013 and 2014). Design programmes have followed a similar trend, although with less intensity, as the ratios increased from 20.7% to 25.7% in the same time period (hitting a peak of 29.5% in 2013).



While it is always difficult to predict how application numbers will translate into enrolment numbers, it should be noted that the application numbers for 2016 is recording a 0.2 percentage point increase (or 13% improvement) in gender distribution. While this number may seem inconsequentially low, small changes in application numbers can sometimes translate to larger changes in enrolment statistics. For example, a small 0.8 percentage point increase of female applicants between 2012 and 2013 resulted in a total 2.7 percentage point change in the overall gender distribution (a 17.8% improvement). The improvement in gender distribution in regards first-hand applicants, however small, will thus hopefully lead to an overall larger improvement when it comes to gender distribution in enrolment as well.

Game Education Programme Map, 2016



Summary

In summary, the landscape of tertiary game education in the '10s seems to be considerably more stable than it was during the '00s. As the rush towards programme expansion is slowing down, more time can now hopefully be spent towards quality assurance and improvement of existing programmes.

However, it is important to now consider how these changes mesh with the requirements and needs of game development studios. On the international scene, Swedish game studios have reliably performed really well in recent years, and the industry has seen a steady and impressive growth both in terms of revenue and employee numbers. In recent weeks, the question has been raised whether Sweden is actually prepared to accommodate for this type of growth. One of the main matters of debate have been the limited access to game development talent, which runs the risk of hindering the continuation of the industry's growth. While Sweden clearly has no trouble producing games that are competitive on the international market, the industry can be hindered by the natural constraints of the country's population. In a situation where the commodities produced competes with the ones made in far larger countries that have larger and more rapidly growing pools of talent to recruit from, the ability for the Swedish game industry to remain a competitive international player hinges on our ability to provide game studios with the talents they need in order to keep expanding and improving their operations.

This issue might not, however, be best ameliorated by another burst of new programmes. The issue might instead come down to the current saturation of the "game student market", which brings up yet another reason for how essential it is that diversity and inclusivity is actively pursued by industry actors and educators alike. Male applications number have stopped growing ever since 2013 – likely not because their interest in these types of educations is fading. Instead, perhaps, it is because there are a finite amount of eligible university applicants any given year and the interested male applicants are already applying, and thus there is no significant room for growth in that sector. Luckily, while the amount of male applications have stagnated, the amount of female first-hand applicants is slowly but steadily increasing, and there is room for this number to improve much further. The pursuit of diversity and inclusivity is thus not only a matter of creating more functional and healthy work-spaces (or fundamental decency), it is a necessity for the continued growth of the Swedish games industry.

Methodological Considerations

The numbers presented in this report were all collated from the national statistics on tertiary academic educations as presented by the Swedish Council for Higher Education. Numbers that pre-date 2008 were gathered from the organization's predecessor Högskoleverket.

The first clarification I'd like to make, is in regards to the gender distribution statistics. Information regarding gender is automatically gathered by the Swedish Council for Higher Education based on Swedish social security numbers. In some programmes (primarily in master's programmes), a significant portion of applicants and enrolled students come from abroad, which means that they show up in the summation of application numbers but not in statistics regarding gender. This is the reason for some of the gaps in the statistics, for example when the combined amount of female and male applicants don't add up to the total amount of applicants in a specific year.

Another important methodological choice to point out, is the one regarding the statistics of granted degrees per year. Statistics regarding student throughput in specific programmes are not easily available through the national database – and thus I have chosen to simply use a static estimation that 40% of students conclude their academic education. This number is based on the statistics that are available (that state that technology-related programmes tend to have an average throughput of roughly 40-50%), in combination with discussions with my colleagues and my own experiences working in, and attending, game education programmes. It should thus be known that the estimate is a conservative one, and the annual amount of granted games-related degrees may be slightly higher than presented here.

One of the more difficult dilemmas you are faced with when conducting these types of inventories is: which programmes should be included and excluded from the statistics. Game development as a practice, and game studies as an academic pursuit, are both highly interdisciplinary, and thus it is difficult to decisively declare which programmes we should consider to be relevant or irrelevant in regards to games. Many programmes in computer science and informatics, for example, heavily emphasize game development in their curriculum and programme description, without explicitly labelling the programme itself as being a games programme. I have made the choice to be inclusive, rather than exclusive, in this inventory process. If programmes describe themselves as being preparatory for work in the games industry, and if they contain courses that also indicate that ambition, I have included them in the statistics.

A limitation of this process, is that it is difficult to find descriptions and curricula of programmes that are no longer active. For example, there may very well have been more programmes in computer science during the mid-'00s that described themselves as game-related, but if their descriptions and curricula have since changed or disappeared entirely, they don't show up in the compiled statistics.

The statistics were collected through three primary steps:

- 1** Identifying relevant programmes through search terms (e.g. 'spel', 'spel- programmering/ design/ grafik/ljud', 'spelutveckling', 'interaktiva medier', 'interaktiv teknologi', etc.) on programme databases and Google.
- 2** A continued examination of the education's relevancy to game development
 - Is the programme described as being preparatory for work in the games industry (and teaching games-related skills)
 - Does the programme curriculum containing game-related courses
- 3** Programmes that passed the filter were included in searches on the Swedish Council for Higher Education statistics database (available at statistik.uhr.se).

This method of filtration have admittedly, at times, been rather subjective. There are programmes that can be argued to be included in the statistics that shouldn't be, just as there are programmes that are excluded from the statistics that shouldn't have been. One particular effect of this filtration process is that computer science educations have an easier time reaching the threshold of being "relevant to game development" as compared to media-, humanities-, and arts programmes. It may be that it is more straight-forward for computer science programmes to describe themselves as relevant for potential games-related work.

If there are any educational institutions that feel like they have been unfairly left out, or needlessly included, in the gathered statistics, I apologize for the oversight and encourage you to contact me so that the mistake can be rectified it in future reports.

This has been a report from the 'EU Interreg Öresund-Kattegat-Skagerrak' funded project *GameHub Scandinavia*.



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European Regional Development Fund



Future Investigations

As mentioned at the outset of this report – the intent with this work is to create and maintain an inventory of Fenno-Scandinavian game educations. There are many organizations within each country that does a tremendous job of tracking and game education efforts and opportunities (such as NeoGames in Finland), but accessible information regarding the educations' programme directions, sizes, and development is difficult to come by. Overviews that present the past and current state of game educations can assist educators and decision makers to make more informed choices when it comes to organizing systems that support the region's game industries, and is thus something we hope to be able to work on further.

Norway



1. Narvik University College
2. Nord University
3. Norwegian University of Science and Technology
4. Hedmark University College
5. Westerdals
6. Noroff University College

Denmark



7. Aalborg University
8. Aarhus University
9. Technical University of Denmark
10. The Royal Danish Academy of Fine Arts

Sweden

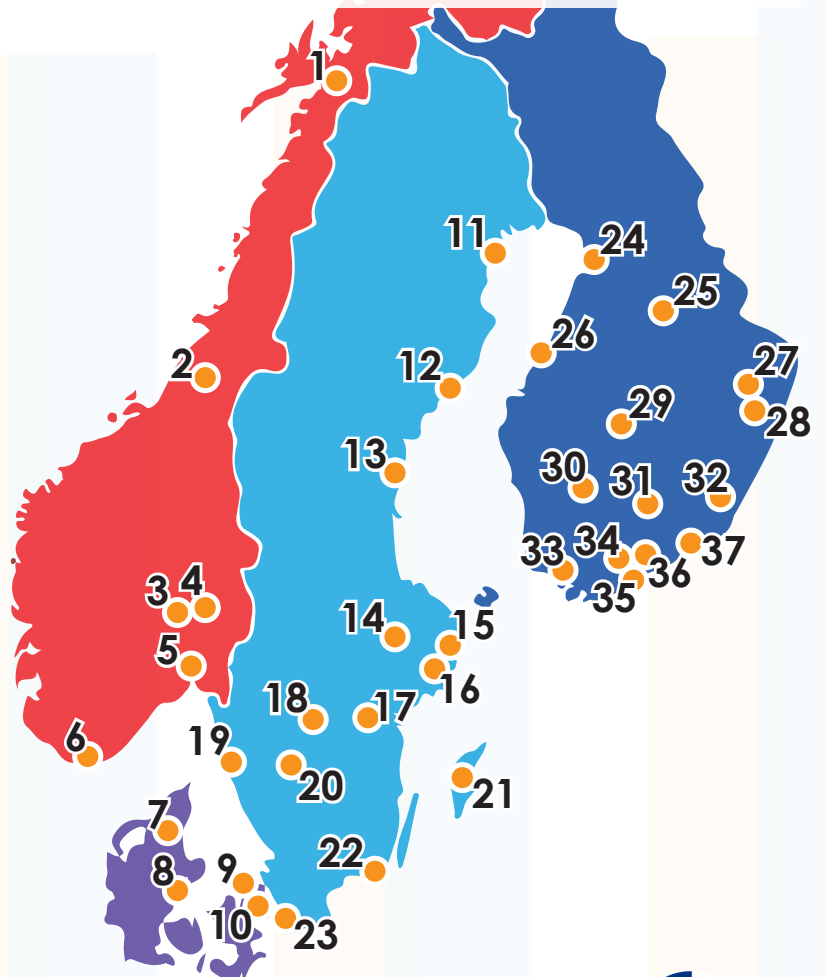


11. Luleå University of Technology
12. Umeå University
13. Mid Sweden University
14. Mälardalen University
15. Stockholm University
16. Södertörn University
17. Linköping University
18. University of Skövde
19. Chalmers University of Technology
20. University of Borås
21. Gotland Campus (Uppsala University)
22. Blekinge University of Technology
23. Malmö University

Finland

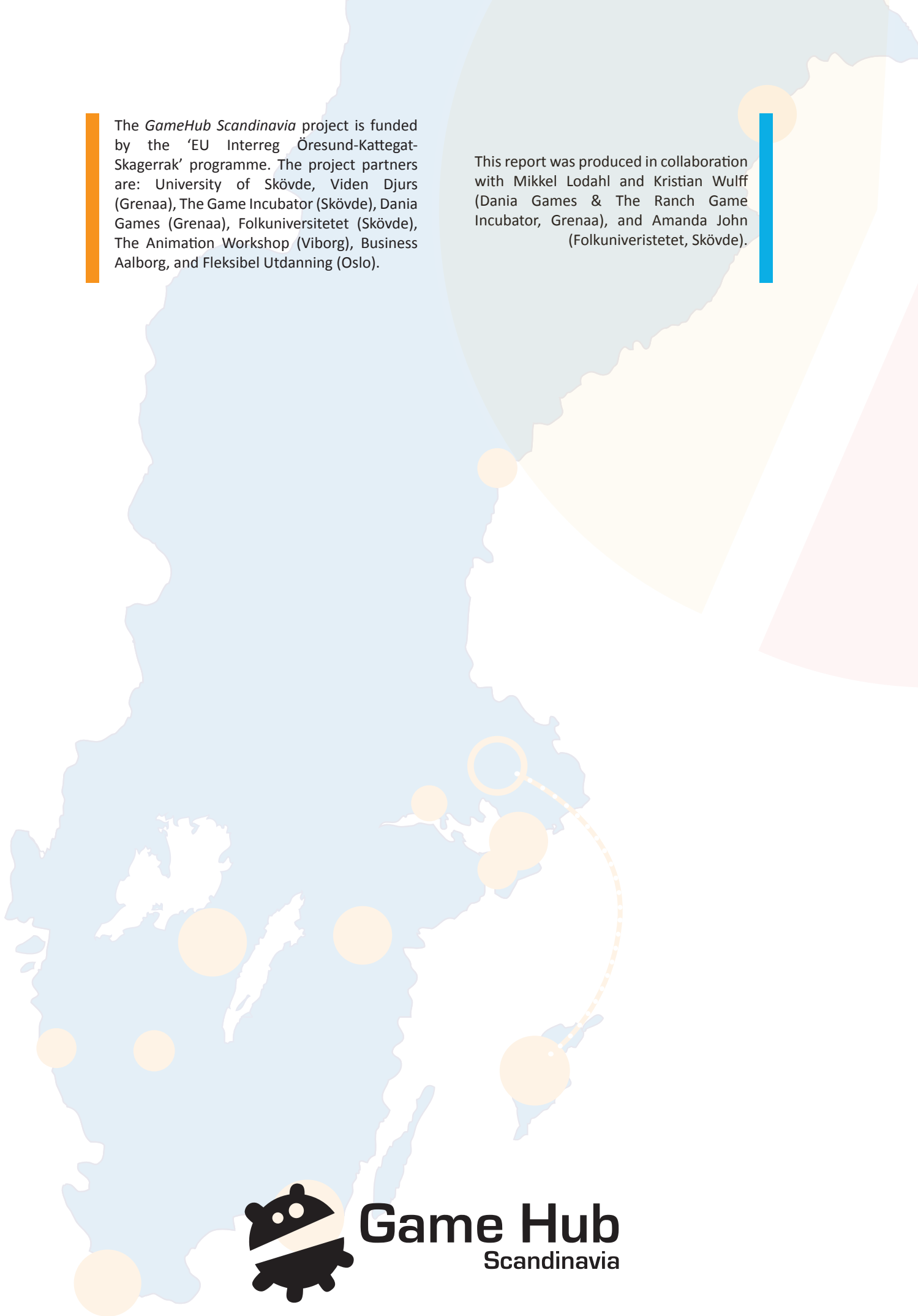


24. Oulu University
25. Kajaani University
26. Centria University
27. University of Eastern Finland
28. Karelia University
29. Jyväskylä University
30. University of Tampere
31. Lahti University of Applied Sciences
32. Lappeenranta University of Technology
33. University of Turku
34. Helsinki Metropolia University
35. Aalto University
36. Haaga-Helia University
37. Kymenlaakso University



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This report was produced in collaboration with Mikkel Lodahl and Kristian Wulff (Dania Games & The Ranch Game Incubator, Grenaa), and Amanda John (Folkuniversitetet, Skövde).



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