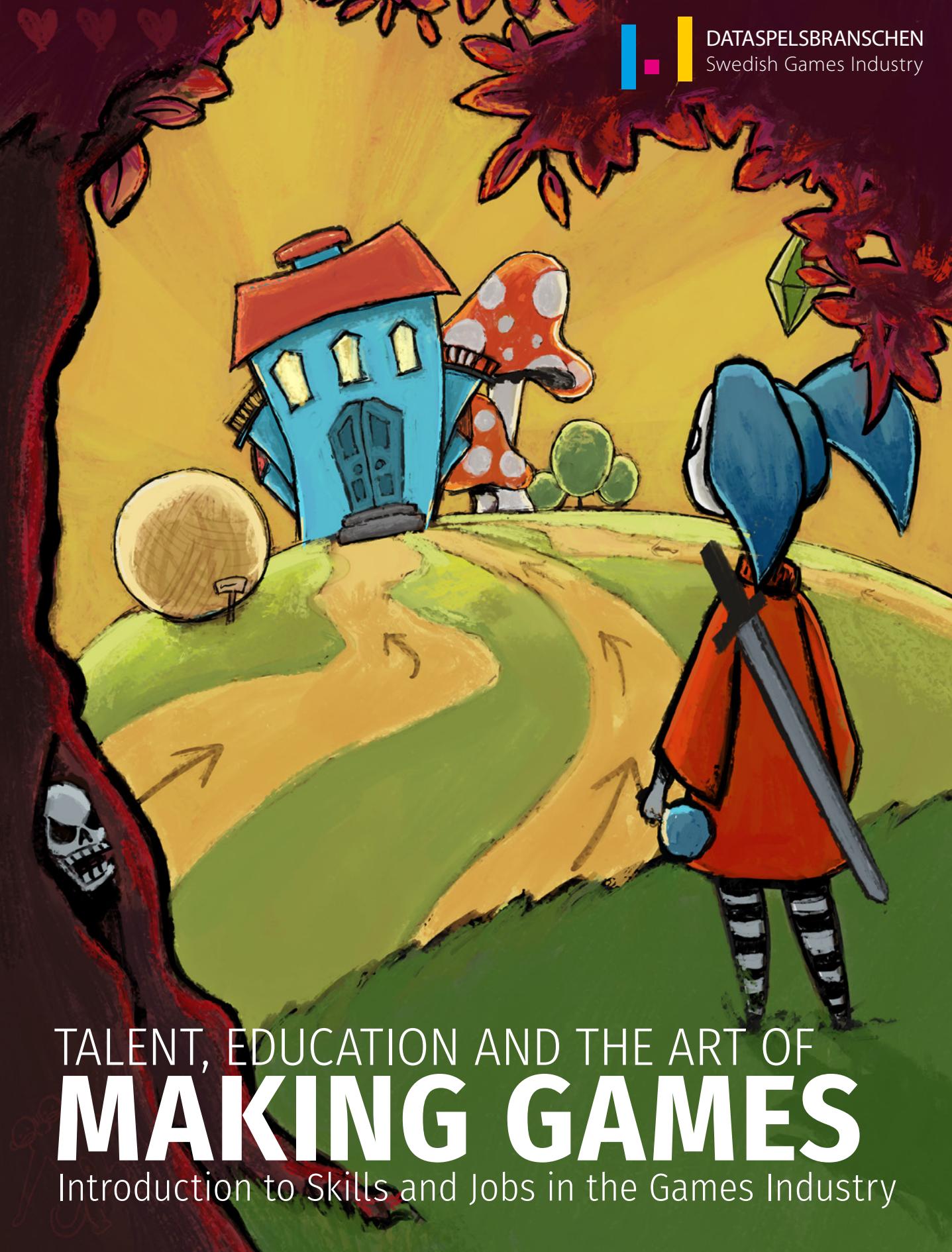




DATASPELSBRANSCHEN
Swedish Games Industry



TALENT, EDUCATION AND THE ART OF **MAKING GAMES**

Introduction to Skills and Jobs in the Games Industry



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Illustration above: Viggo Rohdén, Uppsala University Campus Gotland

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The Swedish games industry will be lacking 25,000 game developers by 2031 if current growth trends continue and nothing is done to increase the talent pool through education.

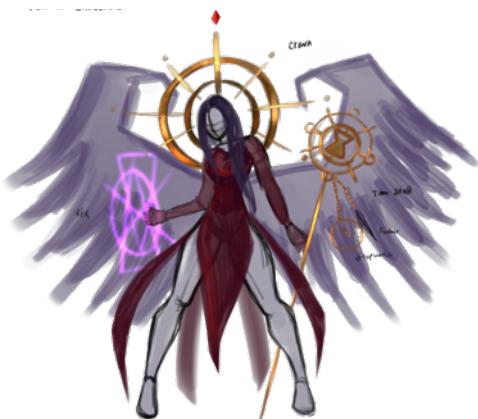
1,348 people were newly hired in Swedish game development companies in 2021, however, only 616 people graduated from a game education during that same period.

27% of all game development students at university or in higher vocational education are women.

Between 30-50% of all individuals working in the Swedish games industry have moved here from abroad.

Half of all those who have moved to Sweden to work with games come from countries outside the EU.

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AMIDC – A Moderately Interesting Dungeon Crawler, Game Project, Uppsala University Campus Gotland

Summary

In this report, we describe different paths into the games industry, which educational programmes are available and where in the country they are located, which professional roles there are in the industry, the challenges concerning skills supply, and challenges which affect those who have moved here from abroad to work.

There is a lack of game developers in Sweden. Too few are educated, so the companies are pursuing talent abroad to maintain competitiveness and to be able to grow in Sweden. The structural changes that can take place now will take years to have effect, but without them, the situation will be even worse in the future.

Studying to become a game developer can be done in different ways. A few are completely self-taught, some start making games already in high school, and the vast majority have some higher education in the subject of game development or in adjacent subjects. The most common type of education is a post-secondary education in the fields of game art, game programming or game design at one of the country's colleges, universities, or higher vocational education schools (HVEs).

In 2021, 1,348 people were hired in Sweden, but there is still a great shortage of skills, and the domestic skill supply is not enough to sustain the industry's continued growth. **Swedish game education only educates enough personnel to satisfy roughly half of the industry's demand of labour.** In 2021, only 616 people graduated from a game education at a higher education institution or HVE. This means that there is a significant shortage of skilled labour in the country, and many of those who have studied a game education in Sweden are also offered jobs in other industries.

Among those admitted to a higher education in games in the fall of 2022, just under 27% were women. This figure can be compared with the number of professionals in the industry where the percentage of women in 2021 was just above 22%. The gender

distribution varies greatly between different programmes, and more efforts need to be made to increase the number of women in the country's game education programmes.

The access to game development education looks different in different parts of the country, something which affects who chooses to further their education in the field. More investments in game development in, for example, the municipal school of the arts would be a way to increase interest in game making for many at a young age.

Employers are largely recruiting from other countries. It is estimated that at least one third of the employees in the industry have moved to Sweden for work, at several of the larger companies it is up to 50%. At the same time, it is difficult for newcomers to find housing and get a work permit. The processes and lead times for work permits were further complicated after legislative changes in 2022, probationary periods have become practically impossible, and employees risk work bans when applying for renewed permits.

This report concludes that more game education and education places are needed in the country to meet the high demand for labour that exists, in order for the domestic industry to be able to continue to grow. The volume of applications is high on the education programmes that exist; however, the number of education places is not high enough. This also becomes clear when you note that the lion's share of the growth in the industry over the past two years has occurred through the acquisition of foreign game studios rather

than through the creation of new, or expansion of existing game studios in Sweden. It can also be compared to other creative industries where the number of graduates exceeds the needs of the labour market, often several times over.

The domestic shortage of skilled labour together with the red tape and bureaucratic obstacles that exist for foreign workers who want to come here to work create great difficulties for the continued growth of the industry. More people need to be educated within the country and it must become easier and more legally secure for workers from outside the EU to come here to work so that the Swedish games industry can enjoy continued stable growth and stay competitive with industries in other countries.

There are great opportunities for those who have the right skillset and want to pursue a career in the Swedish games industry. For anyone who doesn't know where to begin, we hope this report can provide a good introduction to which paths are available.

The need for more skills is prevalent throughout the games industry, and the gap between the number of graduates and the number of new hires every year remains large. Some measures to improve the situation which can be found in the report:

- **Creating more education places, not least in the Higher Vocational Education Schools (HVEs).**
- **Shortening lead times and lessening red tape when applying for work permits.**
- **Providing more funding for research.**
- **Ensuring more people have the opportunity to study game development, and that more women are encouraged to apply for a post-secondary education in games.**

More work needs to be done in the future. For example, there is a concrete need for a fast track into the Swedish games industry to create more ways for foreign expertise to join the domestic workforce. There are also good opportunities for the transition study support offered by the Swedish Board of Student Finance to come in handy if more people from adjacent industries decide to study game development. Continued education of existing staff and retraining requires skilled educators who can teach. This, in turn, requires



John Gustafsson, PlaygroundSquad

more investment in research. At the same time, many companies in the industry are small, and do not have the means to invest in the long term themselves.

In this report, we show that the right education is important for working in the industry. But if you ask many gaming companies, it is likely they will answer that they are primarily looking for practical skills, experience of game projects and the portfolio of applicants. These are most probably connected, as these are skills you acquire if you study a game education.

So where can you find the jobs? Most major companies list their current ads on their respective websites. In 2022, many of these were gathered on the initiative [Swedengamejobs.com](https://www.swedengamejobs.com). We list all game companies in the country in our report *Game Developer Index*. Most of the larger companies are amongst our members. *The game developer ambulance* group on Facebook is perhaps the country's most relevant job location bank for the industry.

The illustrations in this report are submitted by students studying a game education in the country in the fall of 2022.

Have we overlooked any education programme or something else important in the report? Get in touch with us at the Swedish Games Industry!

Game Development for Children and Youth

Games in High School

More and more secondary education institutions are specialising in game development. In the fall of 2022, 36 high schools around the country offered a total of 55 high school programmes focused on game development, most of them in game art or game design. Below is a short summary of these.

Students from **LBS Kreativa Gymnasiet** won the *Sweden Game Awards* in 2018 and 2019. LBS conducts upper secondary education in games at 17 different schools around the country, in Lund, Borås, Helsingborg, Jönköping, Kristianstad, Kungsbacka, Linköping, Nyköping, Trollhättan, Varberg, Örebro, Halmstad, Malmö, Gothenburg, Växjö, Stockholm and Solna. At all these schools, two different high school programmes with a focus on games are offered, the *Arts Programme* with a special focus on game art and the *Technology Programme* with a special focus on game development. Students from both programmes then create games together during their second and third high school years.

The *Arts Programme* at LBS with the profile Image and Form focuses on Game Art where you get to learn 2D and 3D modelling and animation, sketching techniques, concept development and project planning. At LBS's *Technology Programme with a focus on design and product development*, the focus is on game programming. The education focuses on the technical aspect of the development process where you get to learn programming in both two- and three-dimensional environments. The education is also university preparatory and gives general eligibility to, for example, degree programmes in engineering and civil engineering.

The *Arts Programme with a focus on games and game art* is also available at the **Nacka Strands Gymnasium**, which offers a focus on arts and media with specialisation in Game Design or Game Art, and at **Snitz Gymnasium** in Stockholm, where game design is a focus in the specialisation *Image and Form* as well as *Arts and*



Chuhue Wang, Futuregames

Media. In Uppsala, **Uppsala Estetiska Gymnasium** has for several years offered *Game Design* as a special variant within the framework of the *Arts Programme*. In Karlskrona, **Törnströmska gymnasiet** offers the *Arts Programme with a focus on Game Art, 3D and Animation*. These programmes also provide hands-on experience with game projects.

The *Technology Programme with a focus on Game Development and Game Design* is also given at several other schools. These include **Klara Theoretical Gymnasium** in Stockholm, **Katedralskolan** in Skara, **Mediagymnasiet** in Nacka, **Väsby Nya Gymnasium** in Upplands Väsby, **Tibble Gymnasium** in Täby, and **Cybergymnasiet** in Stockholm. Like the *Technology Programme* at LBS, students acquire advanced skills in game programming and design as well as hands-on experience through working on game projects from conceptualisation to the final product.

Fryshuset Gymnasium in Stockholm offers the profile *Passion Game Design* as an electable focus at several of its upper secondary programmes, including their programmes focusing on natural sciences, social sciences, and the arts. The profile offers education in both game art and programming where you learn to make your own games using the game engine Unity.

In addition to these, there is also **MTU Gymnasiet** in Linköping, which provides the *Electricity & Energy Programme with a focus on game programming, networking, security and hardware technology*.

Kulturskolan (The School of the Arts)

Kulturskolan (The School of the Arts), is a municipal extra curricular art school for students who have not yet graduated high school. Below are some concrete examples, but courses are also offered in Kiruna, Kalix, Solna, Mariestad and at the *Regional Culture School Skåne*. A national network for game creation within the School of the Arts has been formed and is gradually expanding.

Challenges ahead include recruiting or training competent educators to expand the range of courses and to offer advanced courses of various techniques and tools.

Since 2021, **Malmö Kulturskola** offers three one-semester courses in creative game creation at different levels. Some Game Jams have also been arranged during school holidays, including Game Jams in collaboration with Kulturskolan Stockholm and Game Habitat. The courses are primarily taught via Discord using the programming language Scratch. The courses cover a broad basis and include work with game art, game design, animation, story telling, sound design, music and programming. *Level 1* (8-13 years) provides a basic introduction to creating your own games, while *Level 2* (10-15 years) and *Level 3* (10-18 years) teach more

specialised techniques and encourage experimentation and creation. At the end of 2022, more than 100 children were on the waiting list for these courses.

Kulturskolan in Luleå has the course *Spelbyggarna* for pupils aged 11 and up. Here, too, the course has a broad structure where students learn to write music, make sound effects, program, create 3D models and animate them to then bring everything together into a working game. The students learn to work both individually and in groups divided into beginners who learn the basics, and a more advanced group where children with prior knowledge can create games under slightly freer forms in an open workshop.

Kulturskolan Stockholm offers short courses in game creation, both online and on site, for ages 11-16 years. The courses provide an introduction to the programming language Scratch where you can create your own game art, animations, audio and program your games. In Stockholm, there is also the initiative *Unga Berättar*, which offers holiday work in game development during school holidays, for young people aged 16-19, and starting in 2023 the Kulturskola in Stockholm will offer short courses in game development for the target group 13-22 year olds.

BOBBI AUGUSTINE SAND GAME HABITAT



Hi Bobbi! You work with Culture & Awareness at Game Habitat. What does your job entail?

My role includes opening up the games industry to new talents – anyone who is not yet a game developer but who may be interested in becoming one. It concerns children and youths, as well as adults who have a background in other professional or cultural fields, and groups that struggle to find their way in the field. I also work on promoting games as culture. One of the most enjoyable things is to see when game interested youths realise they can develop games professionally and to see them pursuing their dreams.

What do you wish all parents and adults around children knew about game development?

How creative it is and how many different areas of expertise come together in game development, including

art, music, animation, game design, programming, and others, including game testing, project management and much more. Many people probably don't know what opportunities exist!

You have worked for a long time for games to be recognised as culture, what is missing for that to be the case today?

More knowledge about games as a medium is needed, but also support functions like those that exist for other cultural areas, such as, development support, advice, exchanges between cultural areas, access to game creation via the school of the arts or game experiences in school. New structures need to be developed. We are in the process of starting the non-profit association Computer Games Center where everyone who is interested in games as a cultural medium can participate - and in the long run we hope that it will become a part of centrumbildningarna (a group of Swedish arts and culture NGOs)!

Game Education for Adults



Concept Art, Ameer Khalid,
Uppsala University Campus Gotland

Folkhögskolan

Folkhögskolan or The Folk High Schools are institutions for adult education where students can either study for a general qualification, which makes them eligible to study at university, or a specific subject such as game development to gain practical experience.

Several folk high schools offer education programmes in game development and there are programmes in game development at folk high school levels A1, A2 and B1. In total, 14 schools around the country offer 27 programmes in the field.

Bona Folkhögskola in Motala collaborates with *Female Legends*, **Framnäs Folkhögskola** in Öjebyn and **Solviks Folkhögskola** in Kåge are linked to the game hub *Arctic Game*. **Birka Folkhögskola** in Ås, Jämtland, offers a course in game development, **Folkhögskolan Skurup & Fridhem Malmö** gives two courses in game design, one basic course and one with a focus on entrepreneurship. **Ingesund Folkhögskola** in Värmland offers a

course in game music at upper secondary school level and **Axevalla Folkhögskola** in Västergötland provides a general qualification course in game development at upper secondary school level. **Glimåkra Folkhögskola** in Skåne provides a course with e-sports and game ideas as a focus.

Valla Folkhögskola in Linköping, in collaboration with the game hub *East Sweden Game*, provides a course in game development at post-secondary level, *Valla Game Education*. At **Ädelfors Folkhögskola** school in Holsbybrunn outside Vetlanda, you can take a course at upper secondary school level in computer game development and a post-secondary course called *Indie Game Studio* that focuses on game development and programming. **Sunderby Folkhögskola** in Luleå arranges game education in collaboration with **Changemaker Educations** and *Gamecamp Boden*. There is also the course *Indie Game Developer*, which is a post-secondary programme

in programming and game development, and a general course at high school level with the profile *Gamemaker*, also with a focus on game development. These courses are located in Luleå and Boden and the school also offers a remote-learning programme at half time.

Hola folkhögskola in Kramfors, Västernorrland, gives through FCV Sverige a basic summer course, *Summercamp Game Development*, as well as a four month remote general preparatory course with a game focus. The school also provides the one-year *Game Audio Design* course, and a two-year post secondary course in *Indie Game Development*. **Kristinehamns Folkhögskola** in Värmland, together with the game hub *The Great Journey*, gives the course *Indie Game Developer* at post-secondary level in Kristinehamn and Karlstad, as well as a general qualification course at upper secondary school level with a focus on games and learning as well as a game design course called *Skapa Världar*. They also give the remote-learning course *World Writing* at half time.

In the far south is **Östra Grevie Folkhögskola** outside Skurup which provides a post-secondary course, *Virtual Composer* and *Sound Designer*, with a focus on game music and audio design for games.

Kim Eklund, PlaygroundSquad



Game Education in Other Forms

Games have also become a focal point at several other adult education institutions. **Spelkollektivet** conducts a municipal adult education in Tingsryd municipality in Småland with a focus on games. In Luleå there is a secondary education for adults by **FCV Sweden** with a focus on games, and in Boden an *Indie Game Dev education* in collaboration with **Futuregames**. In Tyresö there is a municipal adult education programme organised by the **Center for Lifelong Learning** with the name *IT-paket - Game Development*.

Rendering, Ameer Khalid, Uppsala University Campus Gotland



Higher Vocational Education

There are many Higher Vocational Education (HVE) educations around the country focused on game development. These can be divided into three different tracks for three different professional roles, design, arts and programming, where you can then further specialise your skills. Most HVE educations in video games include a lengthy LiA period, i.e., internship at the end of the programme.

HVE is important for the industry. A survey in Skåne, *South Sweden games industry 2022*, showed that just over half of all those who have trained in the region and work at companies in the industry have attended a higher vocational education, compared with just over a third who have completed an academic education.

The Game Assembly (TGA) has three main programmes in game development in Stockholm and in Malmö, *Game Programming*, *Level Design* and *Game Art*, whose students work collaboratively on different game projects during the education. In Malmö there are also the courses *Technical Artist* and *Game Animator*. All programmes are held in Swedish and with close cooperation with the local industry. The school also runs a shorter remote HVE education, *Digital Project Game Management*, which started in December 2021 with the first batch of students.

Futuregames provides two programming courses, one in Stockholm and one in Skellefteå and Boden. They also provide a programming education with a focus on mobile platforms in Skellefteå and Karlstad. The game art-focused programme *Game Artist* is given in four different locations in the country, in Stockholm, Karlstad, Boden and Skellefteå.

Two programmes are offered in *game design*, one in Stockholm and one in Boden. They also offer

the courses *Project Manager IT & Games* in Karlstad, *Immersive Experience Creator* in Stockholm, *QA/Game Tester* in Boden and *Game & UX Designer* in Skellefteå.

The City of Gothenburg, Yrgo provides an education in programming, *Game Creator Programmer* and an education in game art, *Game Creator Artist*. Just as with TGA and Futuregames, there is a great focus on practical work with a lot of group work and project work from start to finish.

PlaygroundSquad (PSQ), by **Tension Education**, has been providing game education since 1999 and today offers three different programmes in Falun including *Game Programmer*, *Game Artist* and *Game Designer*. These courses, like the other HVE programmes, are very practical and include three large game projects that the students get to work on together and create games from scratch that are made playable on PC and console. PlaygroundSquad also collaborates with Sony through *Playstation First*, which involves students developing the majority of their game projects exclusively for Sony hardware, providing a unique specialised skill to kick-start their career.

In addition to these, an HVE education is given in Skellefteå, *VFX Artist: 3D Visualisation and Digital Compositing* arranged by **Skellefteå municipality Adult Education - VUX**, in Stockholm **Forsbergs Skola** organises an education titled *Game Developers - Game Programming* and in Botkyrka you can study the programme *VFX-Artist* organised by **Botkyrka Municipality, Xenter Botkyrka**.



Wiktor Kaluba, Futuregames

CAROLINE HÖSTGREN

CHAMBER OF COMMERCE AND INDUSTRY OF SOUTHERN SWEDEN



Hi Caroline Höstgren, HVE expert at the Chamber of Commerce and Industry of Southern Sweden.

Tell us about HVE-flex, how can it become an opportunity for the games industry?

HVE Flex can be a good way to help people who

have professional skills which correspond to a large part of an HVE education to take a faster path to an HVE degree. It could be people who are self-taught, those who have completed a similar education or people who have professional experience but who cannot provide documentation of their skills. HVE Flex is there so people can get credit for what they already know and learn what they lack to avoid having to go through an entire education. It's a great way for both the individual and the companies to find each other faster.

Can the Higher Vocational Education schools play a role in recruiting staff outside Sweden?

There are many paths into an HVE through the admissions process. Here are several opportunities to admit students who have an equivalent education to a Swedish high school diploma or adopt those with real hands-on experience, it is up to the school to make the eligibility assessment. HVE can be conducted in English if it is justified based on the needs of the labour market, to make it easier for people who are new to Sweden. The HVE is there to supply the employers with skills, therefore it is important that students who are most

suitable to complete the education and work in the profession are admitted to the education programmes, the schools regulate this themselves through the implementation of their entry requirements.

What do you think the games industry could have done better when it comes to cooperation with Higher Vocational Education?

I believe that all industries need to take greater responsibility when it comes to skills supply, including the games industry, which is already very good at making use of the skills of the students. Those who have attended a higher vocational education in games most often find work where their skills are applicable. However, those who design the curriculum are not always aware of the industry's future needs, so the industry must become better at informing the HVE schools of their needs, so that they may design the curriculum accordingly. By getting involved in the HVE, you can help in forming the curriculum of the education programmes so that the knowledge of the students fit the needs of the industry. There are many ways to get involved in the HVE, you can serve on the board of an education, you can hold guest lectures, offer study visits, or receive a person at LiA (internship) at your company. The HVE system is unique in the world in the way it works. Schools must receive support from companies who certify that the curriculum teaches those skills highly sought after by the industry, if they don't, the education programmes won't be approved. This means that the schools will contact you in the industry for support in forming the applications and here you can make a big difference to your own future skills supply, certifying what needs you have so that you can actually get it!



Mineral Madness, Game Project, Blekinge Institute of Technology

Colleges and Universities

There are many college and university educations around the country in game development. Several educational institutions have three different tracks with a focus on either design, game art or programming where the students work on game projects together in an interdisciplinary fashion.

Many of the universities and colleges also have close collaborations with local incubators and game clusters that give students the chance to work closely with the industry during their studies.

Blekinge Institute of Technology (BTH) has had game development on the curriculum since 2004. In the autumn of 2022, the bachelor's programme *Design of Digital and Immersive Experiences* started and the country's first *Master of Science* (MSc) in Engineering focused on games was updated to a *MSc in Engineering in Game Technology*. BTH also has related programs such as *Design of Digital Experiences for Learning*, *Digital Sound Production* and *Digital Visual Production*, all of which teach skills applicable to game development. A new *Bachelor of Science (BSc) in Engineering programme in Technical Game Art*, is set to commence in autumn 2023. The game programmes at BTH are offered in collaboration with Blekinge Business Incubator (BBI) and its video game division Gameport, which has existed since 2003. Game studios which have been recently created by former students include *Something We Made*, *Whacky Mole Studio*, and Shatterplay Studio.

The University of Skövde has a wide range of game education with over 500 students divided into

Charlotte Van Hulle,
Futuregames





Felicia Kyrling, Futuregames

eight bachelor's programmes and four programmes at postgraduate level. Here you can find programmes in programming, design and three different programmes with a focus on game art: *Animation*, *3D Graphics* and *2D Graphics*. In addition to programmes for the three more 'traditional' fields of programming, design and game art, there is also an education in *Game Writing* where students can study digital storytelling with a focus on video game development. It also has bachelor's programmes in *Video Game Development* with a focus on *music* and *sound* for games. At the postgraduate level, four different master's programmes are offered, all of which are taught in English and are open to international students. Master's programmes can be studied in *Games User Experience*, *Serious Games* and *Digital Narration: Game and Cultural Heritage*. They also have a two-year master's programme in *Game Development* with *Games User Experience* (GUX) and *Serious Games* (SG) as elective specialisations.

The University of Skövde also has a close collaboration with the incubator **Science Park Skövde**. With the joint project **Sweden Game Arena**, they bring together students, researchers, business developers and com-

panies to create a concentration with a complete chain of knowledge and competence that is available to the students both during their studies and after. Many students from Sweden Game Arena have gone on to start their own companies and studios. Among these are *Coffee Stain Studios*, *Stunlock Studios*, *Flamebait Games* and *Irongate Studio*.

Uppsala University conducts four game development programmes at the undergraduate level at its **Gotland campus** in Visby as well as two programmes at postgraduate level. All programmes are focused on game design, where you can study for a bachelor's degree in *Game Design* alternatively *Game Design and Project Management*, *Game Design and Graphics* or *Game Design and Programming*. At the postgraduate level, two master's programmes in *Game Design* are offered, one with a one-year duration and one two-year. They accept international students on almost all their programmes. Game studios created by former students include *Eat Create Sleep*, *Toadman Interactive* and *Nexile*.

Chalmers University of Technology provides a master's programme (Msc) in *Interaction Design and Technologies* where students can choose to focus on

Entertainment Games and Social Media or Gameplay Design and Interaction Design. Chalmers also conducts research on topics such as interaction design, game design, AI for music and graphics, VR, and the use of IT in vehicles. The researchers in these areas are also senior lecturers on the *master's programme in interaction design*.

Stockholm University offers an undergraduate programme in *Game Development*, teaching a broad range of skills with a basis in programming where students can choose to specialise in either game art or game design thus creating an interdisciplinary degree. The students also learn to work in teams by creating game projects together. The programme has two major specialisations, one in *Game-AI* and one in *Inclusive Design*.

Malmö University has an undergraduate programme in *Computer Science* with specialisations in *Game Development* and *Game Programming*.

Södertörn University offers the *Game Programme* at bachelor's level with two possible specialisations: *Game Design and Scripting* as well as *Game Art*.

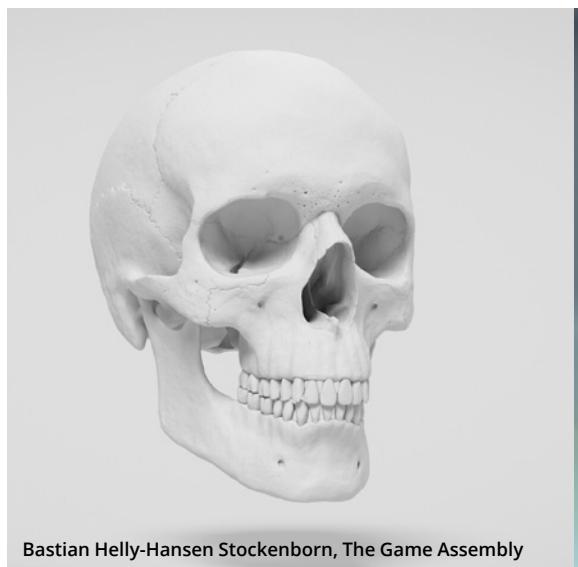
Linköping University (LiU) has a bachelor's degree with a programming focus – *BSc in Engineering in Computer Science* and a *MSc in Computer Science and Software Engineering* where you can choose to focus on game programming as well as courses in, among other things, game art and technology for advanced computer games. There are also a couple of adjacent courses in media technology, graphic design and communication. LiU collaborates with the game hub **East Sweden**



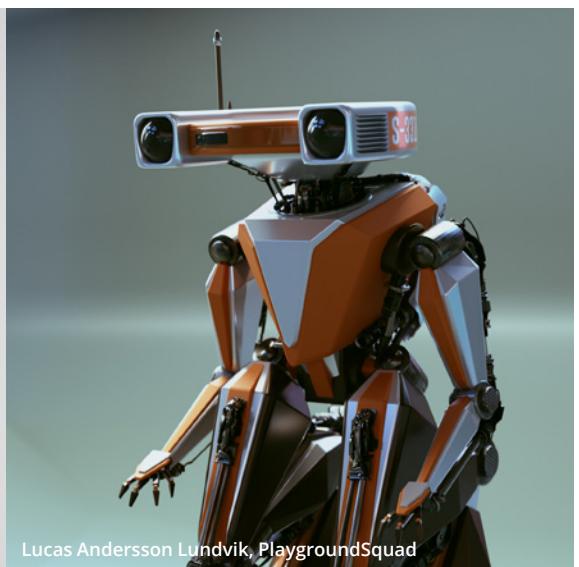
Game and together they arrange the annual conference **LiU Game Conference**, which since 2021 has been part of the game festival **Linköping Game Week**.

Luleå University of Technology (LTU) has a graphic design education of 120 credits (2 years) at the undergraduate level – *Computer Graphics for Games and Film* which is organised at LTU's campus in Skellefteå. They also have a bachelor's degree in *Computer Game Programming* and a MSc in Engineering in *Data Technique focusing on Interactive Systems* which focuses on the design and development of technical systems for visualisation and interactivity/UX, in cooperation with the video game industry.

At the **University of Gothenburg**, there is a game design-focused master's programme, *Game Design & Technology*, which is taught in English. The programme has a strong research focus.



Bastian Helly-Hansen Stockenborn, The Game Assembly



Lucas Andersson Lundvik, PlaygroundSquad



Infinite Monkeys, Game Project, PlaygroundSquad

The Council of Swedish Games Researchers

A challenge for academia is to ensure the curriculum has a scientific basis. Without research, there is no foundation to build education on. Since video games are rarely counted as a separate field of research, game education uses research from other fields.

In August 2022, the Council of Swedish Games Researchers was formed, which brings together video games researchers from eight colleges and universities in Sweden, as well as the Swedish research institute RISE. The council was formed with the goal of creating a meeting place for games researchers for the exchange of ideas and coordination, and to collectively communicate why games research is important to the public, decision-makers, the public sector, players, the games industry, and game educators.

The reason why the Council is prioritising working towards better coordination is due to the interdisciplinary form that game research has. The subject ranges from the arts and humanities, to behavioural and social sciences, to information technology. As games research spreads across several different traditional academic disciplines, problems arise such as difficulties in understanding what the research consists of, challenges linked to decision-making at different levels, communication difficulties between researchers and other stakeholders and limited access to research funds for games

research. By working for better collaboration between researchers in different areas linked to games, there is a chance to create a more comprehensive picture of how game development affects and is affected by society.

The Council also wants to increase the amount of research done in collaboration with the industry, through a greater focus on smaller games companies, by dealing with challenges around shorter work cycles in the industry compared to research, and by encouraging companies to balance the need for trade secrets with the need of providing researchers with data. A major challenge also exists in the currently poor availability of research funds for games research.

The Council wants to raise awareness among decision-makers and research funders about the field of video games and its economic and social relevance, and highlight the lack of targeted funding that leads to games research often being done within the framework of other more traditional disciplines such as healthcare, technology, psychology, etc.

The goal is to highlight the cultural and economic importance of digital games and to draw attention to the need for targeted research and to create closer ties and collaboration between the industry and academia to make the games industry and its importance visible.

At the international level, there is DiGRA, the Digital Games Research Association, which compiles games research from around the world.

Game Education Map

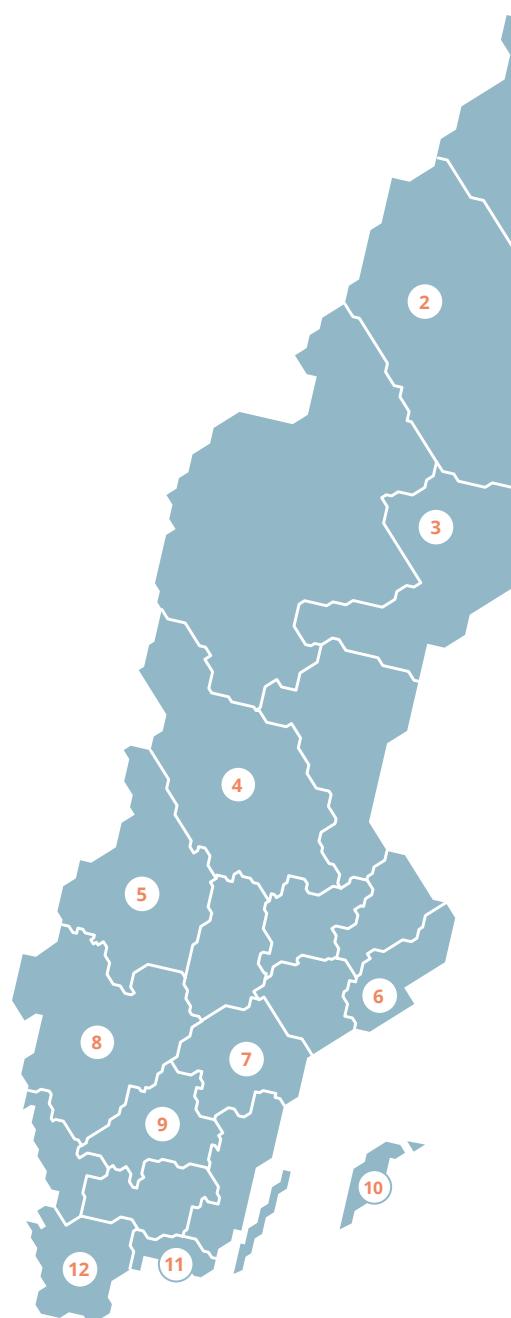
The map lists all CSN-eligible game development programmes at post-secondary level that started in the autumn of 2022.

The list below includes the number of students and education programmes that started in each location in autumn 2022 at HVEs, colleges and universities. In addition to these, there are students at two engineering programmes at Linköping University where game development is an elective, as well as adjacent education programmes with a broader focus.

The number of students in the folkhögskola is not included due to lack of data.

The table below goes through the number of programmes that commenced in the autumn of 2022 in game development at HVEs, colleges and universities. For the HVEs, this is the number of admitted students who have started the education in the autumn of 2022, and for higher education institutions, we have during the period November-December 2022 requested information on the number of registered students on the included educations that started the same semester.

Region	Number of educations	Students at Colleges & Universities	Students at HVEs
Västerbotten & Norrbotten <i>Arctic Game</i>	13	65	185
Stockholm	12	168	234
Dalarna	3	-	50
Gotland	6	167	-
Västra Götaland <i>Sweden Game Arena</i>	16	304	55
Skåne & Blekinge <i>Game Habitat/Gameport</i>	8	139	109
Värmland <i>The Great Journey</i>	2	-	25
Total	61	843	658





NORRBOTTEN 1

Boden

Sunderby Folkhögskola
Indie Game Developer

Changemaker Educations AB

Futuregames Game Artist
Futuregames / Game Tester,
Futuregames Game Designer,
Futuregames Game Programmer

Luleå

Luleå University of Technology
Civilingenjör Datateknik-
inriktning Interaktiva system

VÄSTERBOTTEN 2

Skellefteå

Luleå University of Technology
Bachelor's Programme in Computer Graphics for Games and Film
Bachelor's Programme in Computer Game Programming

CHANGEMAKER EDUCATIONS AB

Futuregames Game & UX Designer,
Futuregames Game Artist,
Futuregames Game Programmer
Mobile Platforms,
Project Manager IT & Games

SKELLEFTEÅ KOMMUN VUXEN-UTBILDNINGEN / VISUAL MAGIC

VFX-artist: 3D-visualisering och
digital compositing

VÄSTERNORRLAND 3

Kramfors

Höga Folkhögskola

Indiespelutveckling

DALARNA 4

Falun

Tension Education AB

Playgroundquad, Game Designer,
Playgroundquad, Game Artist
Playgroundquad, Game Pro-
grammer

VÄRMLAND 5

Karlstad

Kristinehamns Folkhögskola

Indiespelutvecklare,

Changemaker Educations AB

Futuregames Game Artist,
Futuregames Game Programmer
Mobile Platforms

REGION STOCKHOLM 6

Huddinge

Södertörn University

Spelprogrammet - inriktning grafik,
Spelprogrammet - inriktning spel-
design och scripting

Stockholm

Stockholm University

Bachelor's Programme in Com-
puter Game Development

Changemaker Educations AB

Futuregames Game Artist,
Futuregames Game Designer,
Futuregames Immersive
Experience Creator,
Futuregames Game Programmer

FORSBERGS SKOLA

Forsbergs, Game Programming

TGA Utbildning AB

Leveldesigner,
Spelgrafiker,
Spelprogrammerare

BOTKYRKÄ

Botkyrka kommun / Xenter

Botkyrka

VFX-artist

ÖSTERGÖTLAND 7

Linköping

Linköping University

Master of Science in Computer
Science and Software Engineering,
Bachelor's Programme in Com-
puter Game Development

Valla Folkhögskola

Valla Game Education

VÄSTRA GÖTALAND 8

Gothenburg

Chalmers University of Technology

Interaction Design and
Technologies, MSc Programme

University of Gothenburg

Game Design & Technology
Master's Programme

Gothenburg Municipality, Yrgo

Game Creator Artist,
Game Creator Programmer

SKÖVDE

University of Skövde

Dataspelsutveckling - 2D-grafik,
Dataspelsutveckling - 3D-grafik,
Dataspelsutveckling - animation,
Dataspelsutveckling - design,
Dataspelsutveckling - Game
Writing,
Dataspelsutveckling - ljud,
Dataspelsutveckling - musik,
Dataspelsutveckling - program-
mering,
Digital Narration: Game and Cul-
tural Heritage - Master's Programme
Games User Experience - Master's
Programme,
Serious Games - Master's Pro-
gramme,
Game Development - Master's
Programme

REGION JÖNKÖPING 9

Jönköping

Ädelfors Folkhögskola
Indie Game Studio

GOTLAND 10

Visby

Uppsala University

Bachelor's Programme in
Game Design,
Bachelor's Programme in
Game Design and Graphics,
Bachelor's Programme in
Game Design and Programming,
Bachelor's Programme in Game
Design and Project Management,
Master's Programme in
Game Design (1 year),
Master's Programme in
Game Design (2 years)

BLEKINGE 11

Karlskrona

Blekinge Institute of Technology
Design av digitala och
immersiva upplevelser

Karlskrona

Blekinge Institute of Technology
Civilingenjör i spelteknik

SKÅNE 12

Vellinge

Östra Greve Folkhögskola
Virtuell kompositör och
ljuddesigner

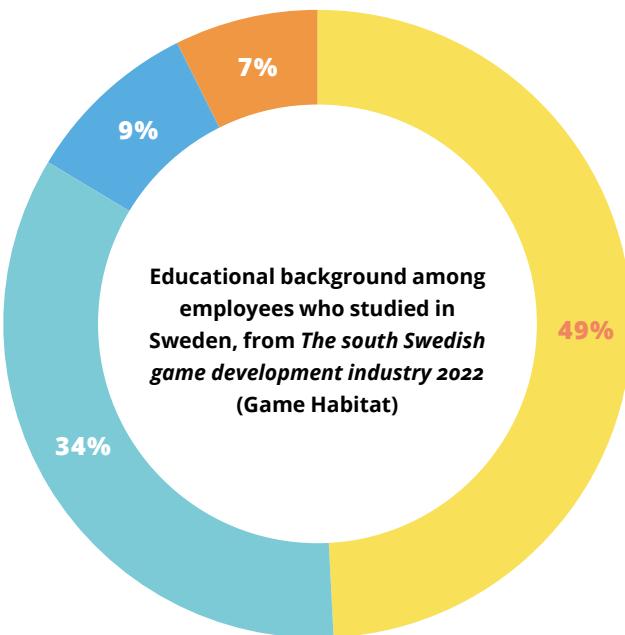
Malmö

Malmö University

Spelutveckling
The Game Assembly
Leveldesigner,
Spelanimatör,
Spelgrafiker,
Spelprogrammerare,
Technical artist

Statistics

Game education is central to the skills supply of the industry. Most people who work with game development have attended an education in the same subject, but the number of graduates from Swedish game education amount to less than half of the number of new jobs in the industry each year.



Educational Background among those who studied in Sweden

- Higher Vocational Education: 49%
- Academic Education (College & University): 34%
- HVE & Academic Education: 9%
- Other: 7%

The number of applicants for the country's game education programmes is large and exceeds the number of education places many times over. In the autumn of 2022, 1,501 people were admitted to a game education in Sweden. 400 of these, just under 27%, were women. This figure can be compared to the average percentage of women employed in the industry which is 22.1%.

The graduation rate differs between those educated at HVEs and those educated in academia. For the HVEs, in 2021, 82% of all students graduated from the game development programmes at HVE, that is, 281 people. Broken down by subject, 82.6% of all game artists,

88.3% of all game designers and 72.7% of all game programmers graduated. On average, 87% of all those who had completed a game education had a job one year after graduation, the vast majority in game-related professions.

At colleges and universities, many drop out at the beginning of the semester, partly due to an over-intake of international students. In the autumn of 2022, 1,019 people were admitted to a game education programme at a college or university, but in November/December there were only 843 people registered at the programmes. Among those admitted, the estimated graduation



Eddie Cyrillus,
PlaygroundSquad



Max Kock,
The Game
Assembly

26,5%

**of all Game Development
Students are Women**

**1,348 people were newly
hired in Swedish game
development companies
in 2021, however, only
616 people graduated
from a game education
during that same period.**

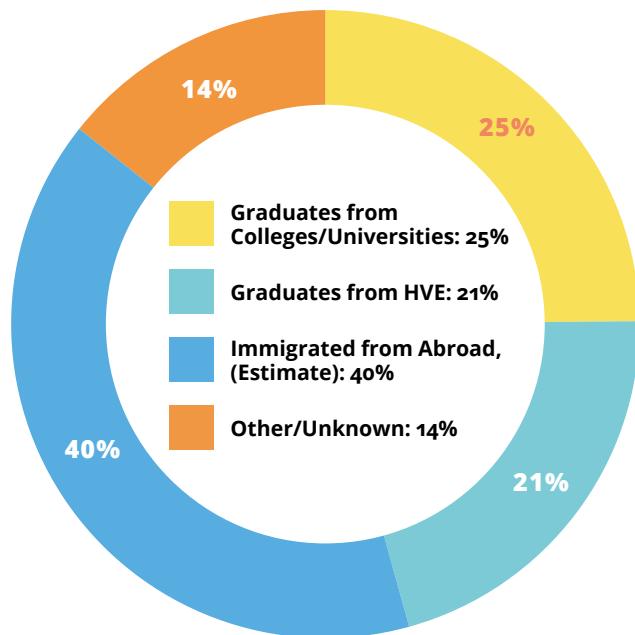
rate is around 35%. In 2021, 335 people graduated from college and university programmes with game development as their main focus.

Of these, 41 people received a master's degree. In addition, some graduated from technical programmes with a game development focus.

Among those who work in the industry and have a post-secondary education from Sweden, the vast majority have had an education in games. According to *South Sweden Games Industry 2022* (Game Habitat), around 70% have attended an education in game development, with the rest coming from various other, often more general educations in, for example, programming, music or from completely different fields.

In 2021, there were a total of 616 graduates from the HVEs and the higher education institutions' game education programmes that entered the labour market in the same year that 1,348 new positions were filled in the games industry alone. This corresponds to just under half of the new hires and is a hefty deficit of skilled labour entering the industry.

If you assume that the same proportion of those who were admitted to an education in the autumn of 2022 graduate as in 2021, it is estimated that 892 of the 1,677 people who were admitted to a game education will graduate. This means that the number of graduates does not even reach half of how many people the industry is estimated to need in terms of recruitment.



1,348 Newly Hired in 2021

What the distribution of newly appointed positions in the games industry in 2021 might have looked like if all graduated game developers in the same year went directly to work in the industry. The estimate of 40% foreign game developers is based on the companies' own reports. The group of others includes recruitment from other industries as well as recruitment to other professional roles outside of game development.



The gulf between the number of graduates and new hires has been a consistent challenge for the industry, which has been addressed in two previous reports, the [*Nordic Game Education Index 2016*](#) (The Swedish Games Industry) which reviews the Nordic game educations, and [*Swedish Game Education 2001-2016*](#) (Berg Marklund,

University of Skövde), both of which found that fewer people graduate each year than are employed.

According to the *Nordic Game Education Index 2016*, around 75-80% of students at the HVE graduated every year up to the year 2017, of which 87% had found a job in the industry within six months. For the university and college programmes, the estimated graduation rate was around 40%. The report noted that there was a significant gap between the number of graduates each year and the number of new hires. Between 2016 and 2018, it was estimated that around 350 people graduated each year from a game education while around 450 people were hired in the industry on average each year. Given the high employment figures from the HVE and the gap between the number of graduates and new employees, the report concluded that there was a need for more education places.

Swedish Game Education 2001-2016 stated that the number of degrees from universities and colleges exceeded the number of new positions in the industry until 2012. However, from 2013 onwards, the number of degrees per year has stagnated, while the demand for new hires has continued to grow. Figures from 2015 showed that there were 573 graduates, compared to 583 new positions in the industry in the same year. Back then, the discipline of game education was very

broad, and more programmes were included in the calculations than would make the cut today. The gap between the number of graduates and the number of new open positions has since continued to widen significantly.

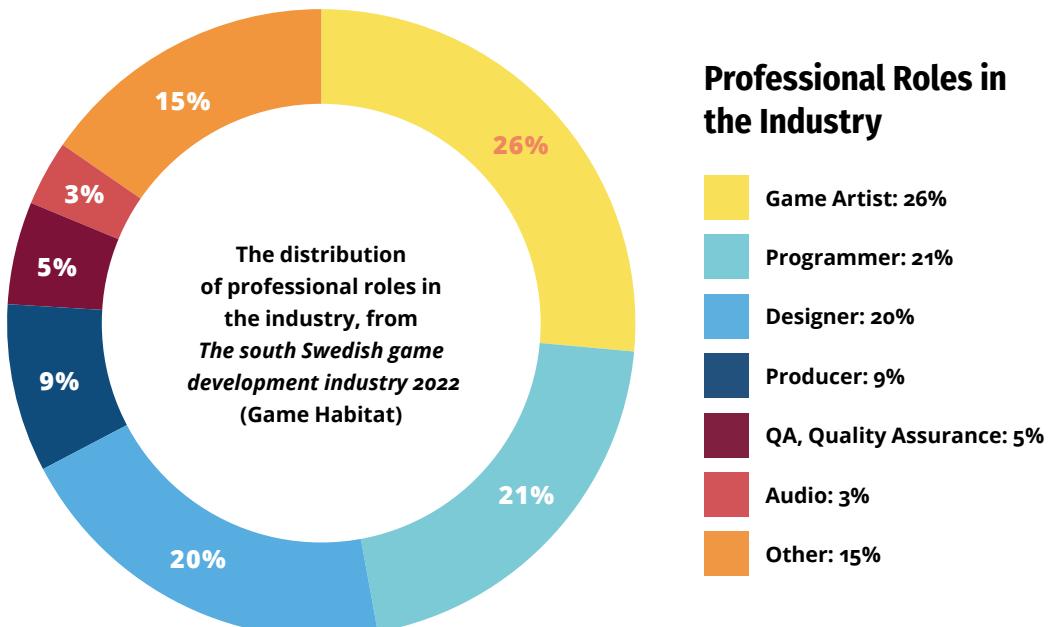
The vast majority of people working in the industry are full-time employees at companies with multiple employees. Based on company data from the *Game Developer Index* 2022, the proportion of consultants and freelancers in the industry is small. It is estimated that there are between 50-100 people in the country who make a living freelancing or consulting in game development, and about as many freelance as a side business.

In 2015, 573 people graduated from a game education in Sweden. In 2021, the number of graduates had increased to 616 people. Between 2015-2021 the average number of new hires was 750 people a year.



Professional Roles in the Industry

The professional group dubbed game developers includes all professions that work with developing games. In isolated cases, it may be one and the same person, but usually it is several different people who work together.



About a fifth of all employees of games companies work in programming. Around a quarter work in various graphic art professions. A large proportion also work with level creation and design of the mechanics and game worlds that build up the game. On top of that, there's QA testers, community managers, producers, marketers, analysts, and a range of other professional roles both game-specific and more general.

Game Artist

The game artist creates the game's visual expressions such as 3D models, textures, and environments. Creativity is at the core of the process. There are different types of game artists, but the most common are 3D graphic artists, 2D graphic artists, animators, and tech

artists. At smaller companies, the tasks are often broader and more generalised, while at larger companies, the professional role is often more specialised.

A game artist's tasks include everything from modeling and animation to texturing, illustration, drawing and concept. 3D artist or 3D graphic artist is a relatively broad term that can sometimes be used for an animator, texture artist and/or tech artist. 2D graphic artists often have a greater need for illustration skills. A concept artist produces visual sketches that describe and convey the artistic vision of the game, developing the characters, environments and feel of the game. The concepts that are approved are then further developed by a 2D or 3D graphic artist who then creates a model based on the images that will be used in the game. The concept art is also often used in the marketing of the game.

Designer

The game designer and level designer are designing how the game will be played and how it will be experienced. A game designer often has a more senior and overarching role, while a level designer works with more specific elements, such as how a level should be played and experienced.

The Game Designer is responsible for the development and implementation of the overarching game concept. This applies to all elements of the game, not least gameplay (rules and conditions for a good gaming experience) in all its parts (game mechanics, game balance, game navigation, plot structures, story, gamification and user experience (UX)).

In collaboration with the producer, the game designer is responsible for planning and evaluating the scope of the work in relation to time and resources. In addition, the game designer is responsible for the structure of the game design in the comprehensive design document.

Level Design is the process of designing, creating and balancing levels, missions, and quests for a video game. Usually, software specifically developed for this task is used, so-called level editors, such as QuArK, GtkRadiant, Valve Hammer Editor or UnrealEd. In addition, in many game productions, internal tools are created to make levels, as the general ones are not always suitable.

Programmer

The work of the game programmer has a theoretical basis and is often not so different from programmers in other industries. The tasks mostly consist of writing code that "brings the game to life" by creating functions and logical connections. The programmer builds the framework and tools that make the game work. Game programmers are sometimes divided into gameplay, tools, and engine programmers.

A lead programmer, a type of senior programmer, participates in pre-production with responsibility for what is programmatically possible. The lead is also responsible for dividing the design document into more programmable sub-goals and that deadlines for these are met. A lead programmer collaborates with the producer to plan and evaluate the scope of work in relation to time and resources.

Some game companies program their own game engine, the framework that governs the game's functions, while others make use of existing game engines. Unreal Engine and Unity are two of the most common commercial game engines on the market today.

Ubisoft Massive has developed the Snowdrop game engine used in Ubisoft games worldwide. EA DICE has developed the Frostbite game engine used in EA games worldwide, and King has developed its own engine, Defold, which is free to use for game development.



Liberosis, Game Project, PlaygroundSquad



Jessica Karlsson,
University of Skövde

Other Roles

QA, QUALITY ASSURANCE or game tester as it is also sometimes called is responsible for quality assuring the overall experience of the game. It often involves finding and identifying various bugs before the game is released.

DIGITAL MARKETING includes different types of positions that all in one way or another are engaged in promoting games. These include Social Media Managers, Search Engine Optimizers or SEOs who make the game more visible in search engines, Community Managers who manage the relationship with the players, User Acquisition who tries to expand the player base, Stream Staff who work to spread the game's content via streamers and streaming platforms such as YouTube or Twitch.

ANALYTICS refers to the analysis and communication of data relevant to a games company. Positions in this professional category include Business Intelligence Developers or BI Developers and Data Analysts.

THE PRODUCER leads the game project and is thus responsible for ensuring that everything works and that the production is completed on time with the quality that the client (or their own company) demands.

At larger companies, it is often a producer who takes care of the actual development process before the game is launched. After the launch, it is often another producer who takes over, a so-called Live Producer. He or she is responsible for the game, the brand, and its community once it's out on the market. The producer has an overall responsibility for the project's design documents and that the other employees deliver their respective parts.

Specialists

Several companies are in need of individuals with a more specialised professional role than artist or designer, who excel at very specific skills. These roles include:

- **Animators** who create movement for 2D and 3D models.
- **Tech Artists** who work as intermediaries for game artists and programmers, whose work is both technical and creative.
- **VFX-artists** who create visual special-effects for the game.
- Within **User Experience (UX)** and **User Interface (UI)**, designers and artists work to create controls and user input systems and to make sure the player receives the right feedback.
- A **Lighting Artist** specialises in lighting for games.

Game Projects and Communication

Learning to communicate between different professional roles is one of the most important experiences required in game development, something you'll learn doing practical work in game projects, which is often a core component of the various education programmes on offer.

A new game often starts with an idea. What happens next depends on what kind of game it is, for which platforms they're made and for what target group. A typical process for how a game comes to life is described here.

To create a game, a team with different skills is needed. There's a need for someone who can articulate what should happen in the game, a designer, someone who can program how it should be carried out, and someone who can visualise it with graphics. The first step is to go from idea to prototype, to create a small mini version of the game that can be shown to potential investors, publishers, and partners, and thus gather enough resources to develop the game fully. Along the way, the game is continuously tested to ensure that the game is playable and fun, and many work in iterative processes. How the game should be funded, what the player should be charged for, how it should be marketed, updated, and how customer support should be handled are other examples of questions that arise through the course of game creation.

One of the most important lessons in the *Nordic Game Education Index 2016* report was that one success factor for Swedish game education is that the included professions are trained together at the same school, which is not the case in many other countries. The competence to communicate effectively between different professions is one of the most important skills taught by the Swedish game educators and is more important than the technical professional skills. This strength of the Swedish game education is also noticeable in the statistics. Of those who work in the industry, those who have studied in Sweden more often have an education



Thor Aiff, Futuregames

in game development, while those with education from other countries more often have a general subject-specific education.

Most Swedish game education programmes work with game projects where designers, programmers and graphic artists learn how to make games from scratch together. The programmes often have a strong production focus where creativity is at the heart of the process. This helps students to both build a strong personal portfolio to use in their future job hunt and to gain experience in working in teams right from the start of their game developer journey. Three Swedish game educations in the HVE, Futuregames, The Game Assembly and PlaygroundSquad were included on [The Rookies' 2022 list of the world's best schools in game development](#).



SJOERD DE JONG EPIC GAMES



***Hi Sjoerd De Jong,
Director, Developer Community, Epic Games, Why
did you open an office in
Sweden?***

Sweden is one of the key places in the world when it comes to game development, and there is a lot of talent and experience here. Not just in design, art or audio related fields, but most importantly for us, also in engine programming, tools and engineering. We are working on things like ray tracing, water, Unreal Engine's new material rendering and so forth in our Stockholm engineering office, and photogrammetry assets and surrounding tools through our Quixel offices.

How do you think game development tools will be evolving in the years and decades ahead?

While both as Unreal Engine, and collectively as an industry, we've introduced and adopted many awesome new features and tools that have made game development more accessible and instantaneous, at its very core developing a game is still generally a complex and time consuming process. There is a lot of potential to revolutionise the way we work to make it faster for us currently in the industry, and much more accessible to the next generation of gamers, creators and starting developers. Tool user interfaces that can start off simple and then in a natural way gradually evolve with the developer's level or use case, more WYSIWYG workflows, more procedurally-assisted development, wide

access to content libraries and easier interoperability between content, tools or platforms. Our character generation tool, MetaHuman, is a clear example of where we could see things go: Anyone can figure out how to use the tool within minutes and accomplish amazing results, but at the same time the content is compatible with a production level game development pipeline and fully accessible.

You can do real-time rendering, ray-tracing and things that seemed like sci-fi only a few years ago. Is there a limit to what you can accomplish? What is next?

After having recently introduced innovations such as Nanite to handle insanely high triangle counts, one of the most exciting future major leaps forward might very well be real-time path tracing. Basically, the next step for ray tracing. If, as industry, we would be able to render games via a real-time path tracer it would dramatically improve the quality we could achieve as well as fundamentally change how we go about real-time rendering pipelines.

That is still some time away though, in the near future we expect to continue our work on ray tracing and Nanite, as well as ensuring that all use cases are covered and able to perform just as well. On our journey towards a real-time path tracer we will see increasingly sophisticated blends between some form of ray tracing and raster.

Rendering aside, in other areas of development I think that tools, development speed and ease of access are the areas where there is the greatest immediate potential and with the widest possible reach, as touched on in the previous question.

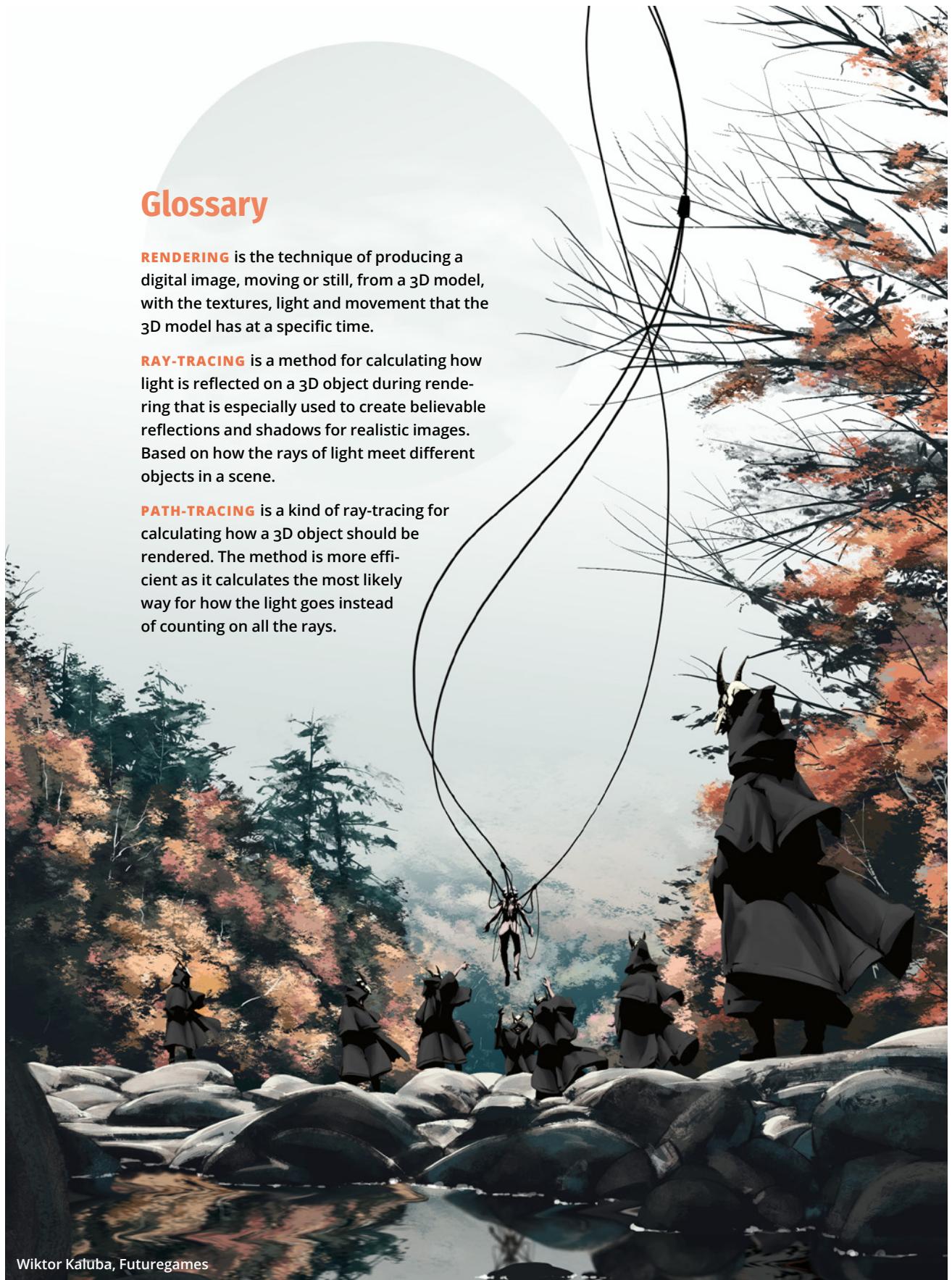


Glossary

RENDERING is the technique of producing a digital image, moving or still, from a 3D model, with the textures, light and movement that the 3D model has at a specific time.

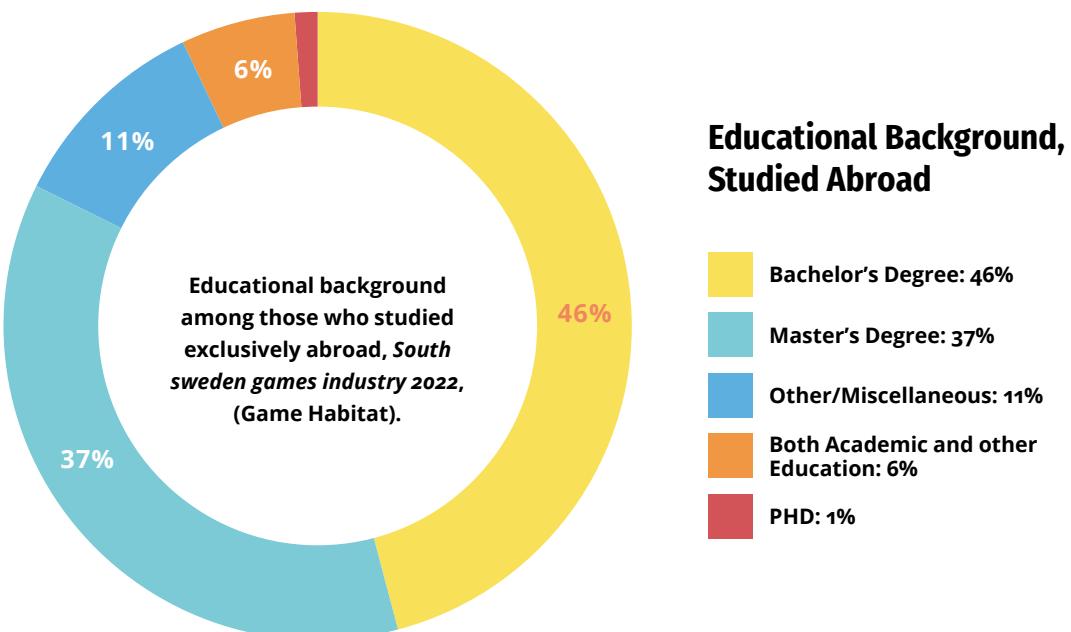
RAY-TRACING is a method for calculating how light is reflected on a 3D object during rendering that is especially used to create believable reflections and shadows for realistic images. Based on how the rays of light meet different objects in a scene.

PATH-TRACING is a kind of ray-tracing for calculating how a 3D object should be rendered. The method is more efficient as it calculates the most likely way for how the light goes instead of counting on all the rays.



Labour Immigration

A large proportion of all those who work with video game development in Sweden have moved here to work with games. Swedish game studios recruit staff from all over the world, and just over half of all those who move to Sweden to work with video games come from countries outside the EU.



At the country's largest game studio, Ubisoft's Massive Entertainment, 52% of employees have moved to Sweden to work in games from a total of 57 countries.

An exact figure for the number of employees in the Swedish games industry who come from other countries is not found in the official statistics. It is estimated, based on reports from larger companies and the polling data available, that the proportion is somewhere between a third and half of all those working in the

domestic industry. In comparison, the corresponding share in Finland is 28% ([Neogames 2021](#)). Those who have studied abroad generally have a higher level of education and more often have an academic education. Just under half of all those who have studied abroad have a game-specific education, but it is more common to have studied, for example, general programming, graphic art or design.



Frida Samuelsson,
University of Skövde

Red Tape and Bureaucratic Challenges

There are several major challenges games companies face concerning issues relating to work permits and long processing times. There are mainly three different problems facing game developers including long lead times, probationary periods and employee work bans during the application period for work permit extensions.

Lead times are far too long, especially when extending permits. It causes several consequential problems when the employee falls through the cracks. For example, the new law requiring a national visa (D-visa), made it somewhat easier to travel for business, however, for the individual the ban on making private trips is still an issue.

The problem of probationary periods became clear after the new migration law that came into force on the first of June 2022 required a ready-made employment contract attached to the application. After this change, the Migration Agency only gives work permits during probationary periods for six months instead of two

years as before. This creates **a large administrative burden** for both the Migration Agency and employers and also makes it difficult for the employee who is not allowed to register in Sweden when the permit is shorter than one year.

Due to the short work permits for probationary periods, the employee does not always have time to work for the six months required to continue working during their extension. This, in turn, leads to the **employee risking a work ban** during the application for an extension of a permit, a direct result of the long processing times.

The situation can be described as a catch-22. The processing times are so long and the permit times so short that the agency cannot keep up. The rules need to be simplified and the process automated, both to uphold the rule of law for those who come here to work and to ensure that Sweden does not lose competitiveness. If the current situation is not resolved, the image of Sweden as a great place to move for work is threatened and **it becomes more difficult for companies to recruit staff from abroad**.



Artwork on this spread: Elena Hurtado Vázquez, Uppsala University Campus Gotland

Remote Work

Most game studios conduct the main development work from a physical location where employees work together. The pandemic has led to more hybrid models where employees can choose to work remotely for some of their working hours. It has also led to an increase in more employees who work 100% remotely, sometimes based in other countries. Teleworking abroad in particular is fraught with several bureaucratic challenges. Differences between legislation in different parts of the world, as well as a desire to create equal opportunities, mean that many Swedish companies are grappling with complicated laws which drain energy and resources. Many people who work remotely today work as consultants, either through their own company or through an intermediary. This can have a somewhat negative impact on employer-worker relations, and

problems relating to issues such as the right to work and taxes quickly becomes a disproportionately large burden for the employee. Better solutions for this, within the EU, and at the global level, are needed to future-proof the competitiveness of Swedish companies in this area, and for remote employees to be able to be retained by the Swedish companies.

Different Rules for Students at HVE and in Academia

There is a significant problem facing international higher education students who come to Sweden to study to then be able to start working in the country. International students from non-EU countries studying at a university or college may stay in the country up to one year after graduation to look for work. However, these rules do not apply to international HVE students whose residence permit expires at the same time as they graduate. In practice, this means that they must start working before they graduate, otherwise they must leave the country at the end of their internship period. This means that higher vocational education becomes less attractive to international students for bureaucratic reasons, and that the investment Sweden makes in a higher vocational education place is wasted when the newly educated workforce is forced abroad as soon as they graduate.



Swedish Education in Europe

Several Swedish game education programmes admit foreign students, and some have in recent years established themselves in other countries.

Many of the programmes at colleges and universities as well as many of the programmes at the HVE are taught in English and have an international intake of students. Within the HVE, for example, all of **PlaygroundSquad's** and **Futuregames'** higher vocational educations are taught in English and accept international students. In addition, Futuregames has several online courses in English as well as offices in Nordreisa, Norway, and in Warsaw, Poland, where they plan to offer game education in the future. **Forsberg's school's** course *Game Developer – Game Programming* is in English and also accepts international students. **The Game Assembly** (TGA) will, from January 2023, offer an apprenticeship in game programming in the UK which is a higher-level supplement to their regular game programming courses.

Several of the education programmes offered by the country's colleges and universities are also given in English and have an international intake of students. In the autumn of 2022, more than 120 international students were admitted to some game education in Sweden. **Luleå University of Technology** offers its bachelor's degree programme in *Computer Game Programming*, *Computer Graphics for Games and Film* in English and accepts international students. So does **Chalmers University of Technology** when it comes to their master's programme *Interaction Design and Technologies* and the **University of Gothenburg** with their master's programme *Game Design & Technology*. **The University of Skövde** offers all of their game development programmes at postgraduate level in English and to international students as does **Uppsala University** for most of its game programmes at Campus Gotland.



Game Education in Europe

Game education is not only important for the Swedish industry but also for our Nordic and European neighbours. In many European countries, academia has become more and more active in game development in recent years.

The European Games Developer Federation (EGDF), compiles the [number of game education programmes in Europe](#). Most are in large countries such as the UK, France and Germany, but Greece, Poland and Finland are also stand outs with many higher education institutions with game development on the curriculum.

Finland has similar challenges as Sweden when it comes to skills supply in the industry, and compiles data on education and students. [According to the Finnish trade association Neogames](#), 62% of Finnish students found work in the games industry immediately after their studies, while 18% found work in other industries. In Finland, it is more common to go from a technical university into the industry than through an HVE, as the latter do not have the same emphasis on practical learning and working on interdisciplinary game projects as do many of the Swedish game educations.

Methodology

It is a challenge to summarise statistics between different levels of education in Sweden. Despite the fact that game education has existed for several decades, it is still not its own separate discipline.

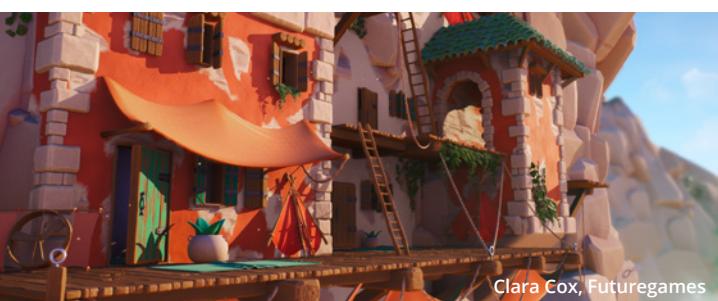
Demarcations and educational focus are clear challenges when it comes to mapping out which education teaches skills demanded by the industry. The difference between the HVEs and academic education also manifests itself in accounting methods and statistics.

To help us, we have in this report gained access to data from Game Habitat's interview study *South Sweden games industry 2022*, where Game Habitat asked more than 200 game developers in Skåne and Blekinge about their experiences and opinions about the industry. From this study comes the data on professional role distribution, educational background and nationality. It should be noted that most respondents are active in Malmö, and that the answers may differ from other regions. In Malmö, for example, there is The Game Assembly HVE, which is well-established and probably influenced the HVE's share of educational background. In places with other educational options present, the distribution is likely to look somewhat different.

For statistics on the HVEs, our data is based on data from the Swedish National Agency for Higher

Vocational Education, combined with our selection of educations that train for the industry. For admission data to colleges and universities, we have used open statistics from the Swedish Council for Higher Education, and for examination dates we have retrieved data directly from Statistics Sweden. As there is a certain dropout at the beginning of the academic education programmes between admission and registration, we have made use of the number of registered students on each program who started in the autumn of 2022. This information was collected from all current educations between November 30 and December 16, 2022. The dropout is largely due to over-intake of international students as they need to apply for a residence permit from the Migration Agency.

The proportion of those who complete an academic education has been particularly difficult to measure as game development isn't counted as its own field of study and these figures are therefore not reported separately in the official statistics. If you look at all higher education programmes in all specialisations, it is estimated that on average half of all those who start pursuing a bachelor's degree graduate (the Swedish Higher Education Authority and Statistics Sweden). With the help of investigative officials at Statistics Sweden, we have identified the graduation rate in 2021 for the games education programmes, to be around 35%. This difference in graduation rate compared to the general average may partly be due to the fact that education programmes with a special vocational degree, where the graduation rate is usually somewhat higher, account for a large proportion of degrees.





Learn More about Game Development

*Further reading and guides from other
countries aimed at aspiring game developers:*

Chips for Game Skills [Finland]:
www.pelimerkit.metropolia.fi/en

Digital School House [United Kingdom]:
www.digitalschoolhouse.org.uk

Into Games [United Kingdom]:
intogames.org

Game Campus [Germany]:
www.gamecampus.de

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